

Creating Possibility

Annual Report 2022

Financial Highlights

As of or for the year ended December 31,
(in millions, except per share, ratio data and headcount)

	2022	2021	2020
Selected income statement data			
Total net revenue	\$ 128,695	\$ 121,649	\$ 119,951
Total noninterest expense	76,140	71,343	66,656
Pre-provision profit ^(a)	52,555	50,306	53,295
Provision for credit losses	6,389	(9,256)	17,480
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Per common share data			
Net income per share:			
Basic	\$ 12.10	\$ 15.39	\$ 8.89
Diluted	12.09	15.36	8.88
Book value per share	90.29	88.07	81.75
Tangible book value per share (TBVPS) ^(a)	73.12	71.53	66.11
Cash dividends declared per share	4.00	3.80	3.60
Selected ratios			
Return on common equity	14%	19%	12%
Return on tangible common equity (ROTCE) ^(a)	18	23	14
Liquidity coverage ratio (average) ^(b)	112	111	110
Common equity Tier 1 capital ratio ^(c)	13.2	13.1	13.1
Tier 1 capital ratio ^(c)	14.9	15.0	15.0
Total capital ratio ^(c)	16.8	16.8	17.3
Selected balance sheet data (period-end)			
Loans	\$1,135,647	\$1,077,714	\$1,012,853
Total assets	3,665,743	3,743,567	3,384,757
Deposits	2,340,179	2,462,303	2,144,257
Common stockholders' equity	264,928	259,289	249,291
Total stockholders' equity	292,332	294,127	279,354
Market data			
Closing share price	\$ 134.10	\$ 158.35	\$ 127.07
Market capitalization	393,484	466,206	387,492
Common shares at period-end	2,934.2	2,944.1	3,049.4
Headcount	293,723	271,025	255,351

(a) Pre-provision profit, TBVPS and ROTCE are each non-GAAP financial measures. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60 for a discussion of these measures.

(b) Refer to Liquidity Risk Management on pages 97-104 for additional information on this measure.

(c) Refer to Capital Risk Management on pages 86-96 for additional information on these measures.

JPMorgan Chase & Co. (NYSE: JPM) is a leading financial services firm with assets of \$3.7 trillion and operations worldwide. The firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the firm serves millions of customers, predominantly in the U.S., and many of the world's most prominent corporate, institutional and government clients globally.

Information about J.P. Morgan's capabilities can be found at jpmorgan.com and about Chase's capabilities at chase.com. Information about JPMorgan Chase & Co. is available at jpmorganchase.com.



1.5 MILLION

LOW-COST CHECKING ACCOUNTS



#1

CORPORATE & INVESTMENT BANK



\$40 BILLION

TO SUPPORT VITAL INSTITUTIONS

Opened 1.5 million Chase Secure BankingSM low-cost checking accounts since 2019

Generated \$15 billion of net new income on revenue of \$48 billion

Extended \$40 billion to support vital institutions like hospitals, schools and local governments since 2021



\$2.5 TRILLION

SUSTAINABLE DEVELOPMENT TARGET



\$10 MILLION

TO SUPPORT UKRAINE



#1

CUSTOMER SATISFACTION

Financed and facilitated \$482 billion toward this target since 2021

\$10 million in humanitarian aid and philanthropic support for Ukraine – the largest giving campaign in the firm's history

Wealth Management ranked #1 in J.D. Power 2022 U.S. Wealth Management Digital Experience Study



210,000+

AFFORDABLE HOUSING UNITS



TOP 5

MOST ADMIRE COMPANIES



#1

IN DEPOSITS AND FOR SMALL BUSINESSES

Helped create or preserve over 210,000 affordable housing units and financed \$27 billion toward affordable housing since 2021

Ranked in the top five on Fortune magazine's Most Admired Companies list for the first time

Named #1 in retail deposit market share and #1 primary bank for U.S. small businesses



#1

IN ARTIFICIAL INTELLIGENCE



\$1.1 TRILLION

AWM CLIENT ASSET INFLOWS



1 MILLION

NEW CUSTOMERS

Ranked #1 on the Evident AI Index, the first public benchmark of major banks on their AI maturity

Over the last five years, Asset & Wealth Management (AWM) client asset inflows totaled \$1.1 trillion

In its first year, Chase in the U.K. acquired more than 1 million customers

Dear Fellow Shareholders,



Jamie Dimon,
Chairman and
Chief Executive
Officer

Across the globe, 2022 was another year of significant challenges: from a terrible war in Ukraine and growing geopolitical tensions – particularly with China – to a politically divided America. Almost all nations felt the effects of global economic uncertainty, including higher energy and food prices, mounting inflation rates and volatile markets, and, of course, COVID-19's lingering impacts. While all these experiences and associated turmoil have serious ramifications on our company, colleagues, clients and the countries in which we do business, their consequences on the world at large – with the extreme suffering of the Ukrainian people and the potential restructuring of the global order – are far more important.

As these events unfold, America remains divided within its borders, and its global leadership role is being challenged outside of its borders. Nevertheless, this is the moment when we should put aside our differences and work with other Western nations to come together in defense of democracy and essential

freedoms, including free enterprise. During other times of great crisis, we have seen America, in partnership with other countries around the globe, unite for a common cause. This is that moment again, when our country needs to work across public and private sectors to lead while improving American competitiveness – which also means re-establishing the American promise of providing equal access to opportunity for all. JPMorgan Chase, a company that historically has worked across borders and boundaries, will do its part to ensure the global economy is safe and secure.

In spite of the unsettling landscape, 2022 was somewhat surprisingly another strong year for JPMorgan Chase, with the firm generating record revenue for the fifth year in a row, as well as setting numerous records in each of our lines of business. We earned revenue in 2022 of \$132.3 billion¹ and net income of \$37.7 billion, with return on tangible common equity (ROTCE) of 18%, reflecting strong underlying performance across our businesses. We also maintained our quarterly common dividend of \$1.00 per share and continued to reinforce our fortress balance sheet. We grew market share in several of our businesses and continued to make significant investments in products, people and technology while exercising strict credit discipline. In total, we extended credit and raised capital of **\$2.4 trillion** for our consumer and institutional clients around the world.

I remain proud of our company's resiliency and of what our hundreds of thousands of employees around the world have achieved, collectively and individually. Throughout these challenging past few years, we never stopped doing all the things we should be doing to serve our clients and our communities.

Adhering to our basic principles and strategies (see sidebar on Steadfast Principles on page 5) allows us to drive good organic growth and properly manage our capital (including dividends and stock buybacks), as we have

¹ Represents managed revenue.

consistently demonstrated for decades. Our performance results are shown in the charts on pages 6-12, which illustrate how we have grown our franchises, how we compare with our competitors and how we look at our fortress balance sheet. I invite you to peruse them at your leisure. In addition, I urge you to read the CEO letters in this Annual Report, which will give you more specific details about our businesses and our plans for the future.

As you know, we are champions of banking's essential role in a community – its potential for bringing people together, for enabling companies and individuals to attain their goals, and for being a source of strength in difficult times. As I often remind our employees, the work we do matters and has impact. We help people and institutions finance and achieve their aspirations, lifting up individuals, homeowners, small businesses, larger corporations, schools, hospitals, cities and countries in all regions of the world.

STEADFAST PRINCIPLES WORTH REPEATING

Looking back on the past two+ decades – starting from my time as CEO of Bank One in 2000 – there is one common theme: our unwavering dedication to help clients, communities and countries throughout the world. It is clear that our financial discipline, constant investment in innovation and ongoing development of our people are what enabled us to achieve this consistency and commitment. In addition, across the firm, we uphold certain steadfast tenets that are worth repeating.

First, our work has very real human impact. While JPMorgan Chase stock is owned by large institutions, pension plans, mutual funds and directly by single investors, in almost all cases the ultimate beneficiaries are individuals in our communities. More than 100 million people in the United States own stock; many, in one way or another, own JPMorgan Chase stock. Frequently, these shareholders are veterans, teachers, police officers, firefighters, healthcare workers, retirees or those saving for a home, education or retirement. Often, our employees also bank these shareholders, as well as their families and their companies. Your management team goes to work every day recognizing the enormous responsibility that we have to all of our shareholders.

Second, shareholder value can be built **only** if you maintain a healthy and vibrant company, which means doing a good job of taking care of your customers, employees and communities. Conversely, how can you have a healthy company if you neglect any of these stakeholders? As we have learned over the past few years, there are myriad ways an institution can demonstrate its compassion for its employees and its communities while still upholding shareholder value.

Third, while we don't run the company worrying about the stock price in the short run, in the *long run* we consider our stock price a measure of our progress over time. This progress is a function of continual investments in our people, systems and products, in good and bad times, to build our capabilities. These important investments will also drive our company's future prospects and position it to grow and prosper for decades. Measured by stock performance, our progress is exceptional. For example, whether looking back 10 years or even farther to 2004, when the JPMorgan Chase/Bank One merger took place, we have significantly outperformed the Standard & Poor's 500 Index and the Standard & Poor's Financials Index.

Fourth, we are united behind basic principles and strategies (you can see the How We Do Business principles on our website) that have helped build this company and made it thrive – from maintaining a fortress balance sheet, constantly investing and nurturing talent to fully satisfying regulators, continually improving risk, governance and controls, and serving customers and clients while lifting up communities worldwide. This philosophy is embedded in our company culture and influences nearly every role in the firm.

Fifth, we strive to build enduring businesses, which rely on and benefit from one another, but we are not a conglomerate. This structure helps generate our superior returns. Nonetheless, despite our best efforts, the walls that protect this company are not particularly high – and we face extraordinary competition. I have written about this reality extensively in the past and cover it again in

this letter. We recognize our strengths and vulnerabilities, and we play our hand as best we can.

Sixth, we operate with a very important silent partner – the U.S. government – noting as my friend Warren Buffett points out that his company's success is predicated upon the extraordinary conditions our country creates. He is right to say to his shareholders that when they see the American flag, they all should say thank you. We should, too. JPMorgan Chase is a healthy and thriving company, and we always want to give back and pay our fair share. We do pay our fair share – and we want it to be spent well and have the greatest impact. To give you an idea of where our taxes and fees go: In the last 10 years, we paid more than \$43 billion in federal, state and local taxes in the United States and almost \$19 billion in taxes outside of the United States. We also paid the Federal Deposit Insurance Corporation over \$10 billion so that it has the resources to cover failure in the American banking sector. Our partner – the federal government – also imposes significant regulations upon us, and it is imperative that we meet all legal and regulatory requirements imposed on our company.

Seventh and finally, we know the foundation of our success rests with our people. They are the frontline, both individually and as teams, serving our customers and communities, building the technology, making the strategic decisions, managing the risks, determining our investments and driving innovation. However you view the world – its complexity, risks and opportunities – a company's prosperity requires a great team of people with guts, brains, integrity, enormous capabilities and high standards of professional excellence to ensure its ongoing success.

Earnings, Diluted Earnings per Share and Return on Tangible Common Equity 2004-2022

(\$ in billions, except per share and ratio data)

	Reported			Excluding reserve release/build ¹		
	2020	2021	2022	2020	2021	2022
Net income (\$B)	\$29.1	\$48.3	\$37.7	\$38.4	\$39.1	\$40.4
Diluted EPS (\$)	\$8.88	\$15.36	\$12.09	\$11.87	\$12.35	\$12.99
ROTCE	14.4%	23.0%	17.7%	19.3%	18.5%	19.1%



■ Net income ■ Diluted earnings per share (EPS) ■ Return on tangible common equity (ROTCE)

1 Firmwide results excluding reserve release/build are non-GAAP financial measures.

2 Adjusted net income excludes \$2.4 billion from net income in 2017 as a result of the enactment of the Tax Cuts and Jobs Act.

GAAP = Generally accepted accounting principles

ROTCE = Return on tangible common equity



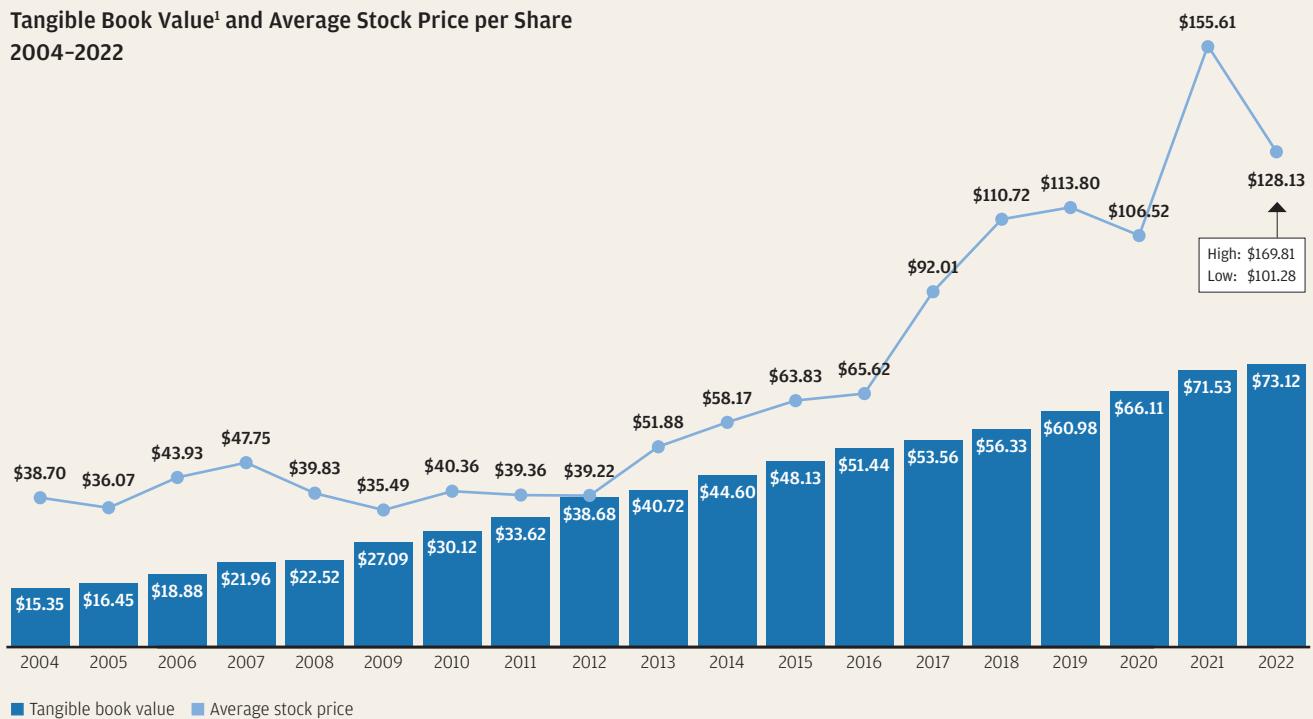
Adjusted ROTCE² was 13.6% for 2017

ROTCE excluding reserve release/build was 19.3% for 2020 and 18.5% for 2021

An important note to describe why we are showing the table above: The loan loss reserve accounting rules – which are life-of-loan estimated losses based upon probability-based economic scenarios – generate huge swings in earnings that can be unrelated to actual credit performance. This was particularly true for the COVID-19 years when, during the first six months of the pandemic, we built approximately \$16 billion in reserves. Then in the next six quarters, we released essentially the equivalent number. We did so only because the scenarios used to estimate future credit losses changed dramatically.

The table above shows reported net income, with and without loan loss reserve changes. Throughout this period, the credit portfolio was healthy, and charge-offs remained below pre-pandemic levels. Either way, the company had strong absolute and relative performance.

**Tangible Book Value¹ and Average Stock Price per Share
2004–2022**



■ Tangible book value ■ Average stock price

1 9% compound annual growth rate since 2004.

Stock total return analysis

**Performance since becoming CEO of Bank One
(3/27/2000–12/31/2022)¹**

	Bank One	S&P 500 Index	S&P Financials Index
Compounded annual gain	11.3%	6.1%	4.6%
Overall gain	1,047.8%	287.7%	176.1%

**Performance since the Bank One and JPMorgan Chase & Co. merger
(7/1/2004–12/31/2022)**

	JPMorgan Chase & Co.	S&P 500 Index	S&P Financials Index
Compounded annual gain	9.9%	8.9%	4.4%
Overall gain	471.6%	386.8%	120.0%

Performance for the period ended December 31, 2022

	Bank One	S&P 500 Index	S&P Financials Index
Compounded annual gain/(loss)			
One year	(12.6)%	(18.1)%	(10.5)%
Five years	7.7%	9.4%	6.4%
Ten years	14.9%	12.6%	12.1%

This chart shows actual returns of the stock, with dividends reinvested, for heritage shareholders of Bank One and JPMorgan Chase & Co. vs. the Standard & Poor's 500 Index (S&P 500 Index) and the Standard & Poor's Financials Index (S&P Financials Index).

1 On March 27, 2000, Jamie Dimon was hired as CEO of Bank One.

Client Franchises Built Over the Long Term

		2006	2012	2021	2022	
Consumer & Community Banking	Average deposits (\$B) ¹	\$204	\$414	\$1,055	\$1,163	■ Serve 79M U.S. consumers and 5.7M small businesses
	Deposits market share ²	4.4%	7.1%	10.3%	10.9%	■ 63M active digital customers ⁸ , including 50M active mobile customers ⁹
	# of top 50 markets where we are #1 (top 3)	7 (14)	7 (18)	8 (25)	11 (25)	■ Primary bank relationships for 78% of consumer checking accounts
	Business Banking primary market share ³	5.1%	6.2%	9.2%	9.3%	■ #1 retail deposit share
	Client investment assets (\$B) ¹	~\$80	\$159	\$718	\$647	■ #1 deposit market share position in each of the largest banking markets in the country (NYC, LA and Chicago) while maintaining branch presence in all contiguous 48 U.S. states
	Total payments volume (\$T) ⁴	NA	\$1.8	\$5.0	\$5.6	■ #1 primary bank for U.S. small businesses
	% of digital non-card payments ⁵	<25%	~40%	75%	77%	■ #1 U.S. credit card issuer based on sales and outstandings ¹⁰
	Credit card sales (\$B)	\$257	\$381	\$894	\$1,065	■ #2 among lenders in the J.D. Power 2022 U.S. Mortgage Origination Satisfaction Study ¹¹
	Debit card sales (\$B)	NA	\$205	\$467	\$491	■ #2 owned mortgage servicer ¹²
	Debit and credit card sales volume (\$B)	NA	\$586	\$1,361	\$1,555	■ #3 bank auto lender ¹³
	Credit card sales market share ⁶	16%	20%	22%	22%	
	Credit card loans (\$B, EOP)	\$153	\$128	\$154	\$185	
	Credit card loans market share ⁷	19%	18%	17%	17%	
Corporate & Investment Bank	Active mobile customers (M)	NA	12.4	45.5	49.7	
	# of branches	3,079	5,614	4,790	4,787	
	# of advisors ¹	NM	2,963	4,725	5,029	
Commercial Banking	Global investment banking fees ¹⁴	#2	#1	#1	#1	■ >90% of Fortune 500 companies do business with us
	Market share ¹⁴	8.7%	7.7%	9.3%	8.0%	■ Presence in over 100 markets globally
	Total Markets revenue ¹⁵	#8	#1	#1	#1	■ #1 in global investment banking fees for the 14th consecutive year ¹⁴
	Market share ¹⁵	6.3%	8.6%	12.1%	11.7%	■ Consistently ranked #1 in Markets revenue since 2011 ¹⁵
	FICCI ¹⁵	#7	#1	#1	#1	■ J.P. Morgan Research ranked as the #1 Global Research Firm, #1 Global Equity Research Team and #1 Global Fixed Income Research Team ¹⁹
	Market share ¹⁵	7.0%	9.0%	12.3%	11.0%	■ #1 in USD payments volume ²⁰
	Equities ¹⁵	#8	#3	co-#1	#1	■ #1 in U.S. Merchant transaction processing ²¹
	Market share ¹⁵	5.0%	7.8%	11.8%	13.1%	■ #2 custodian globally ²²
	Assets under custody (\$T)	\$13.9	\$18.8	\$33.2	\$28.6	
	Average client deposits (\$B) ¹⁶	\$190	\$356	\$715	\$687	
	Firmwide Payments revenue (\$B) ¹⁷	\$5.0	\$6.7	\$9.9	\$13.9	
Asset & Wealth Management	Firmwide Payments revenue rank (share) ¹⁸	NA	NA	#1 (7.2)%	#1 (8.4)%	
	Firmwide average daily security purchases and sales (\$T)	NA	NA	\$2.9	\$3.1	
	# of top 75 MSAs with dedicated teams	36	52	66	69	■ 141 locations across the U.S. and 34 international locations, with 7 new cities added in 2022
	# of bankers	1,203	1,240	2,254	2,360	■ \$1.5B revenue from Middle Market expansion markets, up 26% YoY
	New relationships (gross) ²³	NA	NA	2,252	2,277	■ Credit, banking and treasury services to ~25K Commercial & Industrial clients and ~31K real estate owners and investors
	Average loans (\$B)	\$53.6	\$120.1	\$205.0	\$223.7	■ 18 specialized industry coverage teams
Commercial Banking	Average deposits (\$B)	\$73.6	\$195.9	\$301.5	\$294.3	■ #1 overall Middle Market Bookrunner in the U.S. ²⁶
	Gross investment banking revenue (\$B) ²⁴	\$0.7	\$1.6	\$5.1	\$3.0	■ Over 80,000 incremental affordable housing units financed in 2022 ²⁷
	Multifamily lending ²⁵	#28	#1	#1	#1	
	Mutual Funds with a 4/5-star rating ²⁸	119	172	206	203	■ 90% of 10-year JPMAM long-term mutual fund AUM performed above peer median ³³
	Client assets (\$T) ²⁹	\$1.3	\$2.0	\$4.3	\$4.0	■ Business with 61% of the world's largest pension funds, sovereign wealth funds and central banks
	Traditional assets (\$T) ^{29,30}	\$1.2	\$1.7	\$3.6	\$3.4	■ #3 in 5-year cumulative net client asset flows behind BlackRock and Morgan Stanley ³⁴
Asset & Wealth Management	Alternatives assets (\$B) ^{29,31}	\$100	\$177	\$364	\$372	■ Positive client asset flows in 2022 across all regions, with strength in brokerage, equity, custody and fixed income
	Deposits (\$B) ²⁹	\$52	\$141	\$282	\$233	■ \$988 in Alternatives fundraising over two years
	Loans (\$B) ²⁹	\$30	\$79	\$218	\$214	■ #2 in Institutional Money Market Funds AUM ³⁵
	# of Global Private Bank client advisors ²⁹	1,506	2,371	2,738	3,137	■ 49% of Asset Management AUM managed by female and/or diverse portfolio managers ³⁶
	Global Private Bank (Euromoney) ³²	#7	#3	#1	#1	

NA = Not available

NM = Not meaningful

AUM = Assets under management

EOP = End of period

FICC = Fixed income, currencies and commodities

JPMAM = J.P. Morgan Asset Management

MSA = Metropolitan statistical area

USD = U.S. dollar

YOY = Year-over-year

M = Millions

B = Billions

T = Trillions

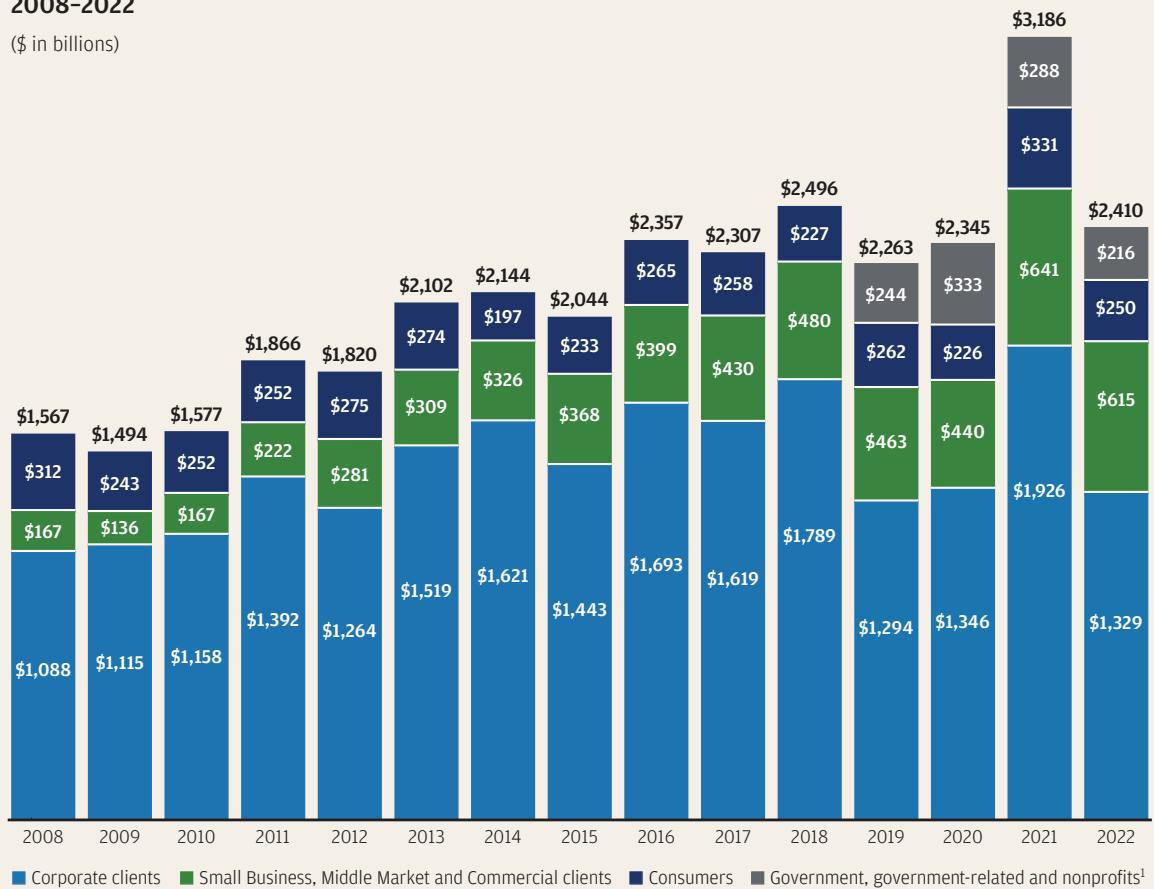
K = Thousands

For footnoted information, refer to page 43 in this Annual Report.

New and Renewed Credit and Capital for Our Clients

2008–2022

(\$ in billions)

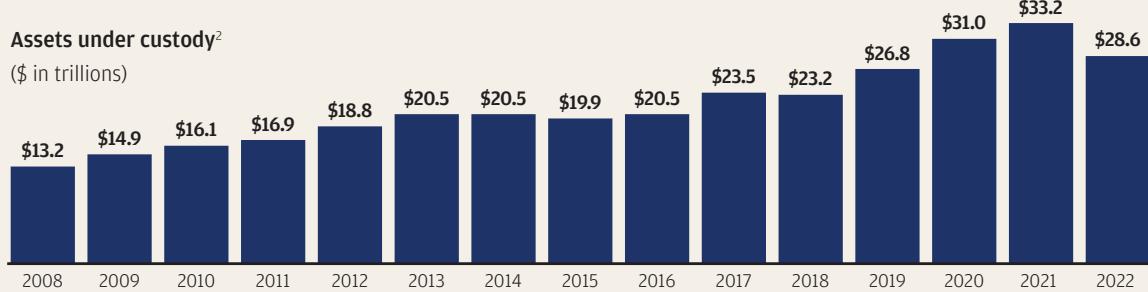
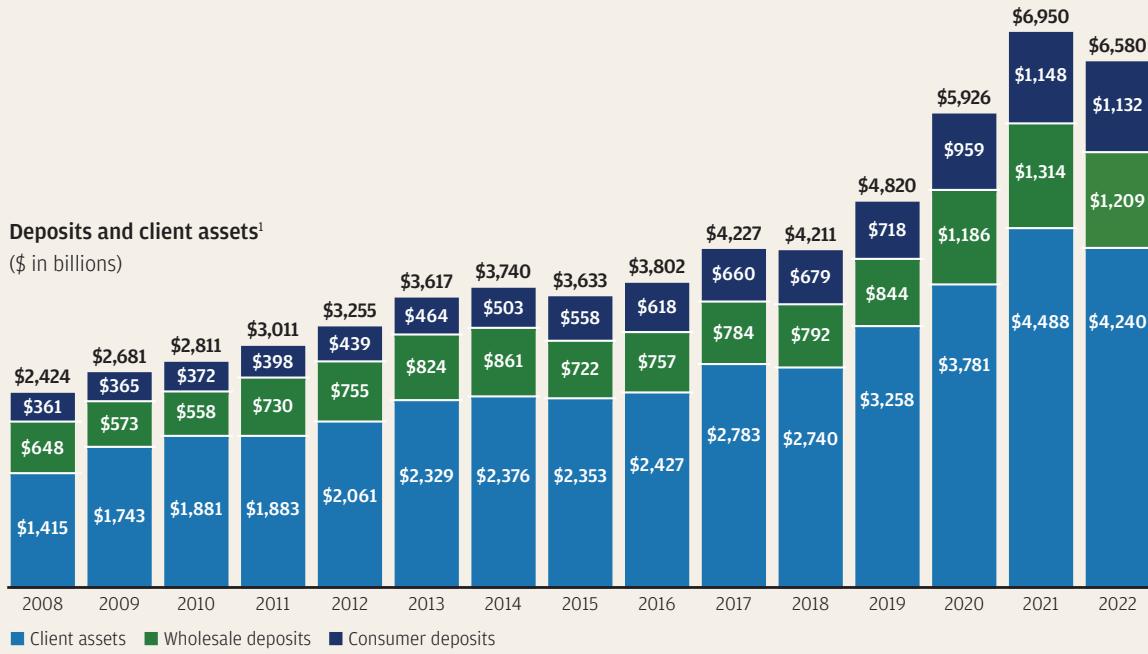


■ Corporate clients ■ Small Business, Middle Market and Commercial clients ■ Consumers ■ Government, government-related and nonprofits¹

¹ Government, government-related and nonprofits available starting in 2019; included in Corporate clients and Small Business, Middle Market and Commercial clients for prior years.

Assets Entrusted to Us by Our Clients

at December 31, 2022

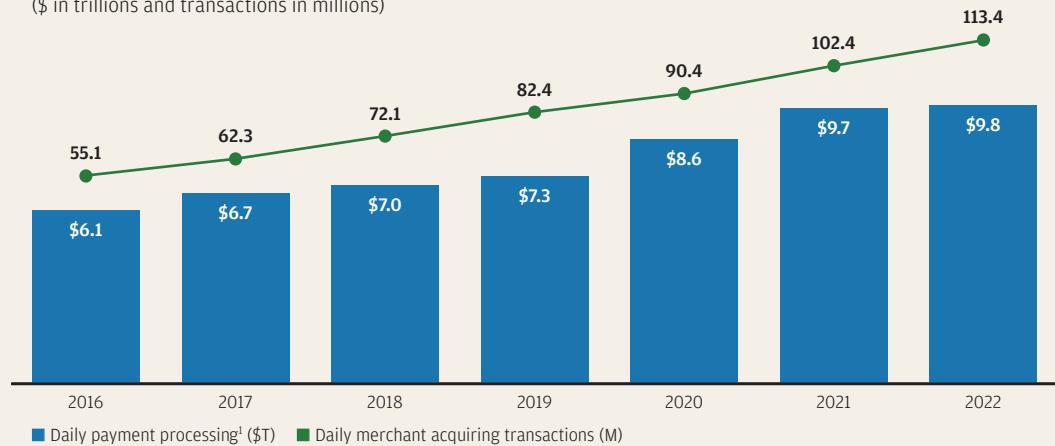


1 Represents assets under management, as well as custody, brokerage, administration and deposit accounts.

2 Represents activities associated with the safekeeping and servicing of assets.

Daily Payment Processing and Merchant Acquiring Transactions

(\$ in trillions and transactions in millions)



¹ Based on firmwide data using regulatory reporting guidelines as prescribed by the Federal Reserve Board.

M = Millions

T = Trillions

JPMorgan Chase Exhibits Strength in Both Efficiency and Returns When Compared with Large Peers and Best-in-Class Peers¹

	Efficiency		Returns		
	Overhead ratio ²	ROTCE	Efficiency		Returns
JPMorgan Chase	JPM	58%	JPM	18%	
	BAC	65%	BAC	15%	
	GS	66%	MS	15%	
	C	68%	GS	11%	
	MS	73%	C	9%	
	WFC	76%	WFC	9%	
Consumer & Community Banking	JPM 2022 overhead ratio	Best-in-class peer overhead ratio ³	JPM 2022 ROTCE	Best-in-class all banks ROTCE ^{4,6}	Best-in-class G-SIB ROTCE ^{5,6}
	57%	52% BAC-CB	29%	31% BAC-CB	31% BAC-CB
Corporate & Investment Bank	57%	55% GS-IB & GM	14%	17% GS-IB & GM	17% GS-IB & GM
Commercial Banking	41%	37% TFC	16%	20% WFC-CB	20% WFC-CB
Asset & Wealth Management	67%	61% NTRS-WM & ALLIANZ-AM	25%	41% UBS-GWM & AM	33% MS-WM & IM

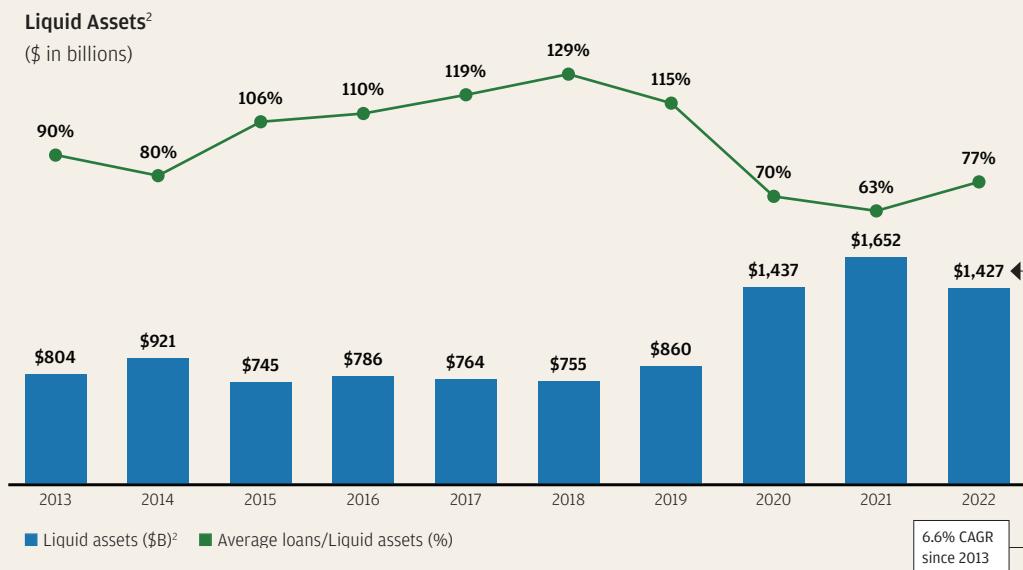
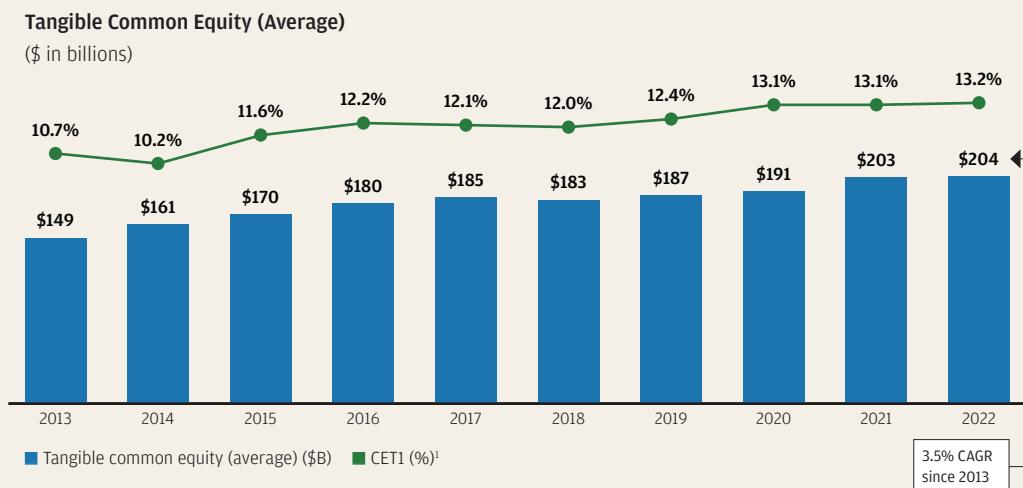
G-SIB = Global systemically important banks

ROTCE = Return on tangible common equity

For footnoted information, refer to page 43 in this Annual Report.

Our Fortress Balance Sheet

Selected data for the year ended December 31, 2022



Net income applicable to common stockholders (\$B)	\$16.6	\$20.1	\$22.4	\$22.6	\$22.6	\$30.7	\$34.6	\$27.4	\$46.5	\$35.9
Capital returned to common stockholders (\$B) ³	\$9.2	\$9.6	\$10.8	\$14.4	\$22.0	\$27.9	\$34.0	\$16.3	\$28.5	\$13.2
ROTCE (%)	11%	13%	13%	13%	12%	17%	19%	14%	23%	18%

Excellent returns

Huge capital generation (even in a recession)

- Dividends
- Investment
- Stock buyback or
- Retain if necessary

CAGR = Compound annual growth rate

CET1 = Common equity Tier 1

ROTCE = Return on tangible common equity

For footnoted information, refer to page 43 in this Annual Report.

Within this letter, I discuss the following:

WHY WE ARE PROUD OF JPMORGAN CHASE	Page 14
• United by principles and purpose	Page 14
– Our purpose	Page 15
– Highlighting our diversity, equity and inclusion efforts	Page 16
– The state of Ohio: How JPMorgan Chase drives community growth	Page 18
UPDATE ON SPECIFIC ISSUES FACING OUR COMPANY	Page 20
• Climate complexity and planning	Page 20
• AI, data and our journey to the cloud	Page 20
• Banking turmoil and regulatory goals	Page 21
• Adjusting our strategy to the new regulatory reality (Basel III Endgame)	Page 24
• Keeping an eye on all of our competitors	Page 26
MANAGEMENT LESSONS	Page 27
• Building true franchise value	Page 27
• Learning from Investor Day	Page 28
• Balancing a customer-centric approach with (excessive) risk	Page 29
SOME COMMONSENSE PRINCIPLES FOR CORPORATE GOVERNANCE	Page 30
• Promoting open communication and trust with the board	Page 30
• Confronting succession planning	Page 30
• Active engagement with asset managers	Page 31
EVALUATING AND MANAGING THE ECONOMIC AND GEOPOLITICAL RISKS AHEAD	Page 32
• The current economy: Pretty good but storm clouds ahead	Page 32
• Potential trouble brewing from unprecedented fiscal spending, quantitative tightening and geopolitical tensions	Page 33
• Preparing for what may be a new and uncertain future	Page 35
OUR SERIOUS NEED FOR MORE EFFECTIVE PUBLIC POLICY AND COMPETENT GOVERNMENT	Page 38
• Developing effective policy and effective government	Page 38
– <i>The Wall Street Journal</i> Op-Ed: “The West Needs America’s Leadership”	Page 39
• Creating a comprehensive global economic strategy	Page 40

Why We Are Proud of JPMorgan Chase

Our vision is simple and unchanged: We aim to be the most respected financial services firm in the world, serving corporations and individuals. To that end, it is imperative that we run a healthy, vibrant and responsible company. In addition to traditional banking, we do a lot to help the communities in which we operate, which, in turn, provides the foundation for increased opportunity and prosperity for all. And just to note, while we are proud of the good things we do every day, we are also an organization that acknowledges the mistakes we make along the way, which is important to do. And when we do make mistakes, we own up to them, learn from them and then move on.

UNITED BY PRINCIPLES AND PURPOSE

We've always had – and published – principles to guide how we do business, with values embedded within them, which I described in the preceding section. These tenets unite our company across the globe. To complement these guidelines, we recently developed a clearly stated purpose – ***Make dreams possible for everyone, everywhere, every day*** – to knit together our values with our everyday business principles and explain how we have done business for years.

While our company has a rich history, is proud of the critical role it plays in powering economic growth and has done exceptionally well over the past 200 years, research has shown that purpose-driven companies achieve stronger business

results and have greater impact by doing better for their customers, employees and shareholders. Our intention in documenting our purpose for ourselves is to help energize our employees, differentiate our company from our competitors, and push our organization to innovate on behalf of our clients, colleagues and communities. In addition, we are launching a new effort – internally and externally – to showcase how the work we do matters and has tangible impact locally and around the world.

In detailing the elements of our purpose, shown in the following sidebar, we have tried to make every word meaningful.

Our Purpose

The impact that JPMC aspires to have

Make Dreams Possible

for everyone, everywhere, every day

Our Vision

The ambition we hold ourselves to

We aim to be the most respected financial services firm in the world, serving corporations and individuals.

Our Values

The mindsets that unite us all

Service

We put our customers first, building with their needs in mind, providing world-class service and growing to reach people, businesses and communities everywhere.

Heart

We take pride in what we do and care deeply about our customers, communities and each other. We have a culture of teamwork, trust, humanity and humility. We create space for people to bring their full selves to work.

Curiosity

We're distinguished by our capacity to imagine and build. Our innovations are powered by a deep understanding of our customers and clients. We bring our capabilities and experience to bear on the toughest challenges in the world.

Courage

We lead with expertise, foresight and fortitude to deliver exceptional results. We face facts and make disciplined decisions grounded in data, with a long-term view. We strive to stand up for what we believe in and do the right thing.

Excellence

Our quality and rigor at scale are unmatched. We attract world-class talent and create an environment where they can thrive. We set high expectations, commit to strong performance and hold ourselves accountable to the highest standards of integrity.

Our Principles

The Business Principles that guide how we work

Exceptional Client Service**Operational Excellence****A Commitment to Integrity, Fairness and Responsibility****A Great Team and Winning Culture**

Our Promises

Our value proposition to employees, customers, communities, and shareholders

We power economic growth, serving our customers, clients and communities for over 200 years.

We uplift communities around the world, making tangible impact at scale.

We champion opportunity and enterprise that unlock equity, inclusion and sustainable growth.

We are a great place to work – an unmatched combination of humanity and excellence at scale.

We are also dedicated to corporate responsibility, and our efforts extend far beyond significant philanthropic contributions (which total more than \$350 million a year globally). For example, at the local level, we support educational institutions and work-skills training programs around the world, as well as finance affordable housing and small businesses. In addition, we help formulate broad-based policies that are good for countries on issues such as healthcare, infrastructure, education and employment. Sometimes we promote specific initiatives; for example, programs that help individuals with a criminal background get a sec-

ond chance. Lest anyone think that I've become a little soft, rest assured your CEO is a red-blooded, patriotic, free-enterprise and free-market capitalist (properly regulated, of course) and finds nothing inconsistent with the multifaceted ways we use our capabilities to lift up our communities.

Part of our corporate responsibility efforts are focused on progress toward diversity, equity and inclusion (DEI), which is detailed in the sidebar below. And the sidebar on pages 18 and 19 shows how our work on the ground translates to a particular geography, in this case the state of Ohio.

HIGHLIGHTING OUR DIVERSITY, EQUITY AND INCLUSION EFFORTS

We seek to create a company that reflects the diverse communities that we serve, a workplace in which all employees feel they belong and are respected. We believe these efforts not only make us a positive work environment, but they also make our company stronger, our business more profitable and our institution a better global corporate citizen. This objective is integrated into how we do business every day. Some of our recent progress is highlighted below:

- We continue to identify ways to support our military veterans. In 2011, along with 10 other companies, JPMorgan Chase co-founded the Veteran Jobs Mission (VJM), a coalition committed to hiring at least 100,000 veterans by 2020. Since its founding, more than 300 member companies representing various industries across the United States have reported over **880,000 veteran hires**. In 2022, VJM increased its goal to 2 million veteran hires and 200,000 military spouse hires over the next decade. JPMorgan Chase alone has hired over **18,000 veterans** since 2011 and currently employs approximately **3,000 military spouses**.
- We continue to make strides in developing a diversified workplace. By year-end, women represented 49% of the firm's total workforce. Overall, Hispanic, Asian and Black representation

grew to 21%, 18% and 14%, respectively. In 2022, the number of employees who self-identified as LGBTQ+ **increased by 35%** year-over-year, following 50% year-over-year growth in 2021.

- The firm's Office of Disability Inclusion (ODI) continues to lead strategy and initiatives aimed at advancing careers while helping the firm be a bank of choice for people with disabilities. As ODI kicked off its business growth and entrepreneurship work in 2022, it provided **business coaching to over 225 entrepreneurs with disabilities** and commissioned research with the National Disability Institute, which identified unique opportunities and challenges among small business owners who have a disability.

An update on our \$30 billion racial equity commitment

What began in 2020 as a \$30 billion, five-year commitment is now transforming into a consistent business practice that our lines of business deliver each day to support Black, Hispanic, Latino and other underserved communities.

By the end of 2022, we reported nearly **\$29 billion in progress toward our original goal**. But our focus is not on how much money is deployed – it is on long-term impact and outcomes.

Here are some details on our program's progress through 2022:

- **Supplier diversity.** In 2022, our firm spent approximately **\$2.1 billion directly with diverse suppliers** – an increase of 25% over 2021. As a part of our racial equity commitment, **\$400 million was spent** in 2022 with over 200 Black-, Hispanic- and Latino-owned businesses – more than doubling the amount spent in 2021.
- **Affordable rental housing.** Through our Affordable Housing Preservation program, we approved funding of approximately \$18 billion in loans to incentivize the preservation of nearly 170,000 affordable housing rental units across the United States. Additionally, we financed approximately \$4 billion for the construction and rehabilitation of affordable rental housing.
- **Homeownership.** In a rising rate environment, we continue our efforts to provide homeownership opportunities for Black, Hispanic and Latino households across all income levels, including advocating for policies that reduce barriers to owning a home. The biggest barriers are upfront cash for a down payment and closing costs. In 2022, we expanded our \$5,000 Chase Homebuyer Grant program to include over 11,000 majority Black, Hispanic and Latino communities. Since our grant program began in 2021, we have provided about 2,700 grants totaling \$13.5 million. We have also assisted Black, Hispanic and Latino homeowners with 11,500 incremental home loans together worth over \$4 billion, mainly driven by refinance activity when rates were low.
- **Small business.** In 2022, we launched a Special Purpose Credit Program, the first of its kind nationally, to expand credit access for small businesses in majority Black, Hispanic and Latino communities, which have traditionally been underserved. When I visited Houston last year, I met Sherice and Steve Garner, Chase customers who own a local barbecue business, Southern Q. They are examples of the types of customers we want to support. Previously, they had been using their personal bank account to run their business. We helped them secure a small business loan to purchase their business location. To assist more families like the Garners, we hired

45 local senior business consultants to provide one-on-one coaching and host educational events, community workshops and business training seminars to support minority entrepreneurs across 21 U.S. cities.

- **Minority depository institutions (MDI) and community development financial institutions (CDFI).** We invested more than \$100 million in equity in diverse financial institutions and provided over \$200 million in incremental financing to CDFIs to support communities that lack access to traditional financing. We also helped them build their capacity so they can provide a greater number of critical services like mortgages and small business loans. Additionally, we do not charge a fee for nearly all our participating MDI and CDFI customers who make a withdrawal at a Chase ATM.
- **Access to banking.** We helped **more than 400,000 customers** open low-cost checking accounts; we've also opened 13 Community Center branches (a total of **15 Community Center branches** since 2019), often in areas with larger Black, Hispanic and Latino populations; and we hired over **140 Community Managers** in underserved communities to build relationships with community leaders, nonprofits and small businesses. These Community Center branches are unique spaces in the heart of urban communities with more space than standard bank branches to host local events, small business mentoring sessions and financial health seminars. The majority were built with minority contractors from the community; we hire staff locally and we engage local artists to help ensure these locations complement their neighborhood. We have been pleased by the dramatic positive effect these specialized branches have had on their communities to date and expect to expand the program.

By driving inclusive economic growth, we can help create a brighter future for all, no matter where people live or the circumstances they're born into. We provide regular updates on our corporate website about our progress toward equity and equality, and I encourage you to read about the meaningful impact we're making within our firm and with the people we serve.

THE STATE OF OHIO: HOW JPMORGAN CHASE DRIVES COMMUNITY GROWTH

When JPMorgan Chase does business in a community, we do more than just open branches. We lend to small, midsized and big businesses; we hire, pay well and provide great benefits; and we finance hospitals, schools, grocery stores, homes, automobiles and governments. For more than 200 years, this approach has enabled us to make investments that have a lasting impact on local economies, families and neighborhoods while also supporting them in good and challenging times.

We have been in Ohio since 1812, and our experience there serves as a great example of how our resources drive growth on the ground.

Our support to government, higher education, healthcare and nonprofit organizations:

- We serve approximately 150 government, higher education, healthcare and nonprofit clients throughout the state, and over the last five years, we provided nearly \$9 billion in credit and capital to them.
- Our clients range from University Hospitals Health System, Inc. to the Ronald McDonald House in Columbus and the University of Dayton in Dayton.
- We are the primary treasury bank for Ohio State University and the primary bank for the city of Columbus; we also bank nearly 50 counties, cities and school districts across the state.

Our support to investment and middle market banking clients:

- Our support includes \$120 billion in credit and capital over the last five years for Commercial & Industrial clients such as energy, retail and auto businesses.
- We have over 4,800 large and midsized clients in Ohio, up over 70% compared with 2019, which also includes emerging middle market companies owned by veterans, women, LGBTQ+ individuals and people of color. This gives us leading market shares in the state compared with other banks.

Our support to local financial firms:

- We have provided nearly \$20 billion in credit and capital over the last five years for financial institutions such as local banks, insurance companies, asset managers and securities firms.
- Importantly, we bank 19 of Ohio's regional, midsized and community banks, helping them serve local communities and accomplish their other goals.

Our support to small businesses:

- By the end of 2022, loan balances for small business customers in Ohio totaled over \$800 million – funds being used to run and grow companies and create jobs.
 - Includes support for distribution of the federal government's Paycheck Protection Program (PPP) to help small businesses navigate the pandemic in 2020 and 2021
- In 2022 alone, JPMorgan Chase helped over 160,000 small businesses thrive and grow through access to customers, capital and networks, giving us the second largest business banking market share in the state. We also offered some 106,000 hours of advice and support to small businesses.

Our support to consumer banking needs:

- We operate nearly 225 branches and over 530 ATMs across the state.
- To help Ohioans build wealth and be financially healthy, we have provided more than 4 million savings, checking and credit card accounts, enabling these consumers to gain access to resources such as free financial health services, as well as mortgage and auto loans.
 - Ranked as the second largest provider of consumer banking in Ohio with over 2 million checking and savings accounts and customer deposits totaling nearly \$37 billion in 2022
- In 2022, we oversaw more than \$20 billion in investment and annuity assets for clients.

Our business and community investments:

- The firm's national \$30 billion racial equity commitment takes place very specifically on the ground. Since the program began, we have committed more than \$260 million across the state, including:
 - Over \$163 million in loans for Black, Hispanic and Latino households to purchase or refinance a home
 - \$54 million financed through investments and loans for the construction and rehabilitation of affordable housing
 - \$14 million in New Markets Tax Credit investments to support the Ronald McDonald House Charities in central Ohio
 - Over \$12 million spent with Black, Hispanic and Latino suppliers
- We've committed \$45 million in philanthropic support across the state since 2018 such as:
 - \$5 million to support The 614 for Linden, a CDFI and nonprofit collaborative, in Columbus, which helped catalyze a \$20 million fund for affordable housing; create or preserve nearly 750 affordable housing units; provide 57 microloans to local entrepreneurs; support technical assistance for over 100 small businesses; and increase wraparound services for prenatal care, as well as facilitate access to healthy food

Our impact as a proud employer in Ohio:

- Today, as the largest private employer in Columbus, JPMorgan Chase employs over 20,000 Ohioans throughout the state, including more than 2,000 veterans and 500 people with a criminal background who deserve a second chance.
- We also support an additional 3,200 jobs for contractors in our branches and corporate offices across the state.
- In Ohio, our average salary is \$96,000, not including benefits. Our lowest **starting** wage is \$41,000 (plus a comprehensive annual benefits package worth nearly \$15,000) compared with Ohio's **average** salary of \$35,000¹.

¹ Ohio per capita income of \$35,000 sourced from 2021 U.S. Census Bureau American Community Survey data released December 2022.

Update on Specific Issues Facing Our Company

CLIMATE COMPLEXITY AND PLANNING

The window for action to avert the costliest impacts of global climate change is closing. At the same time, the ongoing war in Ukraine is roiling trade relations across Europe and Asia and redefining the way countries and companies plan for energy security. The need to provide energy affordably and reliably for today, as well as make the necessary investments to decarbonize for tomorrow, underscores the inextricable links between economic growth, energy security and climate change. We need to do more, and we need to do so immediately.

To expedite progress, governments, businesses and non-governmental organizations need to align across a series of practical policy changes that comprehensively address fundamental issues that are holding us back. Massive global investment in clean energy technologies must be done and must continue to grow year-over-year.

At the same time, permitting reforms are desperately needed to allow investment to be done in any kind of timely way. We may even need to evoke eminent domain – we simply are not getting the adequate investments fast enough for grid, solar, wind and pipeline initiatives. Policies like the Bipartisan Infrastructure Law, the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act, and the Inflation Reduction Act (IRA) – that hold the potential to unlock over \$1 trillion in clean technology development – need to be implemented **effectively**. The upside is undeniable: Widespread investing across the private sector will aid domestic manufacturing, invigorate research and development in green innovation, help create resilient supply chains, lift up local economies and build the U.S. clean energy workforce by up to 9 million jobs over the next decade. While major advances have been made in the last few years on technology to help this cause, we are hopeful that the great American innovation machine (most advancements

will ultimately come from the huge capabilities and capital of America's **largest** companies) will find the additional technologies that are desperately needed. There is a downside – massive, inefficient and malinvestment of capital. I talk more about this in the last section on public policy.

Polarization, paralysis and basic lack of analysis cannot keep us from addressing one of the most complex challenges of our time. Diverse stakeholders need to come together, seeking the best answers through engagement around our common interest. Bolstering growth must go hand in hand with both securing an energy future and meeting science-based climate targets for future generations.

AI, DATA AND OUR JOURNEY TO THE CLOUD

Artificial intelligence (AI) is an extraordinary and groundbreaking technology. AI and the raw material that feeds it, data, will be critical to our company's future success – the importance of implementing new technologies simply cannot be overstated. We already have more than 300 AI use cases in production today for risk, prospecting, marketing, customer experience and fraud prevention, and AI runs throughout our payments processing and money movement systems across the globe. AI has already added significant value to our company. For example, in the last few years, AI has helped us to significantly decrease risk in our retail business (by reducing fraud and illicit activity) and improve trading optimization and portfolio construction (by providing optimal execution strategies, automating forecasting and analytics, and improving client intelligence).

We currently have over 1,000 people involved in data management, more than 900 data scientists (AI and machine learning (ML) experts who create new models) and 600 ML engineers (who write the code to put models in production). This group is

focused on AI and ML across natural language processing, time series analysis and reinforcement learning to name a few. We're imagining new ways to augment and empower employees with AI through human-centered collaborative tools and workflow, leveraging tools like large language models, including ChatGPT.

We also have a 200-person, top-notch AI research group looking at the hardest problems and new frontiers in finance. We were recently ranked #1 on the Evident AI Index, the first public benchmark of major banks on their AI maturity. We take the responsible use of AI very seriously and have an interdisciplinary team of ethicists helping us prevent unintended misuse, anticipate regulation, and promote trust with our clients, customers and communities. AI and data use is complex; it must be done following the laws of the land. But it is an absolute necessity that we do it both for the benefits I just described and, equally, for the protection of the company and the financial system – because you can be certain that the bad guys will be using it, too.

All of our technology groups firmwide work together in a flywheel of innovation and deliver state-of-the-art improvements. We are proud that our AI teams have contributed top-quality novel research and compelling solutions that are transforming more and more business cases every day.

AI is inextricably linked with cloud-based systems, whether public or private, and digital capabilities. Our company needs the cloud for its on-demand compute capacity, flexibility, extensibility and speed. Native cloud-based approaches will ultimately be faster, cheaper and aligned with the newest AI techniques, and they will give us easy access to constantly evolving developer tools.

We have spent over \$2 billion building new, cloud-based data centers and are working to modernize a significant portion of our applications (and their related databases) to run in both our public and private cloud environments. To date, we have migrated approximately 38% of our applications to the cloud, meaning over 50% of our application portfolio (this includes third-party, cloud-based applications) is running on modern environments.

This journey to the cloud is hard work but necessary. Unlocking the full potential of the cloud and nearly 550 petabytes of data will require replatforming (putting data in a cloud-eligible format) and refactoring (i.e., rewriting) approximately 4,000 applications. This effort will involve not just the 57,000 employees we have in technology but the dedicated time of firmwide management teams to help in the process.

BANKING TURMOIL AND REGULATORY GOALS

The recent failures of Silicon Valley Bank (SVB) in the United States and Credit Suisse in Europe, and the related stress in the banking system, underscore that simply satisfying regulatory requirements is not sufficient. Risks are abundant, and managing those risks requires constant and vigilant scrutiny as the world evolves. Regarding the current disruption in the U.S. banking system, most of the risks were *hiding in plain sight*. Interest rate exposure, the fair value of held-to-maturity (HTM) portfolios and the amount of SVB's uninsured deposits were always known – both to regulators and the marketplace. The unknown risk was that SVB's over 35,000 corporate clients – and activity within them – were controlled by a small number of venture capital companies that moved their deposits in lockstep.

It is unlikely that any recent change in regulatory requirements would have made a difference in what followed. Instead, the recent rapid rise of interest rates placed heightened focus on the potential for rapid deterioration of the fair value of HTM portfolios and, in this case, the lack of stickiness of certain uninsured deposits. Ironically, banks were incented to own very safe government securities because they were considered highly liquid by regulators and carried very low capital requirements. Even worse, the stress testing based on the scenario devised by the Federal Reserve Board (the Fed) never incorporated interest rates at higher levels. This is not to absolve bank management – it's just to make clear that this wasn't the finest hour for many players. All of these colliding factors became critically important when the marketplace, rating agencies and depositors focused on them.

As I write this letter, the current crisis is not yet over, and even when it is behind us, there will be repercussions from it for years to come. But importantly, recent events are nothing like what occurred during the 2008 global financial crisis (which barely affected regional banks). In 2008, the trigger was a growing recognition that \$1 trillion of consumer mortgages were about to go bad – and they were owned by various types of entities around the world. At that time, there was enormous leverage virtually everywhere in the financial system. Major investment banks, Fannie Mae and Freddie Mac, nearly all savings and loan institutions, off-balance sheet vehicles, AIG and banks around the world – all of them failed. This current banking crisis involves far fewer financial players and fewer issues that need to be resolved.

These failures were not good for banks of any size.

Any crisis that damages Americans' trust in their banks damages *all banks* – a fact that was known even before this crisis. While it is true that this bank crisis "benefited" larger banks due to the inflow of deposits they received from smaller institutions, the notion that this meltdown was good for them in any way is absurd.

Let's be very thoughtful in our reaction to recent events.

While this crisis will pass, lessons will be learned, which will result in some changes to the regulatory system. However, it is extremely important that we avoid knee-jerk, whack-a-mole or politically motivated responses that often result in achieving the opposite of what people intended. Now is the time to deeply think through and coordinate complex regulations to accomplish the goals we want, eliminating costly inefficiencies and contradictory policies. Very often, rules are put in place in one part of the framework without appreciating their consequences in combination with other regulations. America has had, and continues to have, the best and most dynamic financial system in the world – from various types of investors to its banks, rule of law, investor protections, transparency, exchanges and other features. We do not want to throw the baby out with the bath water.

We should have common goals on how we want the banking system to work.

- **We want to strengthen regional, midsized and community banks, which are essential to the American economic system.** They fill a critical role in small communities, offering local knowledge and local relationships that some large banks simply can't provide – or can't provide cost-effectively. Overall, we want to maintain the extraordinary strength this tiered system affords. JPMorgan Chase directly supports this goal as we are one of the largest bankers in America to regional and community banks. We bank approximately 350 of America's 4,000+ banks across the country. This means we make loans to them or raise capital for them. In addition, we process payments for them, finance some of their mortgage activities, advise them on acquisitions, provide them with interest rate swaps and foreign exchange, and buy and sell securities for them. And we also finance their local communities (think hospitals, schools and larger companies) in ways they cannot.
- **We need large, complex banks to continue to play a critical role in the U.S. and global financial system.** And we need to recognize that they do so in a way regional banks can't. Large banks are complex not because they want to be but because they operate in complex global markets. Regional banks simply cannot manage the scale and complexity of transactions in 50 or 60 countries around the world to help some of America's best and largest companies accomplish their goals. Think of equity, debt, M&A, research, swaps, foreign exchange, large payments systems, global custody and so on. It takes a global workforce with deep expertise and significant capabilities to provide these services. These large global banks finance not just the world's largest companies but the world's development institutions and even countries. Having some of the best large, complex banks in the world is essential to the success of America's biggest companies, its economic system and its global competitiveness, which says nothing against the importance of having great midsized and community banks as well. And contrary to

what some say – to be safe, a global bank needs both huge economies of scale and the strength of diversified earnings streams.

- **We should want a system in which a bank failure does not cause undue panic and financial harm.** While you don't want banks to fail all the time, it should be allowed to happen, and the resolution should follow a completely prescribed process. In almost all bank failures, uninsured deposits never resulted in lost money – but the very fear of loss can cause a run on any bank having characteristics similar to a bank that has failed. Resolution and recovery regulations did not work particularly well during the recent crisis – we should bring clarity and reassurance to both the unwinding process and measures to reduce the risk of additional bank runs. It should also be noted that banks pay for any bank failure (through fees paid to the Federal Deposit Insurance Corporation) as they pay for the whole financial regulatory system. And yes, while these costs are ultimately passed on to their customers – that is true for all industries – the cost is just the price of implementing proper regulations.
- **We want proper transparency and strong regulations.** However, it should be noted that regulations, the supervisory regime and the resolution regime currently in place did not stop SVB and Signature Bank from failing – and from causing systemwide issues. We should not aim for a regulatory regime that eliminates all failure but one that reduces the chance of failure and the odds of contagion. We should carefully study why this particular situation happened but not overreact. Strong regulations should not only minimize bank failures but also help to maintain the strength of banks as both the guardians of the financial system and engines that finance the great American economic machine.
- **We should want market makers to have the ability to effectively intermediate,** particularly in difficult markets, with central banks only stepping in during exceptional situations. In the last few years, we have had many situations in which disruptions in the market were, in my opinion, largely caused by certain regulations that did

not improve the safety of the market maker but, instead, damaged the safety of the whole system. In addition, many of the new “shadow bank” market makers are fair-weather friends – they do not step in to help clients in tough times.

- **We need banks to be there for their clients in tough times.** And they have been. Banks can flex their capital and provide their clients with a lot of loans and liquidity when they really need it. For example, at the beginning of the COVID-19 crisis in March 2020, banks deployed over \$500 billion in liquidity for clients and \$500 billion in PPP loans – and this does not include banks' share of the nearly \$2 trillion in loans that entered forbearance. Banks also play a unique and fundamental role in the transmission of monetary policy because deposits in banks can be loaned out, effectively “creating” money. Some regulations and some accounting rules have become too procyclical and make it harder to do this.
- **Regulation, particularly stress testing, should be more thoughtful and forward looking.** It has become an enormous, mind-numbingly complex task about crossing t's and dotting i's. For example, the Fed's stress test focuses on only one scenario, which is unlikely to happen. In fact, this may lull risk committee members at any institution into a false sense of security that the risks they are taking are properly vetted and can be easily handled. A less academic, more collaborative reflection of possible risks that a bank faces would better inform institutions and their regulators about the full landscape of potential risks.
- **We should decide a priori what should stay in the regulatory system and what shouldn't.** There are reasons for certain choices, and they should not be the accidental outcome of uncoordinated decision making. Regulatory arbitrage is already forcing many activities, from certain types of lending to certain types of trading, outside the banking system. Among many questions that need definitive answers, a few big ones would be: Do you want the mortgage business, credit and market making, along with other essential financial services, inside the banking

system or outside of it? What would be the long-term effect of that choice? Under the new scheme, would nonbank credit-providing institutions be able to provide credit when their clients need them the most? I personally doubt that many of them could.

- **We need banks to be attractive investments.**

It is in the interest of the financial system that banks not become “un-investable” because of uncertainty around regulations that affect capital, profitability and long-term investing. Erratic stress test capital requirements and constant uncertainty around future regulations damage the banking system without making it safer.

While it is perfectly reasonable that a bank refrain from stock buybacks, dividends or growth under certain circumstances, it would be far better for the entire banking system if these rules were clearly enumerated (i.e., stipulate that a bank needs to reduce its buybacks and dividend if they breach certain thresholds).

If done properly, banking regulations could be calibrated – adding virtually no additional risk – to make it easier for banks to make loans, intermediate markets, finance the economy, manage a run on their bank and fail if need be. When it comes to political debate about banking regulations, there is little truth to the notion that regulations have been “loosened,” at least in the context of large banks. (To the contrary, our capital requirements have been increasing for years, as shown on the chart on page 12.) The debate should not always be about **more or less** regulation but about what **mix of regulations will keep America’s banking system the best in the world**, such as capital and leverage ratios, liquidity and what counts as liquidity, resolution rules, deposit insurance, securitization, stress testing, proper usage of the discount window, tailoring and other requirements (including potential requirements on shadow banks). Because of the recent problems, we can add to this mix the review of concentrated customers, uninsured deposits and potential limitations on the use of HTM portfolios. Ideally, new rules and regulations would also make it easier for banks to provide credit in tougher times.

ADJUSTING OUR STRATEGY TO THE NEW REGULATORY REALITY (BASEL III ENDGAME)

The Basel III Endgame (called Basel IV by some) – which, *incredibly*, has been nearly 10 years in the making – seems likely to increase, yet again, capital requirements for banks in general, through higher operational risk changes, and for trading and capital markets activity in particular, among other things. Whether or not we agree with all these changes (and we’ve discussed these regulations in detail in prior letters), we will simply have to adjust to them immediately. It’s important we describe to our shareholders how we will go about doing that and what it means for banks and, in particular, our bank.

First and foremost, banks must satisfy all of their regulators.

We must satisfy all of our regulators, and, remember, we have regulators all around the world, including more than 10 in the United States alone. Regulations include stress testing, reporting, compliance, legal obligations and trading surveillance, among others. While the business is the first line of defense on all these issues, we also have 3,700 people in compliance, 7,100 in risk and 1,400 lawyers actively working every day to meet the letter and the spirit of these rules along with the final line of defense – audit.

Rules are constantly changing and/or being enhanced and are sometimes, unfortunately, driven by political motivations. Relationships with regulators can often be intense, and, recently, we have lost some terrific people in our firm because of this. Regulators know that when banks disagree, we essentially have no choice – there is no one to appeal to, and even the act of appealing can make them angry. We simply ask respectfully to be heard, but at the end of the day, we will do what they ask us to do.

Size of the Financial Sector/Industry

(\$ in trillions)

		2010	2022
Size of banks in the financial system	Global GDP ¹	\$ 64.9	\$ 89.5
	Total U.S. debt and equity market	\$ 57.5	\$ 123.2
	Total U.S. broker-dealer inventories	\$ 4.1	\$ 4.4
	U.S. G-SIB market capitalization	\$ 0.8	\$ 1.2
	U.S. bank loans	\$ 6.6	\$ 12.1
	U.S. bank liquid assets ²	\$ 2.8	\$ 7.5
	Federal Reserve total assets	\$ 2.4	\$ 8.6
	Federal Reserve RRP volume	\$ <0.1	\$ 2.6
Shadow banks	Hedge fund and private equity AUM ³	\$ 2.8	\$ 9.0
	Top 50 sovereign wealth fund AUM ⁴	\$ 3.6	\$ 10.3
	Total private direct credit ⁵	\$ 14.0	\$ 22.0
	U.S. money market funds ⁶	\$ 3.0	\$ 5.2
	U.S. private equity-backed companies (K) ⁷	1996	6.0
	U.S. publicly listed companies (K) ⁸	7.3	4.2
	Nonbank share of mortgage originations ⁹	2000	9%
	Nonbank share of leveraged lending	54%	82%
			75%

Sources: FactSet, S&P Global Market Intelligence, Assets and Liabilities of Commercial Banks in the United States H.8 data, Financial Accounts of the United States Z.1 data, World Federation of Exchanges, Pitchbook, Prequin and World Bank

AUM = Assets under management

GDP = Gross domestic product

G-SIB = Global systemically important banks

RRP = Reverse repurchase agreements

K = Thousands

For footnoted information, refer to page 43 in this Annual Report.

Banks will play a smaller role in the global financial system.

The chart above shows both the decreasing role and size of U.S. banks relative to the global economy alongside the increasing role and size of shadow banks. The data illustrates this dynamic. We expect this trend to continue for all the reasons I've discussed.

Banks will continue to be guardians of the financial system.

Properly regulated banks are meant to protect and enhance the financial system. They are transparent with regulators, and they strive mightily to protect the system from terrorism financing and tax evasion as they implement know your customer guidelines and anti-money laundering laws. They protect clients' assets and clients' money in movement. Banks also help customers – from

protecting their data and minimizing fraud and cyber risk to providing financial education – and must abide by social requirements, such as the Community Reinvestment Act, which requires banks to extend their services into lower-income communities. As mentioned previously, unlike the private market, banks do not always choose when to provide a product or service but need to be there for their clients when they need credit or liquidity the most.

Looking forward, we constantly modify our strategies to adjust to our market realities.

It's always best to adjust to new reality quickly. We really don't like crying over spilled milk, although we sometimes do. The new reality is that some things – for example, holding certain types of credit – are more efficiently done by a nonbank.

Here are some actions we are taking to help our business succeed in the current and future environments:

1. First and foremost, we must conclude that holding certain types of credit, loans or otherwise has generally become less profitable because of the high levels of capital that need to be held against it – generally more than the market demands. What this means is that some credit is better held in a nonbank. Increasingly, for a credit relationship to make sense, banks need a lot of noncredit-related revenue.
2. Because of various capital requirements, we try to reduce clients' nonoperating cash deposits.
3. We are seeking to implement much tighter management and execution of business strategies. This includes repricing certain businesses, running off certain unprofitable products, changing the mix of business for a client, and more rigorously evaluating client selection and resource optimization applied to clients.
4. We are exploring new capital optimization strategies, which could include partnerships and perhaps one day more securitizations, among other opportunities.
5. Unfortunately, it is becoming increasingly difficult for banks to stay in the mortgage business, which ultimately hurts everyday Americans. The high costs of origination and servicing along with the complexity of regulations create a costly business with significant legal, reputational and operational challenges. In addition, given capital requirements and the lack of a healthy securitization market, it barely makes sense for banks to hold mortgages or mortgage-servicing rights. Many banks have already reduced much of this business. We are hanging on, continuing to hope for meaningful change.

6. We have the ability to add low-capital or no-capital revenue streams, like providing valuable data and analytics in trading, travel and other relevant offers in the consumer bank, wealth management and payment services businesses, among others.

If you review our CEO letters, you will see that we have many growth opportunities in front of us and our plans to attack them. We face the future and the new competition, large and small, with confidence, strength and a dash of humility.

KEEPING AN EYE ON ALL OF OUR COMPETITORS

The growing competition to banks from each other, as well as shadow banks, fintechs and large technology companies, is intense and clearly contributing to the diminishing role of banks *and* public companies in the United States and the global financial system. The pace of change and the size of the competition are extraordinary, and activity is accelerating. Walmart, for example (with over 200 million in-store customers each week), can use new digital technologies to efficiently bring banking-type services to their customers. Apple, already a strong presence in banking-type services with Apple Pay and the Apple Card, is actively moving into other similar services such as payment processing, credit risk assessment, person-to-person payment systems, merchant acquiring and buy-now-pay-later offers. Large tech companies, already 100% digital, have hundreds of millions of customers, as well as enormous resources, in data and proprietary systems – all of which give them an extraordinary competitive advantage.

We remain confident that as long as we stay vigilant, hungry, adaptable, fast and disciplined, we will continue to succeed in building this great company.

Management Lessons

As recent countries and companies have demonstrated, great management and leadership are critical to any large organization's long-term success. While providing strong management is a disciplined and rigorous process – facts, analysis, detail, rinse and repeat – creating an exceptional management team is an art, not a science.

In the rest of this section, I talk about some management lessons – I always enjoy sharing what I have learned over time by watching others and through my own successes and failures.

BUILDING TRUE FRANCHISE VALUE

Accounting can distort actual economic reality.

I have spoken in the past about good and bad revenue and good and bad expenses. Certain expenses, such as opening well-designed and well-located branches, actually are long-term investments of great value. Conversely, poorly underwritten credit creates revenue that you are bound to regret. Further, there are accounting practices that may distort the true value of actions you take. For example, when we create a new credit card account, we recognize origination costs over 12 months, but an average account exists for over eight years. And with the new accounting rules for loan loss reserves – called the current expected credit losses standard – you book the expected life of loan losses on the day you make the loan, while the revenue comes in over multiple years.

Increasingly in the modern world, many valuable things are not reflected on our balance sheet in generally accepted accounting principles – for example, previously expensed intellectual property or extraordinary human capital. At the end of the day, human capital is the most valuable asset. Think of a great athlete, a great lawyer or a great artist. It's not simply the equipment – it's the extraordinary training and talent of those involved, as we've also seen with the U.S. military. And sometimes it's not the individual but the highly coordinated activities of the *team* that deliver the championship.

Finally, if any value is based upon models, one must really test the sensitivity of the outcome against changes in assumptions. Understanding the range of potential outcomes may be far more important than the point estimate created by a model. In some cases, you can have an excellent average outcome but with a chance of death.

The point is: Accounting can distort economic reality and can lead one to make the wrong decisions.

Building true franchise value requires an outcomes-based outlook.

In banking, specific examples illustrate how merely following accounting and capital rules – without thinking through the outcomes – can lead one astray. I'm going to describe just two examples, but there are hundreds more.

If you buy or create a loan at par and put it on your balance sheet at par (think of a mortgage) and internally finance it, even match-funded with 10% capital, you might believe you have a 12% return. Many companies subscribe to this interpretation and simply continue to borrow money to invest in such a thing. But I would tell you this product has

no franchise value because it is only worth par, and, in fact, a small change in that value (because of interest rates and credit spread) could mean that you have made a huge mistake. If, on the other hand, you create a loan and sell it at more than par at a profit, you have created value – whether or not you keep it on your balance sheet. And far more important, if you create a loan and at the same time forge a client relationship – and you add additional capital-light revenue, such as asset management and cash management – you have created something of long-term value that you can nurture and grow. This is franchise value.

Simply taking interest rate risk (which contributed to the downfall of SVB) is not a business. Nor is simply taking credit risk. One person and a computer will suffice – you do not need 290,000 people circling the globe to do that.

Another example relates to any branch-based business. Let's say I build a system with well-designed and well-located branches, staffed by well-trained personnel who can offer customers great products and services and who strive to do every task a little bit better. Then you build a branch system with outdated sites in poor locations (often to save money) that have undertrained and underpaid staff and lower-quality products and services. Between the two, my branch system will win every time. One system will have high franchise value and be self-perpetuating with high returns. The other enterprise is probably on the road to eventual failure. If you study the history of business, you can see this phenomenon play out in grocery stores, car companies, restaurants, retailers and various other enterprises.

LEARNING FROM INVESTOR DAY

In February 2021, we did not hold our annual Investor Day for the obvious reason – COVID-19. When February 2022 came around, we were somewhat happy to be relieved of that responsibility again. Investor Day is a tremendous amount of work. But from 2020 to 2022, we did a lot of investment spending and made several acquisitions. Some of our analysts questioned whether we were being transparent enough in terms of what we were doing and why we were doing it. While sometimes we get frustrated with investor demands – and not all investors are created equally – all investors should be treated fairly and with respect. So, in 2022, we gave it more thought and reversed course with an extensive Investor Day. Our senior management team explained in detail our acquisitions and our investments, answering every question to the best of their ability. Having to explain your business to investors, comparing yourself with competitors and looking at the business as a whole – across sales, marketing, returns, growth, risks and strategic opportunities – was a terrific exercise for *us*. We learned our lesson!

This also raises another issue. Of course, it is critically important to analyze your business at the right disaggregated level – right down to the branch – inside the company. But it is also important to have the proper segments reported externally to the company, properly accounted for and generally aligned to their relevant competitors. This actually helps hold managers accountable by forcing them to accurately assess performance – the good, the bad and the ugly – without any attempts to avoid reality through an external obfuscation of results.

BALANCING A CUSTOMER-CENTRIC APPROACH WITH (EXCESSIVE) RISK

Most businesses, including banks like us, say they put their customers first. We often go further than that statement to say that we **need** to be there for them, in good times and in bad. However, banking is a complex industry, and this customer-centric approach requires a little more explanation.

In our business, we are essentially a financial partner to a client. While we strive to build great client relationships based on trust over the long run, our role has intricacies. For example, we do not need every transaction to make economic sense – just the overall client relationship, year after year. Whatever the transaction, we need to be properly compensated for the risks we bear, which can be extraordinary. Very often, a client will merely look for the lowest price, which we completely understand; we recognize that sometimes banks are perfectly willing to make a certain transaction for a client at a loss. There are also occasions when we need to tell a client that a specific financial transaction would be imprudent – maybe for us **and** the client.

Say, for example, that a very strong client of ours is simply trying to get the best price for a leveraged loan. If we believe the desired price is unwise and another institution is willing to offer it, we will advise the client to take that option. For us, this is pure counterparty risk and not really part of our core relationship. Conversely, should the same

client come to us and request something that extends beyond what we consider reasonable for that transaction, we may nonetheless do it. Perhaps the client is in the middle of an M&A transaction in difficult markets and simply cannot get the financing they need – other than from us. In recent crises, we have often gone the extra mile for a client at great risks to ourselves, not to make a profit but to rescue the client from financial calamity.

Fundamentally, putting the client first means always providing them with the products and services they need (although they may go somewhere else because of price) and having our whole team work hard for them – either in the United States or around the world, reliably and with constancy. One of the most important things we do for a client, above all else, is to be a steady hand, providing financial safety and security at every turn.

Some Commonsense Principles for Corporate Governance

I have written before about the diminishing role of public companies in the American financial system. They peaked in 1996 at 7,300 and now total 4,600. Conversely, the number of private U.S. companies backed by private equity firms has grown from 1,900 to 11,200 over the last two decades. And this does not include the increasing number of companies owned by sovereign wealth funds and family offices. This migration is serious and worthy of critical study, and it may very well increase with more regulation and litigation coming. We really need to consider: Is this the outcome we want?

There are good reasons for such healthy private markets, and some good outcomes have resulted from them as well. The reasons are complex and may include public market factors such as onerous reporting requirements, higher litigation expenses, costly regulations, cookie-cutter board governance, less compensation flexibility, heightened public scrutiny and the relentless pressure of quarterly earnings.

With intensified public reporting, investors' growing needs for environmental, social and governance information and the universal proxy – which makes it very easy to put disruptive directors on a board – the pressure to become a private company will rise. Corporate governance principles are becoming more and more templated and formulaic, which is a negative trend. For example, sometimes proxy advisors automatically judge board members unfavorably if they have been on the board a long time, without a fair assessment of their actual contributions or experience. And some simple, sensible governance principles are far better than the formulaic ones. The governance of major corporations is evolving into a bureaucratic compliance exercise instead of focusing on its relationship to long-term economic value. Good corporate governance is critical, and a little common sense would go a long way.

PROMOTING OPEN COMMUNICATION AND TRUST WITH THE BOARD

As authorized and coordinated by the board, directors should have unfettered access to management, including those below the CEO's direct reports. At every board meeting, to ensure open and free discussion, the full board should meet in executive session *without the CEO* or other members of management. The independent directors should ensure that they have enough time to do this properly.

This one act would allow the board to have a completely open conversation and provide candid feedback to the CEO and management team. Good CEOs, who are trying to do the best job they can, should appreciate this important feedback – and should know how difficult it is to gather in a large group. This type of quality discussion among and with board members leads to collaboration and good succession planning since every meeting should include a real conversation around this important topic. Meetings such as these allow the board to nurture the extraordinary value of collaboration and trust.

CONFRONTING SUCCESSION PLANNING

Our board is responsible for succession planning, and it is on the agenda every time board members meet – both when they are with me and when I am not in the room. We already have a “hit-by-the-truck” plan ready to go (not all companies can say this), and we have multiple successor candidates who are well-known to the board and to the investor community. The board believes this is one of its paramount priorities. You can rest assured that our board members are on the case and are very comfortable with where we are.

ACTIVE ENGAGEMENT WITH ASSET MANAGERS

We – companies and investors – need to become more active and involved in proxy issues each year to foster better communication between the investors and the board of the companies they own. Whether it's issues around climate risk or say on pay, it should be appropriate for the management team or board to actively engage with investors during proxy season to hear and understand each other's views on key issues and ***communicate their positions in real time.*** Investors should also require proxy advisors to share any communications they have with a company in real time before investors make voting decisions. In my view, too many portfolio managers and investors have partially ceded critical decisions on key proxy issues to their internal stewardship groups or external proxy advisors. Stewardship teams are also often under pressure to follow proxy advisors by bureaucratic internal systems at investment firms that discourage disagreement and encourage the safety of the herd. Many portfolio managers have told me that even when they have the authority to override the internal group, it is frequently very difficult to do so.

The new universal proxy is likely to create havoc for companies.

The new universal proxy makes it such that one investor with one share, who owns it for as little as one day, can nominate a director for any reason, at relatively low cost. In my view, it is likely that not just activists but also special interest groups will nominate directors. Not only would this be extremely disruptive to the board, but, almost by their nature, special interest groups would be counter to shareholders' interests. While we fully respect being transparent – protecting investors and shareholder rights – director election processes are becoming too far removed from shareholder interests.

While there are legitimate complaints against entrenched boards, good boards often tend to interview prospective candidates for their brains, integrity, work ethic, management and collaboration skills, and experience. With this new universal proxy, it's easy to envision a time when a proxy season will be like a political campaign, with interest groups on both sides of an issue trying to elect a board member. Disruptive boards, which can be caused by just a single troublesome member, are an anathema to shareholders' interests. This is unlikely to end well.

Evaluating and Managing the Economic and Geopolitical Risks Ahead

We usually don't worry about typical economic fluctuations and often compare economic forecasting with weather forecasting: It is extremely complicated, easy to do in the short term and far more difficult to do in the long run. It is particularly hard to forecast true longer-term inflection points in the economy. Although we don't want to waste time on "normal" fluctuations, we do want to be *prepared* for economic extremes – we look at multiple possibilities and probabilities and manage our company so that we can *handle all of them*, whether or not we think they actually will happen. After we spoke last year about storm clouds, some of those storms did indeed hit, and, unfortunately, some of those threatening clouds are still here.

2022 was not normal, economically speaking, and, in fact, 2022 witnessed several dramatic events – the Ukraine war began; inflation hit a 40-year high of 9%; the federal funds rate experienced one of its most rapid increases, up 425 basis points, albeit from a low level; stock markets were down 20%; unemployment fell to a 50-year low at 3.5%; and the U.S. economy was bolstered by frequent fiscal stimulus and by high and rising government debt while supply chain issues eased. In addition, work from home began to raise commercial real estate challenges, and, finally, long- and short-term interest rates presented a sharply inverted yield curve, which is "eight for eight" in terms of predicting a recession (more on this later). But, surprisingly, the global economy marched ahead.

THE CURRENT ECONOMY: PRETTY GOOD BUT STORM CLOUDS AHEAD

Until the collapse of Silicon Valley Bank, the current economy was performing adequately, both here in the United States and remarkably better than anyone expected in Europe. The "market" was generally forecasting either a soft landing or a mild recession, with interest rates peaking at 5% and then slowly coming down.

There has been a lot of market volatility over the past year, partially, in my opinion, as people over-extrapolate monthly data, which is highly distorted by inflation, supply chain adjustments, consumer substitution, basically poor assumptions about housing costs and other factors. But underlying all this, consumers have been spending 7% to 9% more than in the prior year and 23% more than pre-COVID-19. Similarly, their balance sheets are in great shape as they still have, according to our own analysis, \$1.2 trillion more "excess cash" in their checking accounts than before the pandemic (credit card debt is simply normalizing). In addition, unemployment is extremely low, and wages are going up, particularly at the low end. We've had 10 years of home and stock price appreciation, and even if we go into a recession, consumers would enter it in far better shape than during the great financial crisis. Finally, supply chains are recovering, businesses are pretty healthy and credit losses are extremely low.

The failures of SVB and Credit Suisse have significantly changed the market's expectations, bond prices have recovered dramatically, the stock market is down and the market's odds of a recession have increased. And while this is nothing like 2008, it is not clear when this current crisis will end. It has provoked lots of jitters in the market and will clearly cause some tightening of financial conditions as banks and other lenders become more conservative. However, it is unclear whether this disruption is likely to slow consumer spending (as of April 1, 2023, spending has been consistently running higher versus the prior year). Although higher rates, particularly in mortgages, have reduced both home sales and prices, do remember that consumer spending drives more than 65% of the U.S. economy.

Here & Now

Still Good Economy

- Healthy consumer
- Healthy jobs
- Higher wages
- Good credit
- Home values up over 10 years
- Recovering supply chain
- Normalized interest rates
- Healthy business

> In Front of Us: Storm Clouds Ahead

Abnormal QT & Fiscal Spending

- Consumer excess savings close to zero by year-end
- Large quantitative tightening (QT) and other unknowns, reducing liquidity and triggering higher long-term interest rates
- Higher fiscal spending
- Higher climate spending
- Lingering effects of fiscal stimulus
- Possible persistent inflation, requiring higher interest rates
- Maybe no end in sight

War, Energy Crisis, Trade, China

- Unpredictable war
- Energy and food crisis averted for now
- Disproportionate suffering imposed on poor people and nations
- Inflationary trade adjustments
- Economic alliances in flux
- Potential for rising oil and gas prices
- Huge economic and geopolitical strains

While the current crisis has exposed some weaknesses in the system, it should not be considered, as I pointed out, anything like what we experienced in 2008. Nonetheless, we do have other unique and complicated issues in front of us, which are outlined in the chart above.

POTENTIAL TROUBLE BREWING FROM UNPRECEDENTED FISCAL SPENDING, QUANTITATIVE TIGHTENING AND GEOPOLITICAL TENSIONS

Having already confessed to how difficult it is to predict the future, for planning purposes it still makes sense to try to assess the environment ahead by laying out those factors that may be significantly different from the past.

Fiscal stimulus is still surging through the system.

In the last three years, partially but not entirely due to the pandemic, the federal government had a deficit of \$3.1 trillion (2020), \$2.8 trillion (2021) and \$1.4 trillion (2022). These are extraordinary numbers, which ended up in consumers' pockets, in states and local municipalities, and even in companies. We pointed out last year that you simply cannot have this level of spending and say that it's not inflationary. It's also important to point out that there is a multiplier effect of this stimulus; that is, one person's spending is another person's income and so on. The deficit for the next three years is now estimated to be \$1.4 trillion to \$1.8

trillion per year, which is also an extraordinary number, with no end in sight. In Europe, fiscal deficits are high – even before the enormous subsidies given to consumers to counterbalance higher energy prices. It's also important to note that borrowing to invest is fundamentally different from borrowing to consume – borrowing to consume can only be inflationary.

This is before any additional costs related to future recessions, the war or any other unforeseeable events. Offsetting this, by sometime late this year or early next year, we expect consumers will have spent the bulk of their remaining excess savings. It remains to be seen whether this will cause a little bit of a cliff effect or whether consumer spending will simply slow down. Either way, this will add to whatever recessionary pressures there are sometime in the future.

Today's quantitative tightening is following more than a decade of quantitative easing.

In the two years after COVID-19, the Fed bought \$4.5 trillion of U.S. Treasuries and mortgage-backed securities, bringing its total balance sheet to \$9 trillion. We have experienced almost 12 years of quantitative easing (QE), which drove interest rates down – so much so that U.S. short-term rates were virtually zero, and the 10-year bond hit a low of 0.5%. Amazingly, tens of trillions of dollars of debt, mostly in Europe, sold at **negative** interest rates (we will look back upon this with total astonishment). This period of QE also led to extraordinary liquidity (and a surging money

supply) that undoubtedly drove increased prices across many investment classes – from stocks and bonds to crypto, meme stocks and real estate, among others. Importantly, this also increased bank deposits from \$13 trillion to \$18 trillion (and the now-famous uninsured deposits from \$6 trillion to \$8 trillion).

QE is now being reversed into quantitative tightening (QT) as the Fed grapples with inflation. So far, the Fed has reduced its securities holdings by approximately \$550 billion and is committed to reducing its holdings by almost \$100 billion in securities each month or over \$1 trillion each year.

How all this will unfold is still unknown as the direction and speed of money have changed significantly from prior years. To varying degrees, banks will compete for money, not only among one another but also with money market funds, other investments and the Fed itself. Money market fund total assets under management have increased by \$650 billion since April 2022, with a significant portion migrating into the Fed's reverse repo facility, thereby draining deposits from the banking system. So while the Fed's balance sheet has come down by approximately \$550 billion, deposits at the banks have come down by \$1 trillion, largely uninsured deposits. Unfortunately, some banks invested much of these excess deposits in "safe" Treasuries, which, of course, went down in value as rates rose faster than most people expected.

It should be noted that an inordinate amount of attention is focused on short-term interest rates, which the Fed affects directly. But the Fed does not completely control long-term rates and liquidity, which are influenced by both supply and demand (QT) and global investor preferences and sentiment – importantly, including views on risk and safety. It is also important to remember that while the central banks of the world are now selling instead of buying securities, the governments of the world have larger debts to finance. The United States alone needs to sell \$2 trillion in securities, which must be absorbed in the market. This turn of events is generally true globally.

There has been huge intervention by central banks around the world over the last decade. While it was completely necessary in 2008 and 2009 to stop the worst of the global financial crisis, and again in

2020 to stop the effects of the global pandemic, the depth and breadth of these interventions will be studied for years as will the extent to which we need QT (whose full effect may not be known immediately). It is unclear how the Fed incorporated the enormous fiscal spending into both its forecasts for growth and inflation, as well as its need to continue QE as it did. And importantly, the Fed's ability to reverse course on this strategy (QT) is somewhat constrained by higher inflation (though, of course, it can temporarily adjust its actions to deal with the current bank failure crisis).

War complicates geopolitics and materially adds risks.

We have not had a major land war in Europe since 1945. The war in Ukraine, already into its second year, has been particularly devastating in terms of casualties and damage and has been haunted by the threat of nuclear weapons. It may very well last for many more years. Wars are unpredictable, and at the start, most predictions about how they will end have been completely wrong.

This war is also affecting global energy and food supplies, with a disproportionate and negative effect falling on poor people and poorer nations, including millions of Ukrainian refugees. There is still a risk that energy and food supply lines, which are not secure, will lead to higher prices and the large migration of people, triggering another level of geopolitical dislocation.

The tensions of this war are also leading to the rethinking of many economic alliances, as well as trade and national security. All these factors create more risk and potentially higher inflation, and their confluence (along with inflation and QT) creates a somewhat unpredictable and dangerous outcome.

This may be a once-in-a-generation sea change, with material effect.

Of course, there is always uncertainty. I am often frustrated when people talk about today's uncertainty as if it were any different from yesterday's uncertainty. However, in this case, I believe it actually is.

Less predictable geopolitics, in general, and a complex adjustment to relationships with China are probably leading to higher military spending and a realignment of global economic and military alliances.

Higher fiscal spending, higher debt to gross domestic product (GDP), higher investment spend in general (including climate spending), higher energy costs and the inflationary effect of trade adjustments all lead me to believe that we may have gone from a savings glut to scarce capital and may be headed to higher inflation and higher interest rates than in the immediate past.

Essentially, we may be moving, as I read somewhere, from a virtuous cycle to a vicious cycle.

PREPARING FOR WHAT MAY BE A NEW AND UNCERTAIN FUTURE

Of course, we hope that everything turns out okay and that all of these storm clouds peacefully and painlessly dissipate – and we need to be prepared for that outcome. We also need to be prepared for a new and uncertain future. The new risks (in addition to the normal ones, like recession) are higher inflation for longer, the market effects of QT and growing political risks. Of course, I cannot be sure this will happen, but I place higher odds on it than the “market.”

Managing risks is far more than simply meeting the Fed's annual stress test.

While it is critical that we meet and pass the Fed's Comprehensive Capital Analysis and Review (CCAR) stress test, managing risk is far more than that – and we are fairly fanatical when it comes to managing risk. Our company does hundreds of stress tests a week, which include market movements reflective of many past crises (such as volatility resulting from the Russia-Ukraine conflict and the pandemic in 2020) and *rapidly rising interest rates*.

The Fed's CCAR stress test, by its nature, has fairly arbitrary results since it uses only one different and hypothetical scenario each year. This creates uncertainty around our capital requirements (as I mentioned, this may damage the value of bank stocks and the banking system). If I were a shareholder, I would want to know if my company would

really lose the \$44 billion after taxes (over a nine-quarter period) that the stress test shows. And the answer is absolutely not.

While I understand why regulators stress test this way – they are essentially trying to ensure that banks survive the worst-case scenario (which assumes multiple problems at a struggling bank without any benefit from good management or rapid response) – the methodology clearly does not result in an accurate *forecast* of how our company would perform under adverse circumstances. I have very little doubt that if the severely adverse scenario played out, JPMorgan Chase would perform far better than the stress test projections. I believe we would actually make money over the nine quarters in the Fed's stress scenario.

Here's one example that illustrates this. From March 5 to March 20, 2020, when the stock market fell 24% and the bond index spread gapped from 191 to 446 basis points prior to major Fed intervention, our *actual* trading revenue was higher than normal as we actively made markets for our clients. By contrast, the *hypothetical* stress test had us losing a huge amount of money in market making, based on the way it is calculated. One more thing to point out: JPMorgan Chase now has enough total loss-absorbing capacity to bear out peak CCAR losses (using the Fed's numbers) more than *eight times over*.

In addition to CCAR testing, we stress test for various types of huge market disruptions. For example, we stress counterparties – such as hedge funds, large asset managers or trading houses – for extremely large market moves, perhaps an instantaneous 130 basis point move in Treasuries or 50% to 60% moves in commodities. Our shareholders should know that regarding any major international bank, we remain well-collateralized across all of our exposures. Even if one of those banks went bankrupt overnight, we would be okay. While there is always a risk that we won't receive a margin call or that some trades may default and leave us exposed to large market risk, the losses likely would not be material.

Suffice it to say, our company prepares not only for various forms of extreme economic risk but for various forms of geopolitical risk. Later in this letter I describe how we have enhanced those efforts.

Don't underestimate the extreme importance of interest rates.

Interest rates are extraordinarily important – they are the cosmological constant, or the mathematical certainty, that affects all things economic. Before I comment on that, I want to share some astounding numbers to illustrate this point:

Net present value (NPV) of \$1.00 annuity		
	Lifetime NPV	% NPV in first 10 years
1% interest rate	\$100	9%
10% interest rate	\$10	61%

When you analyze a stock, you look at many factors: earnings, cash flow, competition, margins, scenarios, consumer preferences, new technologies and so on. But the math above is immovable and affects all.

In a rapidly rising rate environment, any investment where the cash flows were expected in the out years would have been dramatically affected – think venture capital or real estate development, for example. Any form of carry trade (effectively borrowing short and investing long) would be sorely disappointed. Carry trade exists not just in banks but is embedded and is silently present in companies, investment vehicles and others, including situations that require recurring refinancing.

We are prepared for potentially higher interest rates, and we may have higher inflation for longer.

If we have higher inflation for longer, the Fed may be forced to increase rates higher than people expect despite the recent bank crisis. Also, QT may have ongoing impacts that might, over time, be another force, pushing longer-term rates higher than currently envisioned. This may occur even if we have a mild – or not-so-mild – recession, as we saw in the 1970s and 1980s.

Today's inverted yield curve implies that we are going into a recession. As someone once said, an inverted yield curve like this is "eight for eight" in predicting a recession in the next 12 months. However, it may not be true this time because of the enormous effect of QT. As previously stated, longer-term rates are not necessarily controlled by central banks, and it is possible that the inversion we see today is still driven by prior QE and not the dramatic change in supply and demand that is going to take place in the future.

We have always looked at the "fat tails" of higher interest rates, particularly on our own company. We were premature in thinking about the possibility of interest rates going to 5%, 6% or 7% – which still might not happen, but we always want to be protected against this outcome. For example, we have spoken about stockpiling cash, not investing in sovereign debt when rates were low and being willing to forgo income to protect against rising rates. Rest assured, our company can handle significantly higher interest rates no matter how anyone analyzes capital.

Higher interest rates will obviously have an important impact, not just for banks but for some of those who borrow on a floating rate or those who have to refinance in a higher rate environment. If this tide goes out, you should assume that it will expose additional weaknesses in the economy. However, our company is prepared – not only for higher rates but for a potential recession that could arise and related credit losses. That preparation includes analyzing all of our clients (in particular our leveraged lending, real estate and other clients) for what the impact of higher rates may mean for them. We believe the risks within our own portfolio are manageable. And we try to analyze the impact of these factors on companies and industries away from us. For example, we do expect that some types of real estate in certain locations may come under pressure.

Finally, we assume all of these risks and uncertainties will result in volatile markets.

There are risks and opportunities in the restructuring of global economic relations.

There is no question that supply chains need to be restructured for three different reasons:

- For any products or materials that are essential for national security (think rare earths, 5G and semiconductors), the U.S. supply chain must be domestic or only open to completely friendly allies or partners. We cannot and should not ever be reliant on processes that can and will be used against us, especially when we are most vulnerable. All countries will be protecting their national security in their own way, tailoring their strategies as they see fit.
- Countries will also be taking specific action to protect critical industries (think electric vehicles (EV), AI and chips) that may not be directly related to national security but are key to national competitiveness. This is essentially what America's IRA is meant to do.
- Companies will diversify their supply chains simply to be more resilient.

This restructuring will likely take place over time and does not need to be excessively disruptive. There will be winners and losers – some of the main beneficiaries will be Brazil, Canada, Mexico and friendly Southeast Asian nations.

For similar national security reasons, activities – including investment activities – that help create a national security risk (e.g., sharing critical technology with potential adversaries) should be restricted.

While focusing on the risks, it's also important not to forget the opportunities. The transition to a green economy will eventually require \$4 trillion a year in capital expenditures. The IRA, CHIPS Act and Bipartisan Infrastructure Law combined will create huge opportunities for companies, investors and entrepreneurs across virtually every industry group in the United States. You can rest assured that our company is organizing to help clients make the most of these opportunities.

Along with reconfiguring our supply chains, we must create new trading systems with our allies. My preference would be to rejoin the Trans-Pacific Partnership – it is the best geostrategic trade arrangement possible with allied nations. You can be certain that our company is closely monitoring and adjusting to the risks and opportunities created by current events.

Believe it or not, inflation and interest rates are not the things that worry me the most. I'm most concerned about large geopolitical events, cyber attacks, nuclear proliferation, large dysfunctional markets (partially due to poorly calibrated regulations; e.g., the U.K. Gilt and U.S. Treasury markets) and failure of other critical infrastructure.

We have established a new Security Forum.

The war in Ukraine has exposed the severity, complexity and interconnectivity of threats such as physical security, the loss of nonbank critical infrastructure (i.e., communication networks), pandemics, insider threats, trade relations, political risk, sanctions, data privacy, war, and the impact of regulatory and governmental actions. All these factors affect our company, as well as our clients and countries and their governments. You should know that we have formed a new **Security Forum**, which meets periodically and enables management to continually assess the impact of ongoing threats to our company, our clients and countries around the globe. These risks – which include market risk, credit risk, cyber risk and operational risk, among others – are also covered at the board level by our Risk Committee.

Finally, when one talks about risk for too long, it begins to cloud your judgment. Looking ahead, the positives are huge. However events play out, it is likely that 20 years from now, America's GDP will be more than twice the size it is today, and hundreds of millions of people around the world will have been lifted out of poverty. In the next section, I talk more about the need for a global economic strategy.

Our Serious Need for More Effective Public Policy and Competent Government

Like most Americans, I get frustrated with the mediocrity and bureaucracy of the massive administrative state. We accept it too readily. And it damages the confidence we have in our own country. I have enormous respect for the people who work for the U.S. government, but we simply don't invest enough in making it more effective. Some examples are: *antiquated systems* at the Federal Aviation Administration, United States Postal Service and Internal Revenue Service; inefficient ports and crumbling infrastructure; an ineffective immigration policy; policies that prevent affordable housing and leave apartments vacant; policies that hurt Puerto Rico; tenure versus merit-based compensation and promotion; and work rules that dramatically reduce efficiency. We have a vast system with a lack of accountability and proper reporting. And usually when reports are issued, they only address how much money was spent – not, for example, how many highway miles were built, in what time period and at what cost. Government, which is 20% of the economy, seems to be getting less productive over time, unlike the rest of the economy. In addition, we have too much litigation – this is the bureaucratization of America – think Europe.

To be completely fair, I am also frustrated with the typically shortsighted selfishness of some businesses, asking for abundant special tax breaks and often using regulations to protect the incumbent. I also want to express exasperation with some of my fellow citizens who don't pay the taxes they owe on the order of \$600 billion a year, who won't consider sensible policy measures like a carbon tax to stem climate change and who sometimes seem to only like democracy when the voters agree with them. Democracy by its nature is compromise. One of the lessons of the past decade is that if major legislation cannot be done in a bipartisan way, maybe it should not be done at all.

DEVELOPING EFFECTIVE POLICY AND EFFECTIVE GOVERNMENT

Theology is not policy. Policy based on falsehood or oversimplified facts is doomed to failure. Too often now, policy starts as politics without the benefit of analytics and experts.

Policy should precede politics – not the other way around.

Policy should be painstakingly developed based on facts and analysis (and on information about how policies were productively developed in other parts of the world). You can effectively crowd-source policy expertise. Why were Germany and Switzerland so successful with apprenticeship programs? Why were Canada and Singapore so effective with permitting and infrastructure? All policies, like education, infrastructure and regulation, need to start with an *agreed-upon goal* – and be comprehensive and coordinated to accomplish it. After the core of a policy is developed, then, of course, it will be modified by political leaders – but it is hoped the core of the policy remains intact. If those modifications bastardize it in such a way as to render it inefficient, it should be dropped.

We require a 21st century government.

In a company, you are constantly setting up your organization for success. We need to find a way to more rapidly reorganize our government for the new world. While Congress can often move very quickly in a crisis, we are unable to move quickly as a government over the medium term. We need to move faster, adopt new technologies and retrain human capital more quickly. Even in a good company, reorganizing for change can be hard – business and staff units fight to maintain their status quo and perceived prerogatives as if their lives were at stake. I can only imagine how hard this is in the government, but it will only get worse if we do not fix this in our fast-changing world.

The West Needs America's Leadership

How the U.S. can marshal its strengths—not only military but also moral, economic and diplomatic

By Jamie Dimon

Russia's invasion of Ukraine punctured many assumptions about the future of the world and thus was a pivotal moment in history. America and the West can no longer maintain a false sense of security based on the illusion that dictatorships and oppressive nations won't use their economic and military powers to advance their aims—particularly against what they perceive as weak, incompetent and disorganized Western democracies. In a troubled world, we are reminded that national security is and always will be paramount, even if it seems to recede in tranquil times.

It should also lay to rest the idea that America can stand alone. U.S. leaders must always put America first, but global peace and order is a vital American interest. Only America has the full capability to lead and coalesce the Western world, though we must do so respectfully and in partnership with our allies. Without cohesiveness and unity with our allies, autocratic forces will divide and conquer the bickering West. America needs to lead with its strengths—not only military but also economic, diplomatic and moral. Here's what we can do:

• Rededicate ourselves to the qualities and principles that made America great. These principles are life, liberty, the pursuit of happiness and the idea that all people are created equal. Democracy and human freedom are inseparable from freedom of speech, freedom of religion and free enterprise. It would help to educate all Americans about the sacrifice of those who came before us for democracy at home and abroad.

We need to acknowledge the critical role that government plays—and we need government to be more competent and accountable. We must build stronger safety nets to care for the poor, the old and the disabled, and to cushion adjustment to economic change, while also maintaining economic dynamism, individual responsibility and the dignity of work. We must confront crises and failures of public policy by developing better policies and by dealing with realities. We can recognize the mistakes America has made without disparaging the nation.

We support global human rights and stand on the side of liberty, but we also have to be realistic about the compromises

necessary to accomplish long-term goals. Remember Franklin D. Roosevelt and Winston Churchill allied with Stalin against Hitler's imminent threat.

• Develop a Marshall Plan for global energy and food security. This will be critical both in keeping the Western alliances together and minimizing the global suffering caused by starvation. Global energy and food supply chains are precarious by their nature. And it should be self-evident that energy security and preventing climate change aren't contradictory: Secure and reliable oil and gas production is compatible with reducing CO₂ over the long run, and is far better than burning more coal. It should also be self-evident that global food and energy security relies on realistic trade policy and American military strength.

• Increase military spending, along with our allies, as much as necessary to protect the world. Not only is America a bastion of freedom; it is still the arsenal of democracy, and economic sanctions are no substitute for an effective military. "We know only too well that war comes not when the forces of freedom are strong, but when they are weak," as Ronald Reagan said in 1980. Military strength needs to be combined and coordinated with strong diplomatic and economic aid for the developing world. Thoughtful policies would help many nations lift up their people, develop their human rights and join economic unions that are good for all involved.

• Recover our economic dynamism. A strong economy is the foundation for American power, and we haven't focused enough on economic growth. Between 2000 and 2020, real U.S. GDP grew at an average rate of only 1.7% a year. Had we grown at 3% instead, last year's gross domestic product per person would have been \$15,000 higher. That would help pay for much of what we need to do as a nation.

Economic growth will repair the fraying of the American dream, particularly if we share the wealth by improving education and wages for lower-paid citizens. There are many effective ways to do this, such as raising minimum wages and expanding the earned-income tax credit. We must also fix the immigration policies that are tearing us apart, dramatically reducing illegal immigration and dramatically increasing legal immigration. Economic growth will reduce

inflation, reduce the deficit, and make it easier to afford the strong military we need. We aren't going to have the economic growth we need with the legal, regulatory and bureaucratic system we have today.

Global trade will necessarily be restructured so that we don't rely on potential adversaries for critical goods and services. This will require more "industrial planning" than America is used to—and we must ensure it is properly done and is not used for political purposes. Yet America should also open its arms, through trade and aid, to all other nations. Most developing countries would prefer to align economically with the West if we help them solve their problems. We should develop a new strategic and economic framework to make ourselves their partner of choice.

• Deal with China thoughtfully and without fear. America still has an enormously strong hand—plenty of food, water and energy; peaceful neighbors; and what is still the most prosperous and dynamic economy the world has ever seen, with a per person GDP of over \$75,000 a year. We can have faith that our system will maintain the economic dynamism we need. China has done a great job lifting up its nation and bringing its GDP per person up to \$13,000 a year. Yet any fair assessment must recognize its challenges—not enough food, water and energy; a very complex geopolitical situation with tough neighbors; a lack of freedom that creates economic rigidity and malinvestment.

Whether you think it is a competitor or a potential adversary, we, along with our allies, should firmly negotiate with China (where my company and its predecessor firms have done business for more than a century). We should acknowledge that we have common interests in combating nuclear proliferation, climate change and terrorism. Tough but thoughtful negotiations over strategic, military and economic concerns—including unfair competition—should yield a better situation for all. If America leads well, China will be better off forming partnerships with a strong Western world than with Russia, Iran and other such nations.

Together, we can ensure America's leadership for the next 100 years.

Mr. Dimon is Chairman and CEO of JPMorgan Chase & Co.

CREATING A COMPREHENSIVE GLOBAL ECONOMIC STRATEGY

Just as we need a comprehensive military strategy, globally, to deal with future security risks, we need a comprehensive global economic strategy to deal with future economic risks. Done properly, this will help strengthen and coalesce the Western democratic alliances over an extended period of time. This strategy has four pillars.

First, we need a U.S. growth strategy.

Between 2000 and 2022, real U.S. GDP grew at an average rate of only 2% a year. Had we grown at 3% instead, last year's GDP per person would have been \$15,000 higher. That would help pay for much of what we need to do as a nation. We simply have not focused enough on growing the U.S. economy.

In prior letters, we have spoken about how we need to get public policy right to address a multitude of areas, which span ineffective education systems, soaring healthcare costs, excessive regulation and bureaucracy, the inability to plan and build infrastructure efficiently, inequitable taxes, a capricious and wasteful litigation system, frustrating immigration policies and reform, inefficient mortgage markets and housing markets and housing policy, a partially untrained and unprepared labor force, excessive student debt, and the lack of proper federal government budgeting and spending. I believe that our poor policies have restrained our growth, and simply improving those policies would accelerate our growth.

We should also focus on reducing the worker shortages by allowing both more merit-based immigration and seasonal immigration. Reducing trade barriers could also have a rapid effect, and decreasing regulations and bureaucracy would be helpful. For example, starting a small business today generally requires multiple licenses, which take precious months to get. But it doesn't end there. Talk with any small business owner, and that person will describe the mountains of red tape, inefficient systems and huge amount of documentation involved to operate the business. We need to reduce the burdens that are imposed on those who want to open and run a small business.

By seeking a bold, comprehensive approach, we increase our ability to positively impact economic growth and jobs; in fact, this is also the best way to reduce inflation and the deficit.

Second, an industrial policy, done properly, could drive growth and also protect our national security.

The United States has essentially never had an "industrial policy," a strategy by which the federal government, through incentives and policies, drives American industry. We have done it indirectly through things like the Defense Advanced Research Projects Agency and NASA's moon mission but not generally by favoring industries. More directly, the IRA and the CHIPS Act provide specific incentives for EVs, semiconductors, rare earths, alternative energy sources and others. There are two reasons we should develop an industrial policy:

- 1) specifically to safeguard our national security and
- 2) to counter unfair economic competition, particularly where our national security is directly concerned. For example, making bicycles would not be part of the second example. But China, using subsidies and its economic muscle to dominate batteries, rare earths, semiconductors or EVs, could eventually imperil national security by disrupting our access to these products and materials. We cannot cede these important resources and capabilities to another country.

Crafting an industrial policy should be done properly and with a tightly restricted scope. If the policy is politically motivated, it will be used to benefit various political benefactors and eventually provoke extreme misallocation of capital and corruption. Managing the economy is extremely complex, and Adam Smith's invisible hand still prevails – in a way we can never understand. If the government starts to micromanage through an industrial policy, it will not stop, and much of the efficiencies meant to be created will not be realized. Industrial policy should come with twins – very strict limitations on political interference and related comprehensive policy around factors like permitting requirements, which if not drastically improved will inhibit our ability to make investments and allow infrastructure to be built.

Third, fixing income inequality will reignite the American dream.

Of all the policy errors we need to remedy in America, there are two that I believe will have a dramatic effect on growth and equality – and go a long way toward repairing the frayed American dream. The first is providing graduating students and other individuals with work skills (in fields such as advanced manufacturing, cyber, data science and technology, healthcare and so on) that will lead to better paying jobs. This would be good for growth and much that ails us. And we know what to do. High schools and community colleges should work with local businesses to create specific skills-training programs, internships and apprenticeships that prepare graduating students to be job ready – whether they go on to earn a credential, to work or to attend college. With 10.8 million job openings and 5.9 million unemployed workers in the United States, work-skills training has never been needed more. Businesses must be involved in this process, and programs need to be offered locally because that is where the actual jobs are.

The second step is related to the first: Get more income to lower-paid workers. The gap between skilled and unskilled workers has been growing dramatically – so much so that unskilled labor has become less and less a “living wage.” Of the 150 million Americans working today, approximately 21 million are paid less than \$15 per hour. It is hard to live on \$15 an hour, particularly for families (even if two household members are working). But all jobs should be treated with respect. Jobs and living wages bring dignity, lead to more opportunity – in housing, education, childcare, health and overall well-being – and also help rebuild communities as that income is used to improve how people live.

A major step would be to expand the Earned Income Tax Credit (EITC), which many Democrats and Republicans already agree upon. Today, the EITC supplements low- to moderate-income working individuals and couples, particularly with children. For example, a single mother with two children earning \$9 an hour (approximately \$20,000 a year) could receive a tax credit of more than \$6,000 at year’s end. Workers without children receive a very small tax credit – this should be dramatically expanded, too – and personally, I would eliminate the child requirement altogether. Last year, the EITC program cost the United States about \$64 billion, and 31 million individuals received the credit. We should convert the EITC to make it more like a negative income payroll tax, paid monthly. Many people who are eligible for this benefit do not get it (often because they do not know about it). Proper reform of this program could increase benefits where deserved and reduce fraudulent and improper payments. Any tax credit income should not be offset by any other benefits these individuals already receive.

I have little doubt that this ***would do more than anything else*** to lift up lower-income neighborhoods as the money is spent on lifting up their families. I also have little doubt that this would add to GDP – because most of this money would, in fact, be spent.

Fourth, America must take the lead on devising a comprehensive global economic strategy.

In an op-ed published by *The Wall Street Journal* earlier this year, I wrote: “Only America has the full capability to lead and coalesce the Western world, though we must do so respectfully and in partnership with our allies. Without cohesiveness and unity with our allies, autocratic forces will divide and conquer the bickering West. America needs to lead with its strengths—not only military but also economic, diplomatic and moral.”

Getting military strategy right isn't sufficient. We must keep the Western alliances together and actively appeal to developing nations. A comprehensive economic strategy would tighten the bonds, strengthen our alliances and, importantly, maximize our economic resources. Furthermore, it must encompass a global trade and investment strategy, a holistic plan around energy security and food security, and far more dynamic development finance for emerging markets. Done properly, the economic strength to emerge from such collaboration will preserve our alliances, entice

nations such as India into the fold, guarantee the strength of the U.S. military and preserve the mighty U.S. dollar as the world's reserve currency.

Finally, more active diplomacy and more dynamic communication around the principles that motivate the Western world are required. These principles are life, liberty, the pursuit of happiness and the idea that all people are created equal. Democracy and human freedom are inseparable from freedom of speech, freedom of religion and free enterprise. We should loudly and proudly sing these values from the rooftops.

In Closing

I would like to express my deep gratitude and appreciation for the 290,000+ employees, and their families, of JPMorgan Chase. From this letter, I hope shareholders and all readers gain an appreciation for the tremendous character and capabilities of our people and how they continue to help communities around the world. They have faced these times of adversity with grace and fortitude. I hope you are as proud of them as I am.

Finally, we sincerely hope that all the citizens and countries of the world return to normal after the pandemic, see an end to the ongoing war in Ukraine, and see a renaissance of a world on the path to peace and democracy.



Jamie Dimon
Chairman and Chief Executive Officer

April 4, 2023

Footnotes

Client Franchises Built Over the Long Term (page 8)

Note: figures may not sum due to rounding

- 1 Certain wealth management clients were realigned from Asset & Wealth Management to Consumer & Community Banking in 4Q20. 2006 and 2012 amounts were not revised in connection with this realignment.
- 2 Federal Deposit Insurance Corporation (FDIC) 2022 Summary of Deposits survey per S&P Global Market Intelligence applies a \$1 billion deposit cap to Chase and industry branches for market share. While many of our branches have more than \$1 billion in retail deposits, applying a cap consistently to ourselves and the industry is critical to the integrity of this measurement. Includes all commercial banks, savings banks and savings institutions as defined by the FDIC.
- 3 Barlow Research Associates, Primary Bank Market Share Database as of 4Q22. Rolling 8-quarter average of small businesses with revenue of more than \$100,000 and less than \$25 million.
- 4 Total payment volumes reflect Consumer and Small Business customers' digital (ACH, BillPay, PayChase, Zelle, RTP, External Transfers, Digital Wires), Non-digital (Non-digital Wires, ATM, Teller, Checks) and credit and debit card payment outflows. 2012 is based on internal JPMorgan Chase estimates.
- 5 Digital non-card payment transactions include outflows for ACH, BillPay, PayChase, Zelle, RTP, external transfers, and some wires, excluding credit and debit card sales. 2006 and 2012 are based on internal JPMorgan Chase estimates.
- 6 Represents general purpose credit card (GPCC) spend, which excludes private label and Commercial Card. Based on company filings and JPMorgan Chase estimates.
- 7 Represents general purpose credit card (GPCC) loans outstanding, which excludes private label, American Express Company (AXP) Charge Card and Citi Retail Cards, and Commercial Card. Based on loans outstanding disclosures by peers and internal JPMorgan Chase estimates.
- 8 Represents users of all web and/or mobile platforms who have logged in within the past 90 days.
- 9 Represents users of all mobile platforms who have logged in within the past 90 days.
- 10 Based on 2022 sales volume and loans outstanding disclosures by peers (American Express Company (AXP), Bank of America Corporation, Capital One Financial Corporation, Citigroup Inc. and Discover Financial Services) and JPMorgan Chase estimates. Sales volume excludes private label and Commercial Card. AXP reflects the U.S. Consumer segment and JPMorgan Chase estimates for AXP's U.S. small business sales. Loans outstanding exclude private label, AXP Charge Card, Citi Retail Cards, and Commercial Card.
- 11 J.D. Power, 2022 U.S. Mortgage Origination Satisfaction Study.
- 12 Inside Mortgage Finance, Top Owned Mortgage Servicers as of 4Q22.
- 13 Experian Velocity data as of 4Q22. Reflects financing market share for new and used loan and lease units at franchised and independent dealers.
- 14 Dealogic as of January 2, 2023.
- 15 Coalition Greenwich Competitor Analytics (preliminary for FY22). Market share is based on JPMorgan Chase's internal business structure and revenue. Ranks are based on Coalition Index Banks for Markets. 2006 rank is based on JPMorgan Chase analysis. 2021 excludes the impact of Archegos.
- 16 Client deposits and other third-party liabilities pertain to the Payments and Securities Services businesses.
- 17 Firmwide Payments revenue metrics exclude the net impact of equity investments
- 18 Coalition Greenwich Competitor Analytics (preliminary for FY22). Reflects global firmwide Treasury Services business (CIB and CB). Market share is based on JPMorgan Chase's internal business structure, footprint and revenues. Ranks are based on Coalition Index Banks for Treasury Services.
- 19 Institutional Investor.
- 20 Based on third-party data.
- 21 Nilson, Full Year 2022.
- 22 Based on Assets Under custody reported in company filings.
- 23 Prior year new relationship numbers have been revised to conform to current presentation.
- 24 Includes gross revenues earned by the Firm for investment banking and payments products sold to CB clients that are subject to a revenue sharing arrangement with the CIB.
- 25 S&P Global Market Intelligence as of December 31, 2022.
- 26 Refinitiv LPC, FY22.
- 27 Aligns with the affordable housing component of the firm's \$30B racial equity commitment.
- 28 Represents the Nomura "star rating" for Japan-domiciled funds and Morningstar for all other domiciled funds. Includes only Asset Management retail open-ended mutual funds that have a rating. Excludes money market funds, Undiscovered Managers Fund, and Brazil- and Korea-domiciled funds. Mutual fund rating services rank funds based on their risk-adjusted performance over various periods. A 5-star rating is the best rating and represents the top 10% of industry-wide ranked funds. A 4-star rating represents the next 22.5% of industry-wide ranked funds. A 3-star rating represents the next 35% of industry-wide ranked funds. A 2-star rating represents the next 22.5% of industry-wide ranked funds. A 1-star rating is the worst rating and represents the bottom 10% of industry-wide ranked funds. The "overall Morningstar rating" is derived from a weighted average of the performance figures associated with a fund's three-, five- and 10-year (if applicable) Morningstar Rating metrics. For U.S.-domiciled funds, separate star ratings are given at the individual share class level. The Nomura "star rating" is based on three-year risk-adjusted performance only. Funds with fewer than three years of history are not rated and hence excluded from this analysis. All ratings and the assigned peer categories used to derive this analysis are sourced from these fund rating providers as mentioned. Past performance is not indicative of future results.
- 29 In the fourth quarter of 2020, the Firm realigned certain wealth management clients from AWM to CCB. Prior-period amounts have been revised to conform with the current presentation.
- 30 Traditional assets includes Equity, Fixed Income, Multi-Asset and Liquidity AUM; Brokerage, Administration and Custody AUS.
- 31 AUM only for 2006. Prior period amounts have been restated to include changes in product categorization.
- 32 Source: Euromoney.

33 All quartile rankings, the assigned peer categories and the asset values used to derive this analysis are sourced from the fund ranking providers. Quartile rankings are done on the net-of-fee absolute return of each fund. The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on fund performance and associated peer rankings at the share class level for U.S.-domiciled funds, at a "primary share class" level to represent the quartile ranking of U.K., Luxembourg and Hong Kong funds, and at the fund level for all other funds. The "primary share class" is defined as C share class for European funds and Acc share class for Hong Kong and Taiwan funds. In case the share classes defined are not available, the oldest share class is used as the primary share class. The performance data could have been different if all share classes would have been included. Past performance is not indicative of future results. Effective September 2021, the Firm has changed the peer group ranking source from Lipper to Morningstar for U.S.-domiciled funds (except for Municipal and Investor Funds) and Taiwan-domiciled funds, to better align these funds to the providers and peer groups it believes most appropriately reflects their competitive positioning. This change may positively or adversely impact, substantially in some cases, the quartile rankings for one or more of these funds as compared with how they would have been ranked by Lipper for this reporting period or future reporting periods. The source for determining the rankings for all other funds remains the same. The classifications in terms of product suites and product engines shown are J.P. Morgan's own and are based on internal investment management structures.

34 Source: Company filings and JPMorgan Chase estimates. Rankings reflect publicly traded peer group as follows: Allianz, Bank of America, Bank of New York Mellon, BlackRock, Charles Schwab, Credit Suisse, DWS, Franklin Templeton, Goldman Sachs, Invesco, Morgan Stanley, State Street, T. Rowe Price and UBS. JPMorgan Chase ranking reflects Asset & Wealth Management client assets, U.S. Wealth Management investments and new-to-firm Chase Private Client deposits.

35 Source: iMoneynet.

36 Represents AUM in a strategy with at least one listed female and/or diverse portfolio manager. "Diverse" defined as U.S. ethnic minority.

JPMorgan Chase Exhibits Strength in Both Efficiency and Returns When Compared with Large Peers and Best-in-Class Peers (page 11)

- 1 Bank of America Corporation (BAC), Citigroup Inc. (C), The Goldman Sachs Group, Inc. (GS), Morgan Stanley (MS) and Wells Fargo & Company (WFC).
- 2 Managed overhead ratio = total noninterest expense/managed revenue; revenue for GS and MS is reflected on a reported basis.
- 3 Best-in-class peer overhead ratio represents the comparable business segments of JPMorgan Chase (JPM) peers: Bank of America Consumer Banking (BAC-CB), Goldman Sachs Investment Banking and Global Markets (GS-IB & GM), Truist Financial Corp (TFC), Northern Trust Asset Management (NTRS-WM) and Allianz Group (ALLIANZ-AM).
- 4 Best-in-class all banks ROTCE represents implied net income minus preferred stock dividends of the comparable business segments of JPM peers when available, or of JPM peers on a firmwide basis when there is no comparable business segment: Bank of America Consumer Banking (BAC-CB), and Goldman Sachs Investment Banking and Global Markets (GS-IB & GM), Wells Fargo & Company Commercial Banking (WFC-CB) and UBS Global Wealth Management & Asset Management (UBS-GWM & AM).
- 5 Best-in-class G-SIB ROTCE represents implied net income minus preferred stock dividends of the comparable business segments of JPM G-SIB peers when available, or of JPM G-SIB peers on a firmwide basis when there is no comparable business segment: Bank of America Consumer Banking (BAC-CB), Goldman Sachs Investment Banking and Global Markets (GS-IB & GM), Wells Fargo & Company Commercial Banking (WFC-CB) and Morgan Stanley Wealth Management and Investment Management (MS-WM & IM). WFC-CB is the only G-SIB peer to disclose a comparable business segment to Commercial Banking.
- 6 Given comparisons are at the business segment level, where available; allocation methodologies across peers may be inconsistent with JPM's.

Our Fortress Balance Sheet (page 12)

- 1 Basel III Transitional rules became effective on January 1, 2014; prior period CET1 data is based on Basel I rules. As of December 31, 2014, the ratios represent the lower of the Standardized or Advanced approach calculated under the Basel III Fully Phased-In basis.
- 2 Includes average eligible high-quality liquid assets (HQLA) as defined in the liquidity coverage ratio rule and unencumbered marketable securities, such as equity and debt securities, that the firm believes would be available to raise liquidity, including excess eligible HQLA securities at JPMorgan Chase Bank, N.A., that are not transferable to nonbank affiliates.
- 3 Capital returned to common stockholders includes common dividends and net repurchases.

Size of the Financial/Sector Industry (page 25)

- 1 2010 is sourced from WorldBank.org annual GDP publication. 2022 is calculated using JPM Research forecasts. Figures are represented in 2015 prices.
- 2 Consists of cash assets and Treasury and agency securities.
- 3 2022 figure is annualized based on available data through 1Q.
- 4 Top 50 fund AUM data per Sovereign Wealth Fund Institute, where unavailable 2021 disclosure was used in place of 2022.
- 5 Loans held by nonbank entities per the FRB Z.1 Financial Accounts of the United States.
- 6 U.S. money market fund investment holdings of securities issued by entities worldwide.
- 7 Methodology updated in 2022, 2010 has been restated.
- 8 NYSE + NASDAQ; excludes investment funds, exchange-traded funds' unit trusts and companies whose business goal is to hold shares of other listed companies; a company with several classes of shares is only counted once.
- 9 Inside Mortgage Finance and JPMorgan Chase internal data; consists of Top 50 Originators.

Consumer & Community Banking

We're proud of the performance of Consumer & Community Banking (CCB) in 2022. In a rapidly changing macro environment, we delivered strong financial results, drove meaningful growth of our franchise and continued our disciplined approach to investing for the future. We continued to put the customer at the center of everything we do, across every interaction and line of business. Through the efforts of more than 135,000 talented CCB employees, we extended our leadership positions in retail deposits and credit card while gaining momentum in our growth businesses: Wealth Management and Connected Commerce. Overall, CCB has grown to serve nearly 80 million consumers and 5.7 million small businesses.

CCB is operating from a position of strength with our distribution and scale, exceptional products and highly respected brand. We take none of this for granted. We recognize that 2023 remains

uncertain; however, our data-driven approach to decision making, including risk management and investing, positions us well for what lies ahead.

We provide value to customers through the completeness and interconnectivity of our products, services, channels and experiences. We strive to make it easy to do business with us by engaging customers in the channel of their choice.

Our strategy has not changed, and we are focused on a consistent set of strategic priorities:

1. Delivering financial performance that is consistently best-in-class
2. Leveraging data and technology to drive speed to market and deliver customer value
3. Growing and deepening relationships by engaging customers with products and services they love and expanding our distribution

4. Protecting our customers and the firm through a strong risk and controls environment

5. Cultivating talent to build high-performing, diverse teams where culture is a competitive advantage

DELIVERING FINANCIAL PERFORMANCE THAT IS CONSISTENTLY BEST-IN-CLASS

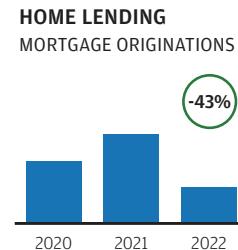
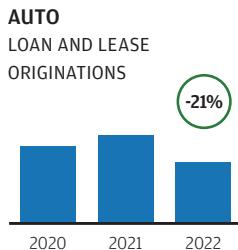
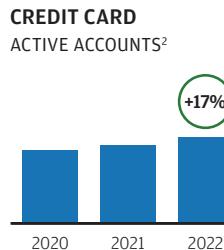
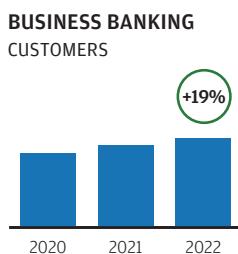
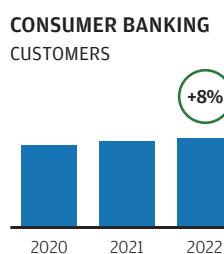
In 2022, CCB delivered a 29% return on equity (ROE) on net income of \$14.9 billion. Revenue of \$55 billion was up 10% year-over-year, and our overhead ratio was 57%, down one percentage point.

We take a long-term approach to investments and focus on delivering sustainable growth and outperformance. Last year, we continued to invest in data and technology, in distribution through our branch network and marketing, and in our growth businesses.

Our financial performance should also be considered in the context of the rapidly evolving macro environment, which created both headwinds and tailwinds for our lines of business. On the strength of our models to acquire, engage and retain customer relationships, we continued to drive core growth in most of our businesses. However, we acknowledge that our businesses are not immune to the macro landscape - Home Lending, in particular, faced shrinking total market size.

Average deposits of \$1.2 trillion were up 10% over 2021, and we extended our #1 market share in U.S. retail deposits³. In 2022, the historic speed and magnitude of rate hikes accelerated the return toward normalized deposit margins.

2020 TO 2022 GROWTH



Our customers remain on solid footing. While still elevated, cash buffers⁴ are down from their peak, as spending continued to be strong throughout 2022. We ended the year with \$439 billion in average loans, up 1%. Credit performance across our portfolios remains strong, and, although net charge-offs were at historic lows, we continued to see normalization. In 2022, we built \$1.1 billion in credit reserves.

The diversification of the CCB franchise, which provides natural hedges and delivers industry-leading returns through the cycle, delivered another year exceeding 25% ROE.

LEVERAGING DATA AND TECHNOLOGY TO DRIVE SPEED TO MARKET AND DELIVER CUSTOMER VALUE

Data and technology are key differentiators and competitive advantages for CCB, enabling us to deliver innovation at scale. In 2022, our investments focused on two core categories: technology modernization and product development. These investments allow us to better respond to the needs of our customers, partners,

employees and regulators – and to deliver the best of what Chase has to offer, with greater speed than ever before.

On technology modernization, we are on a journey to mature our agile model, focused on our applications, infrastructure and data, and are already realizing benefits from this work. Our migration of all Chase.com customers to the public cloud is generating higher site availability and leading to a 50% reduction in runtime costs. We're scaling the use of AI/ML across CCB, which delivered over \$500 million in value in 2022 alone, with more value to unlock in years to come.

On product development, we're investing to drive engagement and deliver experiences customers love across channels, products and platforms. To do so, we operate in a fully agile product structure – with close to 100 products and services delivered by dedicated design, product, data and technology teams. We've enhanced the Chase Mobile® app and Chase.com, making it easier for customers to manage their everyday financial lives and engage with a richer offering of products and features. We also improved our platforms and experiences so customers can perform more activities with ease – such as more seamlessly opening new accounts.

Data and technology are critical enablers, driving business value over time. The full scope of benefits will manifest in a number of key areas – from reliability and speed to market to employee satisfaction.

GROWING AND DEEPENING RELATIONSHIPS BY ENGAGING CUSTOMERS WITH PRODUCTS AND SERVICES THEY LOVE AND EXPANDING OUR DISTRIBUTION

In 2022, we grew our customer base by nearly 4% across all our lines of business. Here, our primary measure is customer⁵ growth because it indicates success as we strive to be the bank for all and to deepen and engage customer relationships.

Banking and Wealth Management

Our goal is to grow primary bank relationships with our customers across Banking and Wealth Management. Core to that goal is having the right products, experiences and distribution to meet our customers in their channel of choice and serve more of their financial needs.

Our strategy is working. We are #1 in U.S. retail deposit share, driven by growth of more than \$400 billion in deposits over the past three years. Key to this growth is the branch – and our branch network is second to none. We have the right branches in the right locations to capture a larger customer base in both legacy and new markets.

Our branches are a local storefront, where digital engagement comes together with our bankers and advisors to deliver the full capabilities of JPMorgan Chase. Last year, nearly 40 million customers walked into our almost 5,000 branches. In 2021, we became the first bank with branches in all lower 48 states and have delivered on our commitment of 400 new branches in 25 states and the District of Columbia. Not only are our seasoned branches delivering value to our customers, communities and shareholders, but the investment in new branches is a key driver to market share gains over time. Our model's success gives us confidence to continue to invest in new branches in high-opportunity markets where we still have significant untapped opportunity.

Beyond our investments in the branch network, we continue to scale and improve products that meet the distinct needs of customers across segments. Last year, we enhanced our cash flow management solutions. We launched early direct deposit for our Secure BankingSM customers, which allows them to access their paychecks up to two days early, and we enhanced Chase Overdraft AssistSM to provide an extra day before charging an overdraft fee.

It's part of our job to make it easy for customers to have more of their banking relationship with us. We're continuing

1 Unique families with primary and joint account owners for open and funded accounts.

2 Reflects open accounts that received a statement.

3 Federal Deposit Insurance Corporation (FDIC) 2022 Summary of Deposits survey per S&P Global Market Intelligence applies a \$1 billion deposit cap to Chase and industry branches for market share. While many of our branches have more than \$1 billion in retail deposits, applying a cap consistently to ourselves and the industry is critical to the integrity of this measurement. Includes all commercial banks, savings banks and savings institutions as defined by the FDIC.

4 Reflects the days of outflow coverage based on available deposit balances.

5 "Customer" includes both consumers and small businesses and reflects unique individuals and business entities that have financial ownership or decision-making power with respect to accounts. The firm believes this metric is more representative of its customer relationships than similar metrics it has presented in previous public reports.

6 #1 In active users among digital banking mobile apps based on Data.ai and #1 most-visited banking portal in the U.S. (Chase.com) based on Similarweb.

7 In 2022, we achieved record high satisfaction in our branch and digital channels, determined by overall satisfaction and measured on a scale of 1 to 10. The score is calculated as the share of "9" and "10" responses as a percent of total responses. Digital channel includes a weighted average of monthly active users of Chase.com and the Chase Mobile app.



#1

#1 in U.S. retail deposit market share³



#1

#1 U.S. credit card issuer based on sales and outstandings



#1

#1 primary bank for U.S. small businesses



#1

#1 in total combined U.S. credit and debit payments volume



#1

#1 digital banking platform in the United States⁶

to invest in natural adjacencies to the Consumer Banking franchise so we can deepen and grow Business Banking and Wealth Management efficiently.

For our Business Banking customers, we offer products, services and expertise to make it easier than ever to start, run and grow their businesses. We made it simpler to open a checking account, introduced more convenient methods to pay and get paid, and created a streamlined digital lending experience for faster access to capital when customers need it. We take pride in helping entrepreneurs go from idea to IPO and beyond.

For our Wealth Management clients, we're growing our advisor base and developing products and capabilities to serve clients across the wealth continuum. In 2022, we added more than 300 advisors on our path to 6,000, launched new products such as Wealth Plan and Personal Advisors, and continued to make enhancements to Self-Directed Investing. Our goal is to achieve \$1 trillion in assets over the next several years, and we're on track to do so.

Payments, lending, commerce

We continue to be the #1 credit card issuer in the United States for both spend and lend, crossing \$1 trillion in sales volume in 2022. It is our marketing

engine that fuels distribution and scale. Marketing is to Card what bankers, branches and advisors are to banking: baseline distribution. Our strategy is working. In 2022, we drove a 20% year-over-year increase in new accounts within our risk appetite. This drove our share of outstandings to 17.3%, up nearly 75 basis points – healthy progress toward our goal of 20% lend share over the long term.

A large part of our Card strategy is to get the right products into customers' hands. Over the last three years, we refreshed our entire branded card portfolio to ensure our cards' value propositions were best-in-class and set up to perform well. We also renewed valuable relationships with our co-brand partners that cover the vast majority of co-brand spend share to at least 2027. Beyond consumer cards, we're making progress on the opportunity with business customers, launching Ink Business PremierSM in the second half of 2022. While it's early days, the new card has been well-received, attracting higher-revenue small businesses that spend multiples above the average.

Payments remain a center of gravity for financial relationships. We are a leading payments franchise in the United States, enabling our customers to move more than \$5.6 trillion in 2022 across payment methods.

To extend that leadership position, we're also investing in our Commerce business. The strategy here is straightforward: Lean into what our customers do on our cards all the time – spend on travel, dining and shopping – and invest in digital experiences for Chase to win in discovery, booking, paying and borrowing across these journeys. With our recent acquisitions of cxLoyalty, FROSCH, Figg and The Infatuation, we now own differentiated assets and experiences in travel, offers and dining. We're leveraging our new assets and talent to build out our two-sided platform, connecting customers and merchants as only a company with our scale and digitally engaged customer base can.

Our efforts produced meaningful results in 2022:

- **Chase Travel:** Our travel business delivered ~\$8 billion in volume booked in 2022
- **Chase Offers:** We drove over \$6 billion in spend to merchants who used our offers platform
- **My Chase Plan[®]:** Two years post-launch, we've opened more than 7 million plans

The Connected Commerce business is driving impact for Chase by improving satisfaction, stimulating engagement and creating capital-light, recurring revenue streams, all while making the core franchise more resilient long term. As we told you at Investor Day last year, we expect to drive more than \$30 billion in volume through our Commerce platforms in the next few years.

Omnichannel engagement

Earning the right to be the primary financial partner for consumers and small businesses requires us to build trust by delivering experiences our customers expect – in both major and everyday moments. The completeness of our product set can serve all of our customers' banking, lending and investing needs.

Our true differentiator is the combination of delivering award-winning digital capabilities to our 63 million active digital users, our extensive physical network spanning all lower 48 states, and our more than 50,000 local bankers, advisors, business relationship managers and branch managers, who operate as a local team of experts to serve customer needs.

We're building and delivering experiences our customers love and achieved record-high customer satisfaction across channels⁷ in 2022. Although we're proud of this, we are never satisfied and recognize there's always more to do for our customers. We prioritize improving activities our customers do most often in their everyday lives, such as opening an account, replacing a card and making a payment. We also help them with major life milestones, like planning for their future through goals-based plans or searching for and buying a car or a home.

A key part of our engagement strategy is ensuring we reach historically underserved populations. We continue to make meaningful strides in our community strategy in support of our \$30 billion racial equity commitment announced in October 2020. Since then, we have:

- Opened 13 Community Center branches in minority neighborhoods and hired over 140 Community Managers
- Conducted over 9,000 financial health sessions with more than 190,000 attendees
- Hired ~160 Community Home Lending Advisors and expanded our homebuyer grant program to more than 10,000 minority neighborhoods nationwide
- Provided complimentary one-on-one coaching to nearly 3,000 small businesses through dedicated consultants in 21 U.S. cities and launched a national special purpose credit program to improve access to credit for small business owners in historically underserved areas

PROTECTING OUR CUSTOMERS AND THE FIRM THROUGH A STRONG RISK AND CONTROLS ENVIRONMENT

Everyone's top priority in CCB is to protect our customers and the firm. Having the proper governance and processes in place ensures our business is sustainable and resilient and meets regulatory requirements. Coupled with our fortress balance sheet, this strength attracts a strong, diversified customer base that has confidence in the safety and security of banking with Chase.

Through data and analytics, we continue to enhance our risk management capabilities across CCB. Keeping our credit appetite constant, machine learning is helping us surgically extend more credit to more consumers and small businesses. While fraud is everywhere, we are improving our ability to protect customers earlier and more often. Education plays a big role, too. Bankers, Community Managers and marketing work together to help customers build healthy financial habits and avoid becoming victims of fraud.

CULTIVATING TALENT TO BUILD HIGH-PERFORMING, DIVERSE TEAMS WHERE CULTURE IS A COMPETITIVE ADVANTAGE

Our people continue to be our greatest asset. We attract the best talent from all backgrounds who choose to work at Chase because of the impact we have on our customers and communities and the opportunity to grow their career. We strive to create a culture where everyone's voice matters, leading to the best business outcomes.

Our employees embrace the full spectrum of career opportunities that Chase offers – across lines of business, functions and roles. They grow with us and move across our businesses to develop unique perspectives that help us solve the most important and complicated issues across the firm.

Our people work hard every day – with heart and humanity – to better serve our customers, communities and each other.

IN CONCLUSION

We're tremendously confident about the future of our franchise, yet we approach our opportunities and challenges with great humility. We wouldn't trade our hand with anyone's. Our scale, distribution, brand, products and people position us well to continue to achieve best-in-class performance for decades to come.



Marianne

Marianne Lake

Co-CEO, Consumer & Community Banking



Jenn

Jennifer Piepszak

Co-CEO, Consumer & Community Banking

Corporate & Investment Bank

2022 was a watershed year for financial markets.

Tasked with taming inflation and cooling an overheating economy, the Federal Reserve raised interest rates seven times in 2022 to levels not seen in nearly 15 years.

The end of near-zero interest rates meant that many young, emerging companies needed to focus on profitability rather than revenue growth at any cost. Higher rates also dented investors' confidence and tested their patience in assets such as special purpose acquisition companies and cryptocurrencies, which benefited so much from excess capital just a year ago.

Geopolitics dominated headlines and moved markets. In February, Russia invaded Ukraine, fomenting a humanitarian crisis that worsens even now. The war disrupted supply chains and forced countries to rethink their entire approach to sourcing energy, food and other critical resources, with every issue now being viewed through the lens of national security.

BENEFITS OF BUSINESS DIVERSITY

In recent shareholder letters, I've stressed the key pillars of a strategy we set years ago: to be global, diversified, complete and at scale. That strategy has served us well and continues to serve us well across the Corporate & Investment Bank (CIB) and our wholesale businesses. We and our clients benefit from our strong, balanced business during volatile times and market dislocations, including those we have witnessed in the last few months.

The CIB generated \$15 billion in net income on revenue of \$48 billion in 2022, a solid performance following record net income and revenue in 2021.

Industrywide investment banking fees fell 42% from the prior year¹, and J.P. Morgan's fees followed suit, down 48% from 2021. This was not unexpected. Industrywide investment banking fees have averaged about \$80 billion per year from 2015 to 2020¹ so 2022 was a lighter-than-average year, more comparable with the pre-pandemic years of 2018 and 2019. Even so, we finished the year #1 in investment banking fees, #1 in equity capital markets, #1 in debt capital markets and #2 in mergers and acquisitions¹.

In 2022, our M&A franchise advised on over 350 deals that totaled more than \$900 billion, including some of the year's biggest deals, notably in the healthcare industry for Johnson & Johnson and Pfizer.

With declining M&A activity and higher rates slowing refinancings, our debt underwriting fees declined 43% year-over-year in 2022. More positively, we're proud of the discipline we kept in underwriting, particularly in our leveraged finance business. This puts us in prime position to help companies when activity picks up.

Equity capital markets also saw a dramatic drop-off in deal activity during the year. Volatile and uncertain markets nearly shut down the IPO market, although J.P. Morgan did help lead two of the year's most notable deals: AIG's

\$1.7 billion IPO of Corebridge, its retirement solutions and life insurance business, and Volkswagen's €9.4 billion IPO of Porsche.

Meanwhile, we have continued to scale up our regional investment banking capabilities across the United States. Working with the Commercial Bank, we are deepening relationships with middle market sponsors and aligning coverage teams to support growth industries, particularly technology, healthcare and the green economy.

Our Markets business continues to be the top-ranked franchise in the world by revenue². The business outperformed even our own expectations in 2022, generating revenue of \$29 billion, just short of 2020's record highs, as volatility persisted.

Interest rate hikes and geopolitical tensions had investors repositioning portfolios, driving Fixed Income revenue higher, particularly in our Currencies & Emerging Markets and Rates trading businesses. Overall, we reported \$18.6 billion in Fixed Income revenue, up 10% from the previous year, and retained our top wallet share². Equities revenue came in at \$10.4 billion. Underscoring the strides we've made in Equities, the business has grown revenue by more than 80% since 2017, and market share has increased by almost 300 basis points over the same period². Another notable success in 2022 was our Global Research team's top ranking across all three of *Institutional Investor*'s annual global surveys.

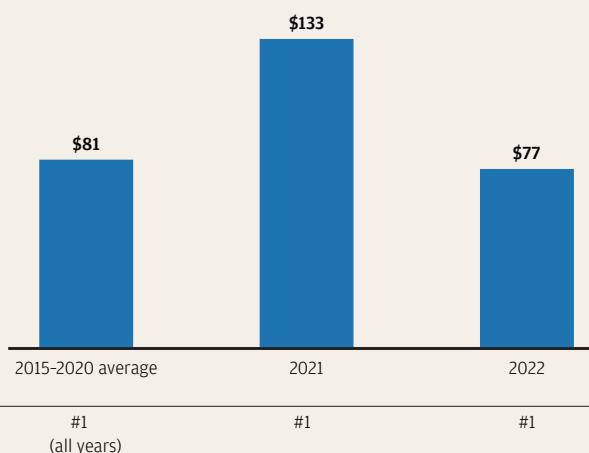
¹ Dealogic as of January 2, 2023.

² Coalition Greenwich Competitor Analytics (preliminary for FY22). Market share is based on JPMorgan Chase's internal business structure and revenue. Ranks are based on Coalition Index Banks for Markets. Securities Services market share is based on cumulative growth from FY17 to FY22.

INVESTMENT BANKING

Global Investment Banking wallet evolution and J.P. Morgan rankings

(\$ in billions)



Source: Dealogic as of January 2, 2023

Scale is essential to run a successful and profitable Markets business, and the capital required to fuel our global trading desks has risen significantly over the last five years. While this increase has been a headwind, our business has been disciplined in deploying capital and continues to deliver strong returns. With the strategic initiatives we have in place, we're confident in our strategy as market structure evolves.

Our Securities Services business, which provides essential post-trade services to our institutional asset-manager and asset-owner clients, also had a strong year, reporting record revenue of \$4.5 billion.

Investment over the years has allowed us to steadily grow revenue and market share in Securities Services² while maintaining a top-tier operating margin.

The scale of our business is remarkable. We provide safekeeping, settlement and services for securities in approximately 100 markets around the world, and at the end of 2022, assets under custody³ exceeded \$28 trillion.

Turning to Payments, the business saw strong growth in 2022, generating firmwide revenue of nearly \$14 billion, \$4 billion more than in 2021, due in large part to the effect of higher rates⁴. Payments revenue generated from the CIB alone increased 33% from the previous year⁴.

Serving more than 30,000 clients across the CIB and Commercial Banking and approximately 300,000 small- and medium-sized enterprises in the United States and Canada, the business continued to win new mandates and deepen relationships with the world's largest and most sophisticated companies. Over the last five years, the CIB's new mandates revenue more than doubled for both corporate and financial institution clients.

INNOVATION, TALENT AND INVESTMENT

I am very proud of our people, our results and the vital role our business plays in supporting global economies and commerce and in maintaining liquid, orderly markets. That role is amplified by the close collaboration across our businesses, which has allowed us to grow and invest while still maintaining strong returns for our shareholders. Innovation and investment are critical as we work to meet clients' evolving needs, as the competition intensifies and as we look to capitalize on several exciting opportunities.

Capital for the climate

Climate change is one of the most pressing challenges of our age. With the introduction of the Inflation Reduction Act and the need for solutions to Europe's energy challenges, a major opportunity exists in committing capital and expertise to help clients transition to the low-carbon economy. In 2022, the CIB facilitated \$164 billion in transactions (toward the firmwide target of \$2.5 trillion by the end of 2030) to further sustainable development, including \$1 trillion to support green initiatives. This predominantly consisted of leading or participating in environmental, social and governance (ESG)-related bond issuances, providing derivative hedging and advising on M&A deals.

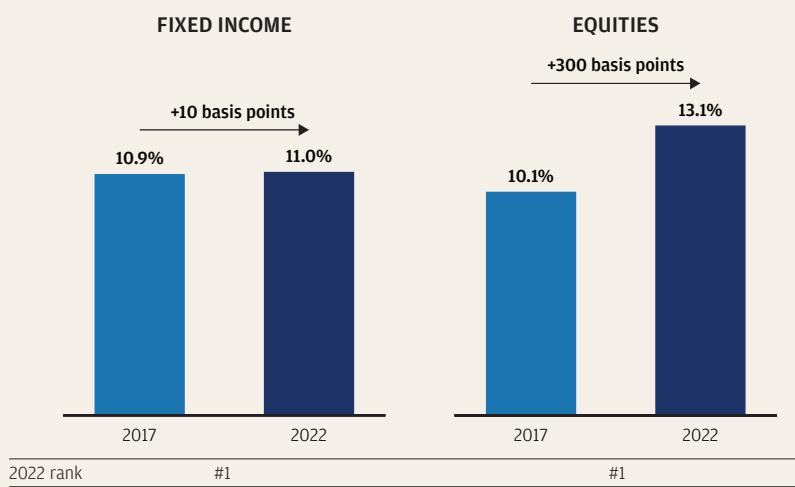
Moving forward, we plan to deepen our coverage of clients engaged in the green economy and low-carbon transition, create new products and allocate capital to finance ESG objectives. We will also build on the success of our two centers of excellence: the Center for Carbon Transition and ESG Solutions, a specialist team of investment bankers who provide ESG-related advice and transaction support.

³ Represents assets held directly or indirectly on behalf of clients under safekeeping, custody and servicing arrangements.

⁴ Firmwide Payments and CIB Payments revenue metrics exclude the net impact of equity investments.

MARKETS

Markets market share



Source: Coalition Greenwich Competitor Analytics (preliminary for FY22); market share is based on JPMorgan Chase's internal business structure and revenue; ranks are based on Coalition Index Banks for Markets

Boom in private capital markets

Another opportunity is the rapid growth in private capital markets. In 2022, we were involved in nearly 60 deals, raising \$12 billion in proceeds. We also launched our Capital Connect platform, which reinvented the traditional private capital raise, seamlessly connecting investors with earlier-stage companies. Helping a client at an early stage can result in a client-for-life relationship, leading to opportunities in global corporate and private banking and potentially an IPO or sell-side M&A mandate.

Private debt markets have also grown significantly in the last five years and at a much faster pace than the syndicated lending market⁵. To compete, we have set up a new direct lending initiative that has already funded dozens of deals, helping to deepen relationships, especially with middle market clients.

The halo effect in trading

In trading, we believe that being complete continues to offer huge advantages. Providing a complete set of trading products creates a halo effect, making it more attractive for clients to trade with us across the full range of our products. Our diversification also provides balance to our revenue regardless of the macroeconomic environment. For example, in 2021, equities outperformed while in 2022, fixed income macro businesses were the main growth engines.

We are also committed to providing a seamless and differentiated experience across the trade life cycle – from pre-trade through to execution to post-trade. For pre-trade, we are the clear leader in research, offering analysis on more than 5,200 companies and around 80 economies worldwide. With so much content, our focus has been on improving the client experience, ensuring we're delivering relevant, timely reports in the most accessible and digestible formats. For post-trade, our Securities Services business offers

comprehensive middle- and back-office services to complete the full trade life cycle experience for our clients.

Finally, we want to capitalize on secular growth trends in the industry. For instance, over the last five years, the industry wallet with large institutional clients has grown more than with other financial institutions. Increasingly, these large clients need banks with size, scale and solutions to manage complex portfolios. Being a reliable, complete counterparty, our market share with this particular group of clients has grown more than 350 basis points over the past five years⁶.

All of our clients continue to embrace electronic trading. Through the years, we've invested heavily in our electronic trading capabilities, both in areas that have been at the forefront of electronification, such as equities and foreign exchange, and in those where the industry has been slower to embrace the trend, such as credit.

Growth opportunities in data services

In Securities Services, the rising complexity of funds is creating opportunities as we continue to evolve to meet the changing needs of our clients. As a result, we have been modernizing our core custody and fund accounting infrastructure to create scale and efficiency.

We are also investing to expand our capabilities in areas like exchange-traded fund (ETF) servicing, middle-office outsourcing and alternatives – all of which are growth areas for our business.

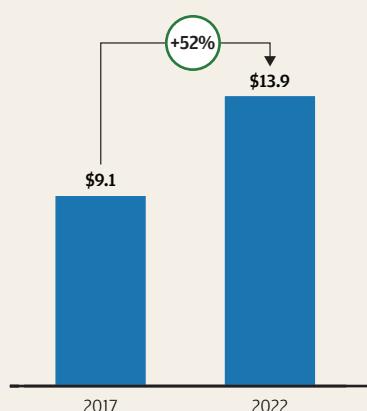
Looking ahead, clients will increasingly turn to service providers for help in managing their data. Anticipating this development, we launched our Fusion platform in 2022, and we're already building strong brand recognition in the market. Providing seamless and efficient solutions for discovering, managing and analyzing data will unlock new opportunities to deliver value to our investor clients.

⁵ Private debt market measured by private debt assets under management. Syndicated lending market measured by leveraged loans outstanding.

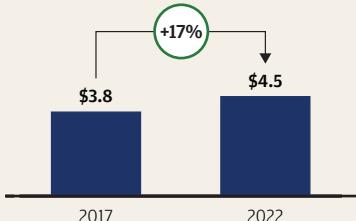
⁶ Coalition Greenwich Institutional Client Analytics. "Large Institutional Clients" is a JPM-only categorization that is defined by share of wallet, product, penetration and revenue metrics.

PAYMENTS AND SECURITIES SERVICES

Firmwide Payments revenue (\$ in billions)¹



Securities Services revenue (\$ in billions)²



¹ 2017 Firmwide Payments revenue is predominantly in CIB and CB and excludes the net impact of equity investments; adjusted down by \$0.1 billion for Merchant Services accounting re-class.

² 2017 Securities Services revenue adjusted down by \$0.1 billion to exclude the impact of past business simplification, exit actions and accounting changes.

WELL-POSITIONED FOR THE FUTURE

Global markets have already encountered significant challenges in the new year – from interest rate volatility to market and geopolitical uncertainty.

And with central banks tightening in ways we haven't seen before as they wrestle with ongoing inflationary pressures, market uncertainty is likely to persist and weigh on growth in the United States and other developed economies in 2023.

More positively, we are well-positioned to help clients in any environment. Our scale, completeness and culture of collaboration are key differentiators as clients increasingly look to us for solutions that straddle different business lines.

I am incredibly proud of how our employees supported clients in 2022. Our performance and the opportunities ahead show what an amazing hand our business has – and give me immense confidence and hope for the future.



Daniel E. Pinto

President and Chief Operating Officer,
JPMorgan Chase & Co., and
CEO, Corporate & Investment Bank

Software solutions for healthcare and connected cars

Our Payments business also operates at tremendous scale and lightning speed, moving more than \$9 trillion each day across 160 countries and 120 currencies.

We are investing to further scale and modernize our core payments infrastructure, as well as to develop the networks of the future. From peer-to-peer blockchain connections to JPM Coin, programmable money and digitization of assets, we're seeking to make sending, managing and receiving money easier, faster and more secure.

Connections with other parts of our firm, including Investment Banking, Commercial Banking, Markets and Retail Banking, are opening opportunities for Payments, especially with the 5.8 million small businesses that already bank with Chase. As the only bank with end-to-end in-house acquiring and treasury capabilities, we have created an ecosystem that provides merchants with everything from smart terminals and tap-on-phone solutions to consumer trends and insights drawn from issuing and acquiring data.

Another big opportunity exists in developing data and software-as-a-service solutions for platform businesses and industry verticals such as healthcare and connected cars. For example, in U.S. healthcare, InstaMed, which we acquired in 2019, digitizes interactions between patient, payers and providers, seamlessly processing payments and moving healthcare data. Now connected to approximately 60% of U.S. healthcare providers, it has created an extensive network for our clients. Similar opportunities exist in the fast-changing mobility industry, impacting not only the automotive sector but energy, utilities and commerce. Through our partnership with Volkswagen Financial Services and majority stake in Volkswagen Pay, we are exploring a future in which cars will be used as smart payment devices and commerce platforms.

In this and many other areas, our accelerated investments over the past few years are helping to future-proof our business. As we compete with banks and fintechs, we have the best of both: scale, end-to-end capabilities and direct relationships with clients of all sizes.

Commercial Banking

In 2022, Commercial Banking (CB) remained focused on executing our long-term strategy – growing our client franchise, investing in our platform and capabilities, and empowering and enabling our teams. We continued to stand by our clients, delivering capital, advice and solutions to help them best navigate an uncertain market environment.

I'm incredibly proud of our results and the notable market leadership positions we achieved last year.

CB reported record revenue of \$11.5 billion, net income of \$4.2 billion and a return on equity of 16%. Our strong performance was largely driven by adding clients, expanding into new markets and maintaining higher deposit margins.

- We had our third-best year for Investment Banking, with \$3 billion in revenue¹.
- Commercial & Industrial loans increased by 11% year-over-year².
- Commercial Real Estate loans grew 7% year-over-year².
- Credit performance remained strong, with net charge-offs of 4 basis points.

Our business continues to perform extremely well in a complex and competitive environment. The sustained investments we're making across our franchise are accelerating our organic growth, and our success is compounding. This letter will give you a window into our business and the tremendous runway that lies ahead.

¹ Represents total JPMorgan Chase revenue from investment banking products provided to CB clients.

² Commercial & Industrial and Commercial Real Estate groupings for CB are generally based on client segments and do not align with regulatory definitions.

SERVING MORE EXTRAORDINARY CLIENTS

CB's strategy is anchored on being our clients' most important financial partner, and we do this by delivering the expertise and capabilities of our global firm locally. In 2022, we continued to extend and deepen our reach by growing our U.S. and international footprint, enabling us to increase our addressable market and serve more exceptional clients around the world.

We expanded to five additional U.S. states and four new countries:

- **In the United States**, CB established a presence in Idaho, Montana, Nevada, New Mexico and South Carolina and is now in 78 of the top 100 metropolitan statistical areas, with a potential to cover more than 48,000 prospective clients.
- **We achieved a significant milestone in 2022** when we became the first bank able to accept government deposits in all 50 U.S. states, allowing us to bring

our services to more local governments and their residents.

- **Outside the United States**, we expanded into Denmark, Finland, Norway and Sweden and now have 80 bankers calling on more than 2,000 prospective, non-U.S.-headquartered clients in 24 countries.

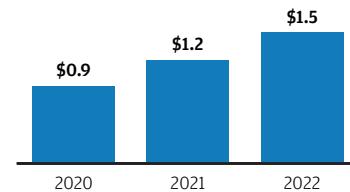
We're thoughtfully growing our team to support several high-potential opportunities:

- **We've maintained our focus on middle market companies with revenue less than \$100 million** and added bankers to serve more than 12,000 companies in this important segment, doubling our client relationships since 2018.
- **Both in the United States and EMEA**, we continued building our Green Economy and Innovation Economy teams to provide tailored support to these critical sectors that are advancing economic growth and sustainability. CB is well-positioned to serve clients from startup to IPO and beyond, partnering

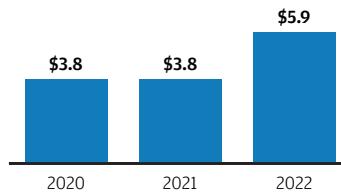
SELECT FINANCIAL HIGHLIGHTS

(\$ in billions)

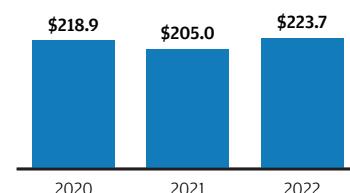
MIDDLE MARKET EXPANSION



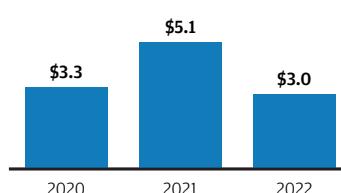
TOTAL PAYMENTS REVENUE



AVERAGE LOANS



INVESTMENT BANKING REVENUE





\$11.5B

TOTAL REVENUE



\$5.9B

TOTAL PAYMENTS REVENUE



~2,300

CLIENT ACQUISITIONS



~\$224B

AVERAGE LOAN BALANCES

across the firm to provide a full suite of capabilities, including capital raising, strategic advisory and a differentiated set of digital solutions.

- We created a new team of bankers** across 20 U.S. cities that is focused on understanding and supporting the unique journeys of diverse, women and veteran business owners and working to help their businesses grow and succeed. The community impact from this team has been very positive, and we are looking for more ways to serve this important segment of our economy.

CHAMPIONING OUR CLIENTS' SUCCESS WITH POWERFUL SOLUTIONS

Our ability to deliver JPMorgan Chase's full suite of solutions remains a key competitive advantage. In 2022, we continued to make significant investments in our capabilities, innovating to drive even more value for our clients.

- We're offering new, simple digital banking platforms** and integrated payment solutions to help clients run their businesses more effectively.
- In collaboration with our CIB partners,** we're providing clients with a more complete set of financing alternatives with the addition of our new direct lending offering.

- We introduced Story by J.P. Morgan™,** our all-in-one property management tool that offers multifamily property owners and operators valuable data, insights and an intuitive rent payments platform to best manage their real estate assets.

INVESTING IN TECHNOLOGY AND DATA TO OPTIMIZE OUR BUSINESS

We continue to make excellent progress in building a truly data-driven business, using our unique assets to enhance our operating processes and deliver valuable insights to both our teams and clients. The impact from this effort has been quite exciting, and the investments we are making will drive tremendous benefit for years to come.

- CB continued to scale and optimize our cloud-based data platform** and expanded our team of data scientists to help unlock even more value and embed business intelligence into all we do.
- Our robust customer relationship management platform and collaboration tools** promote connectivity across the firm, enabling us to serve clients with greater precision and foster new relationships.
- Using insights from our operating data,** we markedly improved client satisfaction scores by enhancing and streamlining both our onboarding process and client service experience.

DEEPENING OUR FOCUS ON COMMUNITY IMPACT

While growth and innovation are essential to CB's success, perhaps just as important is our focus on being a purpose-driven business. Our firm has long championed the essential role of banking in a community, a concept that is deeply woven into the strategy and culture of our franchise. In CB, we are using the power of our business – doing what we do best every day – to drive real outcomes in our communities.

Across our local markets, our teams deliver critical resources, specialized expertise and tailored solutions to help communities thrive. Collectively, in 2022 CB financed:

NOTABLE 2022 RECOGNITION



- Multifamily Lender in the United States³
- Multifamily Lender in New York City and Washington, D.C.³
- Primary Bank Market Share in Middle Market⁴
- In Middle Market syndicated lending⁵

³ Home Mortgage Disclosure Act data, United States Consumer Financial Protection Bureau.

⁴ Barlow Research.

⁵ Refinitiv.

SPOTLIGHT ON WASHINGTON, D.C.

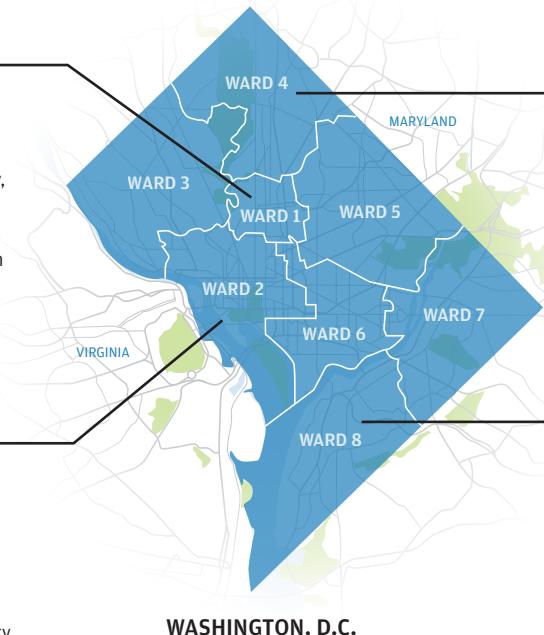
Our work helps strengthen thousands of communities every day, including Washington, D.C. CB currently serves **nearly 300 clients** in D.C. and has extended more than **\$1.2 billion** in financing to affordable housing developers, vital institutions and local businesses in the district since 2018.



As **Howard University's** primary operating bank, we've helped them increase efficiency, reduce costs and mitigate risk so they can focus on providing scholars, staff and the greater community with access to education and economic opportunity.



The firm's multimillion dollar investment and tailored advice helped **City First Broadway** become the largest Black-led minority depository institution in the country and extend more loans to underserved communities.



CB has provided local developer **Dantes Partners**, a division of Dumas Collective, with financing to support six affordable housing communities. In total, Dantes Partners has closed and financed more than 3,000 luxury affordable housing units in Washington, D.C., with a focus on seniors and low- to moderate-income residents.



Community of Hope recently opened a Family Health and Birth Center, the only free-standing birth center in the city. CB provided a \$21 million New Markets Tax Credit-qualified equity investment to purchase and expand the center, which has served more than 4,000 patients since March 2022.

- **\$19 billion in credit to vital institutions** – such as hospitals, schools and governments – that are critical to the health and vibrancy of our communities⁶
- **\$12 billion to create or incentivize the preservation of more than 95,000 affordable units** to help thousands of families access stable housing
- **\$300 million in New Markets Tax Credit investments** to support projects such as health clinics, grocery stores and job training facilities
- **\$670 million in loans to Green Economy clients** to help accelerate decarbonization

Together with our exceptional clients and colleagues across the firm, we're working to advance an inclusive economy, support local and diverse

businesses, and create a sustainable future for the places we call home.

LOOKING FORWARD

While we're incredibly proud of our 2022 results, we aren't standing still. 2023 is proving to be another complex year, and we have a responsibility to be a source of strength and stability, especially in uncertain times. As such, we remain prepared for a wide range of economic scenarios with our core tenets in clear view:

- **Partnering** across our firm to deliver value for our clients and communities
- **Maintaining** our credit discipline and client selection standards
- **Consistently investing** in our people, technology and data

Thus far, 2023 has only reinforced my confidence in our people, who have proved that they will rise to any

challenge. I'd like to express my sincere gratitude to the entire CB team, as well as our partners across the firm for their dedication, teamwork and client focus. I'm incredibly proud to work alongside all of them.



Douglas B. Petno

Douglas B. Petno
CEO, Commercial Banking

6 Includes new credit commitment originations and existing credit commitments that experienced a major modification during 2022.

Asset & Wealth Management

It was an important transition year for financial markets in 2022 as the world adjusted to the move from near-zero interest rates and quantitative easing – in order to stimulate post-COVID economies – to rapid interest rate increases and global quantitative tightening. The unprecedented speed of this reset caused significant market dislocations, with higher discount rates leading to severe asset repricing. For the first time in more than 50 years, both stock and bond markets had negative returns, calling into question the diversification principles of asset allocation.

Through it all, J.P. Morgan Asset & Wealth Management (AWM) drew upon its two centuries of experience navigating global markets and providing forward-looking insights to ensure that our clients had the planning and investment advice they needed to sustain a long-term perspective. Our relentless focus on risk management

and comprehensive controls over all our activities has helped us guide and support our clients throughout the years – especially during more challenging times.

As fiduciaries for millions of clients, and with more than \$4 trillion of their assets, we never take for granted the trust and confidence they place in us, and we work tirelessly to re-earn it each and every day.

INVESTMENT PERFORMANCE FOR OUR CLIENTS

For many years, I have written about the importance of being an active investor, as the world is constantly evolving – yesterday's leading opportunities are not guaranteed to be tomorrow's. In 2022, these principles were reinforced, as actively managed portfolios – an area in which J.P. Morgan has long excelled – proved their value in delivering strong returns for clients.

AWM has one of the industry's largest internal research budgets and employs more than 1,100 investment professionals who cover over 2,500 companies, spanning every asset class and major geography. These individuals methodically travel around the world to uncover compelling investment opportunities for our clients; last year alone, they held over 5,000 meetings with companies and management teams.

Our durable approach helped us deliver strong investment performance amid the historic levels of volatility in 2022, particularly in our Fixed Income and Equity platforms, outpacing most of our largest peers, especially those with more passive approaches to investing assets. In fact, across the three-, five- and 10-year time horizons, our investment performance in those asset classes has never been stronger. Our long-term mutual fund assets under management (AUM) outperforming the peer median over 10 years increased from a strong 86% in 2021 to an even better 90% in 2022.

Clients rewarded our consistent and strong outperformance by entrusting us with even more of their assets. AWM not only achieved its 19th consecutive year of net new inflows, but we also ranked in the top three of public peers for net client inflows over the past five years.

FINANCIAL PERFORMANCE FOR OUR SHAREHOLDERS

With delivering superior investment performance as our guiding principle, our revenue grew by 5% to reach a record level. Our results were strong across regions and channels and benefited from our fortress balance sheet, the Global Private Bank's (GPB) robust deposit

INVESTMENT PERFORMANCE

2022 % of J.P. Morgan Asset Management Long-Term Mutual Fund AUM Outperforming Peer Median Over 10 Years¹

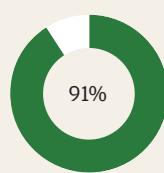
TOTAL J.P. MORGAN ASSET MANAGEMENT



EQUITY



FIXED INCOME



MULTI-ASSET SOLUTIONS & ALTERNATIVES



franchise, J.P. Morgan Asset Management's (JPMAM) investment prowess, and a sizable number of new clients turning to J.P. Morgan for advice and guidance.

While pre-tax income was lower in 2022 than the previous year, it reflected our purposeful investments in our world-class talent, cutting-edge technologies and superior client coverage. With a healthy pre-tax margin of 33% that is among the industry's highest, AWM has continued to deliver operating leverage to our shareholders over the past five years.

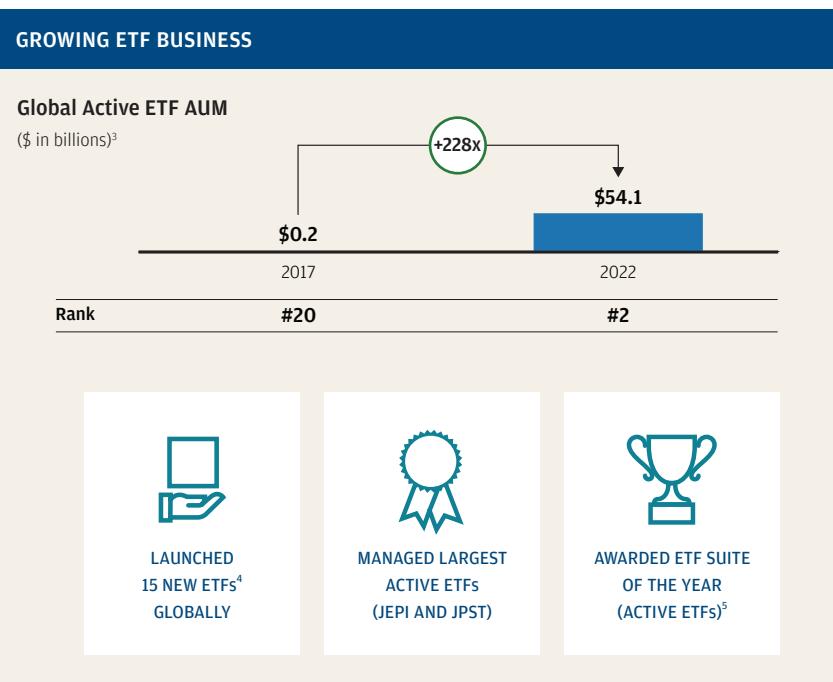
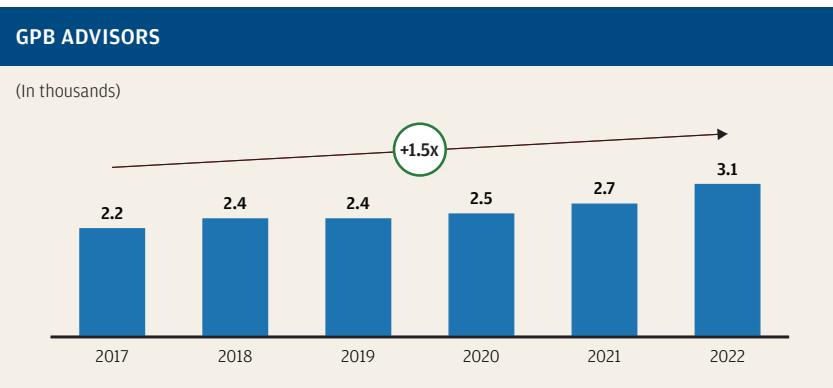
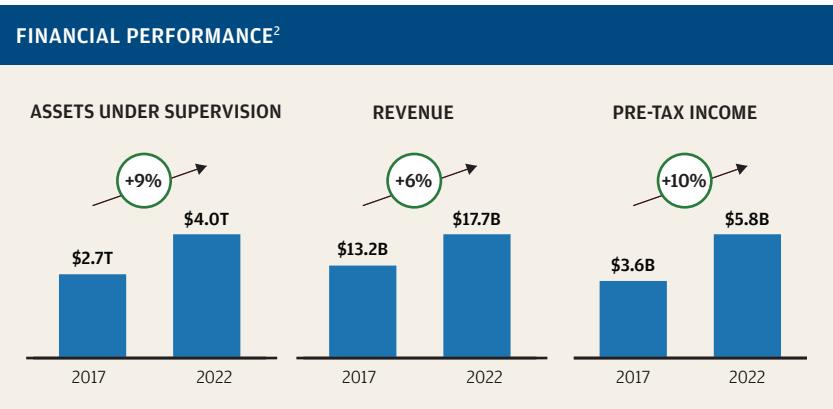
INVESTING IN THE FUTURE OF OUR FRANCHISE

One of our most significant investments has been in our effort to increase our roster of high-quality GPB advisors. Our commitment in this area yielded results, and in 2022, for the first time, we surpassed 3,000 GPB advisors. Once hired, our advisors go through our world-class training programs to set them on a path to success and help them grow through each stage of their career.

We also saw progress in our systematic efforts to expand our capabilities to meet client demand. We have invested heavily in JPMAM's active exchange-traded fund (ETF) business, which in just a few years has grown from two solutions with \$237 million in AUM to 78 U.S. and UCITS ETFs, representing more than \$54 billion in AUM. With a lineup that includes two of the industry's largest and top-performing active ETFs – JPMorgan Equity Premium Income ETF (JEP1) and JPMorgan Ultra-Short Income ETF (JPST) – JPMAM ended 2022 ranked #2 in global active ETF AUM.

In addition to organic growth, AWM has made several acquisitions in recent years, each of which is making valuable contributions to our business:

- **55ip**, our customized tax-loss harvesting engine, built new, more highly scalable platforms to handle separate accounts, along with additional tax-managed strategies.



1 For footnote, refer to page 43 footnote 33 in this Annual Report.

2 In the fourth quarter of 2020, the firm realigned certain wealth management clients from AWM to CCB. Prior-period amounts have been revised to conform with the current presentation. Percentage increases represent compound annual growth rates.

3 Includes U.S.-domiciled ETFs and European-domiciled ETFs with UCITS labels.

4 U.S. and UCITS ETFs, including four ETFs in Australia.

5 Award by With Intelligence in 2022.

6 Sustainable Equity Strategy Assets.

7 Projected by 1H23.

8 Any forecasts, figures and opinions set out are for information purposes only, based on certain assumptions and current market conditions and are subject to change without prior notice.

- **Campbell Global**, our timber- and forestry-focused investment manager, had notable new investment flows. Additionally, several other alternative funds started with newly acquired teams of experts in their various fields.
- **OpenInvest**, our customized investment preference screener, delivered several new screening capabilities to our advisors and clients.
- **Global Shares**, our cloud-based provider of equity share plan management to public and private companies, ended 2022 with nearly 1 million employee

participant clients and continues to onboard new companies and their respective employees at a record pace.

To ensure we can scale our growth, we are investing in operational excellence across all that we do, with a particular focus on trade processing flows and client transactions/money movement, strong controls and protection around client activities, and ease of interaction. These investments are part of our ongoing efforts to streamline our processes and make it easy for our clients and advisors to work with us.

DELIVERING VALUE THROUGH M&A

We continue to focus on delivering digital, personalized and ESG solutions to our clients.



7X AUM
SINCE ACQUISITION



\$1.5B⁶
ALIGNED TO OPENINVEST INSIGHTS
AND CLIENT REPORTING



15%
GROSS TOTAL RETURN (1Y)



~1M⁷
TOTAL CLIENTS

STEPPING UP OUR SUPPORT FOR UKRAINE



J.P. Morgan is the #1 issuer for Ukraine sovereign debt and has been since 2010, raising over \$25 billion. When the war broke out in February 2022, we worked swiftly to give a two-year payment deferral to help do our part during the conflict. As we approached the one-year mark of the war, J.P. Morgan sent a delegation traveling 11 hours by train into Kyiv to sign a memorandum of understanding for J.P. Morgan to advise on rebuilding, financial stabilization, sovereign credit ratings and economic ties to Europe. We are committed to helping with the road map to recovery for Ukraine and its people.

Pictured (clockwise): **Volodymyr Zelenskyy**, President of Ukraine; **Yulia Svyrydenko**, First Deputy Prime Minister of Ukraine and Minister of Economic Development and Trade; **Anton Pil**, JPMAM Global Head of Alternatives; **Stefan Weiler**, JPM Head of Debt Capital Markets in Central and Eastern Europe, the Middle East and Africa; **Vincent La Padula**, JPM Head of Workplace; and **Rostyslav Shurma**, Deputy Head of the Office of the President of Ukraine. Photo from J.P. Morgan Summit broadcast of meeting in Kyiv (February 10, 2023).

OPTIMISTIC FOR THE FUTURE

We know there will always be unexpected volatility in the broader environment. As a fiduciary, we constantly stress test portfolios to prepare clients for those scenarios. Recent events in 2023's first quarter have reminded us of those risks. Today's financial system is stronger than any time before, and it will emerge even more resilient as we apply lessons learned to the future. As tough as 2022 was on markets, the good news is the starting point for the next 10 to 15 years of future return assumptions has increased nearly 70%, from 4.3% last year to 7.2%⁸.

I am so proud of the breadth and consistency of our success in delivering value to our clients and shareholders. We remain relentlessly focused on being the advisor of choice to the world's most prominent institutions, pension funds, central banks, individuals and families. Our commitment to doing first-class business in a first-class way for these clients is what makes AWM a special gem inside JPMorgan Chase.

I also take great pride in how we helped clients and our shareholders navigate the challenges of 2022 and across past market cycles, and I am optimistic about the opportunities ahead and our role in helping to deliver the best possible outcomes for all our stakeholders.



Mary

Mary Callahan Erdoes

CEO, Asset & Wealth Management

Corporate Responsibility

Corporate Responsibility at JPMorgan Chase takes a robust, holistic approach to driving inclusive economic growth in communities around the world. Combining our philanthropy, research, policy recommendations and advocacy, while working with leaders at every level of government and business, we advance strategies to help move the needle on significant challenges affecting the communities we serve, from closing the racial wealth gap and tackling the skilled labor shortage to making the economy and communities more resilient.

At the core of our integrated model is a focus on outcomes. Bringing together our resources – including our expertise and community network – we work to generate solutions that benefit customers, communities and the economy at large. **We see this in how JPMorgan Chase develops banking products, supports clients and communities, and powers the economy.**

Promoting financial health. Far too many people lack access to the products and services they need to improve their financial health, including checking and savings accounts. To help close America's wealth gap, we looked to consumer data, social entrepreneurs and our long-standing community partners for insights, which influenced the design of products like Chase Secure BankingSM, an affordable and safe account option serving nearly 1.5 million customers, and Autosave, a tool used by 1.9 million consumers to simplify and automate savings. With nonprofits like the Cities for Financial Empowerment Fund, we helped establish national standards for products similar to Secure Banking so more people can access low-cost banking services. And with Autosave, we leveraged insights from the JPMorgan Chase Institute

and collaborated with consumer advocates and community leaders to understand the most effective strategies to help even more customers meet their savings goals and set aside money for unexpected expenses like car repairs or medical bills.

Increasing access to economic opportunity. We believe that when communities thrive, businesses thrive. In Seine-Saint-Denis (SSD), just outside of Paris where 30% of young people live in poverty, we are putting our model to work to help spur economic growth. Nearly five years ago, we made a \$30 million philanthropic commitment to support communities in Greater Paris, particularly in SSD. We started by collaborating with government agencies and nonprofits on skills training and small business growth, assessing and updating our strategy along the way. This effort reached people like Fatou, an entrepreneur who, with the assistance of our nonprofit partner Adie, learned how to win public and private contracts for her security company. She was able to get her business off the ground and grow her client network. Fatou is one of more than 6,700 entrepreneurs and 600 local businesses who have received such support in addition to the 23,000 SSD residents who have received necessary skills training to advance their careers. We are continuing to learn from the outcomes of our work in Greater Paris, coordinating closely with local policymakers and organizations as we plan to enhance our commitment going forward.

Supporting global growth and security. The war in Ukraine has upended millions of lives and created a significant shortage of energy supplies. Over the past year, we have worked closely with leaders across our company, clients and policymakers to navigate these unprecedented social, economic and energy security challenges.

Once again, we are taking a comprehensive approach, informing business decisions to advance energy security and scale clean technology solutions while providing \$10 million in philanthropic capital to address critical humanitarian needs and help launch career training and upskilling programs for Ukrainian refugees in Poland. And we are thinking toward the future, advising the Ukrainian government on its plan for a postwar recovery. This is a pivotal moment for the global economy, and we will continue to leverage our wide range of expertise and insights to navigate complex global dynamics.

Generating impact is a business imperative. Improving our products, strengthening communities, and supporting a more inclusive and secure global economy are inextricably tied to the success of our company. Even as we seek to manage uncertainty and market distress to promote a sound financial system, it remains the responsibility of both the public and private sectors to come together to identify solutions that will lead to greater prosperity.



A handwritten signature in black ink, appearing to read "Demetrios".

Demetrios Marantis
Global Head of Corporate Responsibility

In Corporate Responsibility, we aim to help strengthen the global financial system by supporting economic opportunity that is equitable and accessible. We help identify solutions to major global challenges thanks to the investments we've made to build a strong and sustainable company.

Every day, we apply what we've learned from supporting our customers and clients to help build more resilient communities. This approach allows us to focus on the ingredients essential for inclusive growth: jobs and skills training, small business growth, community development and financial health.

Here are some ways we bring the full force of the firm – combining our business resources, community and government engagement, philanthropic capital, data and expertise – to promote a stronger, more inclusive economy.



Safeguarding sound financial systems

The global economy is only as resilient as its financial systems. Around the world, we're working with policy groups, trade associations and regulators so we can extend loans, make capital investments and provide services that help people access more opportunities.

In 2020, we joined the Office of the Comptroller of the Currency's launch of Project REACH (Roundtable for Economic Access and Change), formed to identify and reduce barriers to full and fair participation in the United States' banking system and economy. We were the first major financial institution to launch an

initiative to provide credit to customers with no credit history, and we have now approved credit cards for roughly 15,000 new-to-credit customers. This helps people to build credit scores and access lower-priced mainstream credit products, which could eventually include a mortgage – one of America's most important sources of generational wealth.

Accelerating climate and sustainability solutions

Across our company, we are taking measures to respond to the climate challenge against the backdrop of a global energy crisis. In December, we issued our Climate Report outlining how we are scaling green solutions to support our clients' business goals, investing in new clean energy technology that creates local economic growth and jobs, meeting immediate energy needs, and minimizing our operational impact. In 2022, we financed and facilitated \$197 billion toward our \$2.5 trillion Sustainable Development Target: \$70 billion toward green, \$87 billion toward development finance and \$40 billion toward community development. Through 2022, we have financed and facilitated \$482 billion toward this overall target, including \$176 billion toward our \$1 trillion green target.

We also announced 2030 emissions intensity reduction targets for three new key sectors: iron and steel, cement and aviation. The aggregate of these new sectors, along with the sectors we announced in 2021, accounts for the majority of global emissions across both the supply and demand sides in the global energy system – a key consideration for advancing overall decarbonization and the global path to net-zero emissions.

We recognize that climate change has a domino effect on communities, with extreme weather impacting roughly one in 10 homes in the United States. In response, we're supporting programs

that aim to scale climate-resilient affordable housing models, particularly in Black, Hispanic and Latino communities, including in rural areas. Our most recent \$15 million philanthropic commitment will help produce or preserve more than 1,400 units of affordable housing, incorporating energy-efficient features and weatherization upgrades that offer protection against extreme weather and reduce utility costs.

Driving inclusive economic growth

Investing in the careers of tomorrow

As rapid changes in technology, automation and artificial intelligence alter career paths, it is imperative for companies like ours to transform how we prepare people to compete for well-paying jobs. Since 2018, we've supported the Dallas County Promise, a program helping Dallas County Public School students access postsecondary education opportunities at local colleges and universities. Today, more than 90,000 high school seniors in the Dallas area have benefited.



This model is being scaled across the state, with the potential to serve 5% of the nation's high school seniors. It is even influencing legislation to help districts prepare students for college and encourage high schoolers to apply for federal financial aid before they graduate. Supporting this impactful program is part of our five-year, \$350 million commitment to equip people with the skills they need for the future of work and to meet the growing demand for qualified workers.

Supporting small business growth

Small businesses generate jobs and are vital to driving local economic growth. In the past year, we have assisted more than 26,500 small businesses around the world, helping them create or retain more than 54,000 jobs and increase revenue by over \$129 million. Our employees have been central to this effort, committing 7,000+ volunteer hours globally through our Founders Forward small business mentorship program. The program pairs entrepreneurs with JPMorgan Chase team members to receive consultative support on various business challenges, covering leadership, financial modeling, e-commerce, marketing and more.



We also help entrepreneurs succeed through our support of Ascend, a nationwide program focused on developing customized growth strategies for small businesses. Eighty-nine percent of participating businesses are owned by people of color, and this year these businesses surpassed \$2 billion in contracts. As a result of Ascend's specialized approach, participating entrepreneurs are able to focus on trainings most relevant to them. In New York City, for example, Salsa Hospitality CEO Daniel Garcia learned how to grow his executive team, plan for long-term business expansion and purchase a new facility to accommodate business growth, ultimately increasing sales by 56% in 2022.

Catalyzing community development

Economic opportunity is deeply rooted in neighborhoods. We saw this firsthand in Syracuse, New York, where a declining manufacturing sector contributed to an economic downturn, job loss and population decrease. As one of the inaugural winners of our annual *Advancing Cities* Challenge, a yearly competition that promotes community-driven solutions to advance local inclusive growth, we provided \$3 million over three years and ongoing coaching to help drive technological development in the city's workforce, neighborhoods and small businesses and to boost its economy.

With our support, the city of Syracuse piloted and evolved its Community Investment Framework, ultimately attracting significant public and private sector investments. According to the city, these investments are creating nearly 50,000 jobs, generating almost \$600 million in annual tax revenue for New York state and spurring an additional \$500 million in public and private sector funding that will help scale opportunities and create economic growth for residents in Syracuse's underserved communities.

Promoting financial health and wealth creation

Policies, programs and products aimed at improving financial health are key to creating more inclusive economies. Through our support of innovative, inclusive fintech accelerators – the Financial Inclusion Lab, the Financial Solutions Lab and the Catalyst Fund – we are helping advance the financial well-being of underserved low- and middle-income populations. The Labs provide capital, mentorship and additional assistance to create scalable fintech solutions that enable communities to build wealth, save money and reduce debt.

In India, the Financial Inclusion Lab has supported 50 early-stage startups, serving more than 30 million consumers who need access to savings, credit and

insurance services and raising over \$80 million in follow-up funding to continue their work. In the United States, Financial Solutions Lab participants have helped more than 33 million consumers. And in emerging markets like Nigeria, the Catalyst Fund has supported 61 startups, helping more than 14 million customers build savings, learn to invest and more easily access credit.

Extending support in times of crisis

We show up for the communities we serve in both good and tough times. Over the last three years, we've contributed more than \$33 million for disaster relief through corporate donations and employee personal donations. We've provided support to communities through hardships of all kinds, from catastrophic earthquakes in Haiti, Türkiye and Syria to the cost-of-living crisis in the United Kingdom and tragic violence in neighborhoods spanning the United States.



But in many cases, impacted communities need more than financial support. When Jackson, Mississippi, a city with more than 140,000 residents, experienced periodic water shutdowns and boil orders due to burst pipes and high lead levels, our team worked closely with community organizations responding to the crisis, hosting a local training for nonprofits working on recovery plans while also distributing resources like bottled water. This is just one example of how we're bringing our expertise and resources to Mississippi as our business in the state continues to grow.

Table of contents

Financial:

44 Three-Year Summary of Consolidated Financial Highlights

45 Five-Year Stock Performance

Management's discussion and analysis:

46 Introduction

47 Executive Overview

51 Consolidated Results of Operations

55 Consolidated Balance Sheets and Cash Flows Analysis

58 Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures

61 Business Segment Results

81 Firmwide Risk Management

85 Strategic Risk Management

86 Capital Risk Management

97 Liquidity Risk Management

106 Credit and Investment Risk Management

131 Market Risk Management

139 Country Risk Management

141 Climate Risk Management

142 Operational Risk Management

149 Critical Accounting Estimates Used by the Firm

153 Accounting and Reporting Developments

154 Forward-Looking Statements

Audited financial statements:

155 Management's Report on Internal Control Over Financial Reporting

156 Report of Independent Registered Public Accounting Firm

159 Consolidated Financial Statements

164 Notes to Consolidated Financial Statements

Supplementary information:

292 Distribution of assets, liabilities and stockholders' equity; interest rates and interest differentials

297 Glossary of Terms and Acronyms

Note:

The following pages from JPMorgan Chase & Co.'s 2022 Form 10-K are not included herein: 1-42, 304

Financial

THREE-YEAR SUMMARY OF CONSOLIDATED FINANCIAL HIGHLIGHTS (unaudited)

As of or for the year ended December 31, (in millions, except per share, ratio, headcount data and where otherwise noted)	2022	2021	2020
Selected income statement data			
Total net revenue	\$ 128,695	\$ 121,649	\$ 119,951
Total noninterest expense	76,140	71,343	66,656
Pre-provision profit ^(a)	52,555	50,306	53,295
Provision for credit losses	6,389	(9,256)	17,480
Income before income tax expense	46,166	59,562	35,815
Income tax expense	8,490	11,228	6,684
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Earnings per share data			
Net income: Basic	\$ 12.10	\$ 15.39	\$ 8.89
Diluted	12.09	15.36	8.88
Average shares: Basic	2,965.8	3,021.5	3,082.4
Diluted	2,970.0	3,026.6	3,087.4
Market and per common share data			
Market capitalization	\$ 393,484	\$ 466,206	\$ 387,492
Common shares at period-end	2,934.2	2,944.1	3,049.4
Book value per share	90.29	88.07	81.75
Tangible book value per share ("TBVPS") ^(a)	73.12	71.53	66.11
Cash dividends declared per share	4.00	3.80	3.60
Selected ratios and metrics			
Return on common equity ("ROE") ^(b)	14 %	19 %	12 %
Return on tangible common equity ("ROTCE") ^{(a)(b)}	18	23	14
Return on assets ("ROA") ^(a)	0.98	1.30	0.91
Overhead ratio	59	59	56
Loans-to-deposits ratio	49	44	47
Firm Liquidity coverage ratio ("LCR") (average) ^(c)	112	111	110
JPMorgan Chase Bank, N.A. LCR (average) ^(c)	151	178	160
Common equity Tier 1 ("CET1") capital ratio ^(d)	13.2	13.1	13.1
Tier 1 capital ratio ^(d)	14.9	15.0	15.0
Total capital ratio ^(d)	16.8	16.8	17.3
Tier 1 leverage ratio ^{(c)(d)}	6.6	6.5	7.0
Supplementary leverage ratio ("SLR") ^{(c)(d)}	5.6	5.4	6.9
Selected balance sheet data (period-end)			
Trading assets	\$ 453,799	\$ 433,575	\$ 503,126
Investment securities, net of allowance for credit losses	631,162	672,232	589,999
Loans	1,135,647	1,077,714	1,012,853
Total assets	3,665,743	3,743,567	3,384,757
Deposits	2,340,179	2,462,303	2,144,257
Long-term debt	295,865	301,005	281,685
Common stockholders' equity	264,928	259,289	249,291
Total stockholders' equity	292,332	294,127	279,354
Headcount	293,723	271,025	255,351
Credit quality metrics			
Allowances for loan losses and lending-related commitments	\$ 22,204	\$ 18,689	\$ 30,815
Allowance for loan losses to total retained loans	1.81 %	1.62 %	2.95 %
Nonperforming assets	\$ 7,247	\$ 8,346	\$ 10,906
Net charge-offs	2,853	2,865	5,259
Net charge-off rate	0.27 %	0.30 %	0.55 %

(a) Pre-provision profit, TBVPS and ROTCE are each non-GAAP financial measures. Tangible common equity ("TCE") is also a non-GAAP financial measure. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60 for a discussion of these measures.

(b) Quarterly ratios are based upon annualized amounts.

(c) For the years ended December 31, 2022, 2021 and 2020, the percentage represents average ratios for the three months ended December 31, 2022, 2021 and 2020.

(d) As of December 31, 2022, 2021 and 2020, the capital metrics reflect the relief provided by the Federal Reserve Board in response to the COVID-19 pandemic, including the Current Expected Credit Losses ("CECL") capital transition provisions. As of December 31, 2020, the SLR reflected the temporary exclusions of U.S. Treasury securities and deposits at Federal Reserve Banks, which became effective April 1, 2020 and remained in effect through March 31, 2021. Refer to Capital Risk Management on pages 86-96 for additional information.

FIVE-YEAR STOCK PERFORMANCE

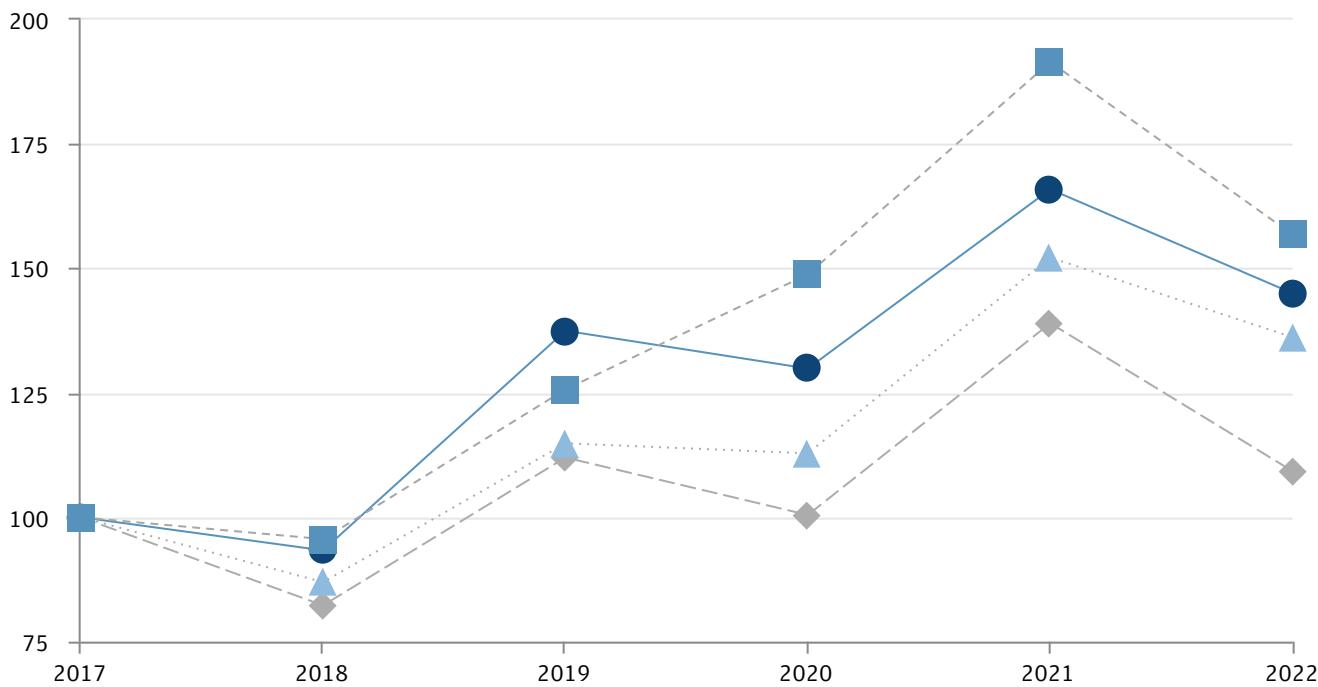
The following table and graph compare the five-year cumulative total return for JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”) common stock with the cumulative return of the S&P 500 Index, the KBW Bank Index and the S&P Financials Index. The S&P 500 Index is a commonly referenced equity benchmark in the United States of America (“U.S.”), consisting of leading companies from different economic sectors. The KBW Bank Index seeks to reflect the performance of banks and thrifts that are publicly traded in the U.S. and is composed of leading national money center and regional banks and thrifts. The S&P Financials Index is an index of financial companies, all of which are components of the S&P 500. The Firm is a component of all three industry indices.

The following table and graph assume simultaneous investments of \$100 on December 31, 2017, in JPMorgan Chase common stock and in each of the above indices. The comparison assumes that all dividends were reinvested.

December 31, (in dollars)	2017	2018	2019	2020	2021	2022
JPMorgan Chase	\$ 100.00	\$ 93.35	\$ 137.48	\$ 129.89	\$ 165.91	\$ 145.01
KBW Bank Index	100.00	82.29	112.01	100.47	138.99	109.25
S&P Financials Index	100.00	86.96	114.87	112.85	152.20	136.17
S&P 500 Index	100.00	95.61	125.70	148.82	191.49	156.81

December 31,
(in dollars)

—●— JPMorgan Chase —◆— KBW Bank ▲... S&P Financials -■- S&P 500



Management's discussion and analysis

The following is Management's discussion and analysis of the financial condition and results of operations ("MD&A") of JPMorgan Chase for the year ended December 31, 2022. The MD&A is included in both JPMorgan Chase's Annual Report for the year ended December 31, 2022 ("Annual Report") and its Annual Report on Form 10-K for the year ended December 31, 2022 ("2022 Form 10-K" or "Form 10-K") filed with the Securities and Exchange Commission ("SEC"). Refer to the Glossary of terms and acronyms on pages 297-303 for definitions of terms and acronyms used throughout the Annual Report and the 2022 Form 10-K.

This Form 10-K contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are based on the current beliefs and expectations of JPMorgan Chase's management, speak only as of the date of this Form 10-K and are subject to significant risks and uncertainties. Refer to Forward-looking Statements on page 154 and Part 1, Item 1A: Risk factors in this Form 10-K on pages 9-32 for a discussion of certain of those risks and uncertainties and the factors that could cause JPMorgan Chase's actual results to differ materially because of those risks and uncertainties. There is no assurance that actual results will be in line with any outlook information set forth herein, and the Firm does not undertake to update any forward-looking statements.

INTRODUCTION

JPMorgan Chase & Co. (NYSE: JPM), a financial holding company incorporated under Delaware law in 1968, is a leading financial services firm based in the United States of America ("U.S."), with operations worldwide. JPMorgan Chase had \$3.7 trillion in assets and \$292.3 billion in stockholders' equity as of December 31, 2022. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the Firm serves millions of customers, predominantly in the U.S., and many of the world's most prominent corporate, institutional and government clients globally.

JPMorgan Chase's principal bank subsidiary is JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), a national banking association with U.S. branches in 48 states and Washington, D.C. JPMorgan Chase's principal nonbank subsidiary is J.P. Morgan Securities LLC ("J.P. Morgan Securities"), a U.S. broker-dealer. The bank and non-bank subsidiaries of JPMorgan Chase operate nationally as well as through overseas branches and subsidiaries, representative offices and subsidiary foreign banks. The Firm's principal operating subsidiaries outside the U.S. are J.P. Morgan Securities plc and J.P. Morgan SE ("JPMSE"), which are subsidiaries of JPMorgan Chase Bank, N.A. and are based in the United Kingdom ("U.K.") and Germany, respectively.

For management reporting purposes, the Firm's activities are organized into four major reportable business segments, as well as a Corporate segment. The Firm's consumer business is the Consumer & Community Banking ("CCB") segment. The Firm's wholesale business segments are the Corporate & Investment Bank ("CIB"), Commercial Banking ("CB"), and Asset & Wealth Management ("AWM"). Refer to Business Segment Results on pages 61-80, and Note 32 for a description of the Firm's business segments, and the products and services they provide to their respective client bases.

The Firm's website is www.jpmorganchase.com. JPMorgan Chase makes available on its website, free of charge, annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934, as soon as reasonably practicable after it electronically files or furnishes such material to the U.S. Securities and Exchange Commission (the "SEC") at www.sec.gov. JPMorgan Chase makes new and important information about the Firm available on its website at <https://www.jpmorganchase.com>, including on the Investor Relations section of its website at <https://www.jpmorganchase.com/ir>. Information on the Firm's website is not incorporated by reference into this 2022 Form 10-K or the Firm's other filings with the SEC.

EXECUTIVE OVERVIEW

This executive overview of the MD&A highlights selected information and does not contain all of the information that is important to readers of this 2022 Form 10-K. For a complete description of the trends and uncertainties, as well as the risks and critical accounting estimates affecting the Firm, this 2022 Form 10-K should be read in its entirety.

Financial performance of JPMorgan Chase

Year ended December 31, (in millions, except per share data and ratios)	2022	2021	Change
Selected income statement data			
Noninterest revenue	\$ 61,985	\$ 69,338	(11)%
Net interest income	\$ 66,710	\$ 52,311	28 %
Total net revenue	\$ 128,695	\$ 121,649	6 %
Total noninterest expense	76,140	71,343	7
Pre-provision profit	52,555	50,306	4
Provision for credit losses	6,389	(9,256)	NM
Net income	37,676	48,334	(22)
Diluted earnings per share	12.09	15.36	(21)
Selected ratios and metrics			
Return on common equity	14 %	19 %	
Return on tangible common equity	18	23	
Book value per share	\$ 90.29	\$ 88.07	3
Tangible book value per share	73.12	71.53	2
Capital ratios^(a)			
CET1 capital	13.2 %	13.1 %	
Tier 1 capital	14.9	15.0	
Total capital	16.8	16.8	
Memo:			
NII excluding Markets ^(b)	\$ 62,355	\$ 44,498	40
NIR excluding Markets ^(b)	40,938	53,412	(23)
Markets ^(b)	28,984	27,394	6
Total net revenue - managed basis	\$ 132,277	\$ 125,304	6

- (a) The ratios reflect the CECL capital transition provisions. Refer to Capital Risk Management on pages 86-96 for additional information.
- (b) NII and NIR refer to net interest income and noninterest revenue, respectively. Markets consists of CIB's Fixed Income Markets and Equity Markets businesses.

Comparisons noted in the sections below are for the full year of 2022 versus the full year of 2021, unless otherwise specified.

Firmwide overview

JPMorgan Chase reported net income of \$37.7 billion for 2022, down 22%, earnings per share of \$12.09, ROE of 14% and ROTCE of 18%.

- **Total net revenue** was \$128.7 billion, up 6%, reflecting:
 - Net interest income of \$66.7 billion, up 28%, driven by higher rates and loan growth, partially offset by lower Markets net interest income. Net interest income excluding Markets was \$62.4 billion, up 40%.

- Noninterest revenue of \$62.0 billion, down 11%, driven by lower Investment Banking fees, \$2.4 billion of net investment securities losses in Treasury and CIO, lower net production revenue in Home Lending and lower auto operating lease income, largely offset by higher CIB Markets revenue and a \$914 million gain on the sale of Visa Class B common shares ("Visa B shares") in Corporate.

- **Noninterest expense** was \$76.1 billion, up 7%, driven by higher structural expense and continued investments in the business, including compensation, technology and marketing, partially offset by lower volume- and revenue-related expense.
- The **provision for credit losses** was \$6.4 billion, reflecting:
 - a net addition of \$3.5 billion to the allowance for credit losses, consisting of \$2.3 billion in wholesale and \$1.2 billion in consumer, driven by loan growth and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede, and
 - \$2.9 billion of net charge-offs.

The prior year provision was a net benefit of \$9.3 billion, reflecting a net reduction to the allowance for credit losses of \$12.1 billion.
- The total **allowance for credit losses** was \$22.2 billion at December 31, 2022. The Firm had an allowance for loan losses to retained loans coverage ratio of 1.81%, compared with 1.62% in the prior year.
- The Firm's **nonperforming assets** totaled \$7.2 billion at December 31, 2022, a net decrease of \$1.1 billion, predominantly driven by lower consumer nonaccrual loans, reflecting improved credit performance and loan sales.
- Firmwide **average loans** of \$1.1 trillion were up 6%, driven by higher loans across the LOBs.
- Firmwide **average deposits** of \$2.5 trillion were up 5%, reflecting:
 - growth in CCB from existing and new accounts, and net inflows in AWM resulting from the residual effects of certain government actions, partially offset by the impact of growth in customer spending in CCB and migration into investments in AWM, and
 - reductions in CIB and CB due to attrition driven by the rising interest rate environment.

Selected capital and other metrics

- **CET1 capital** was \$219 billion, and the Standardized and Advanced CET1 ratios were 13.2% and 13.6%, respectively.
- **SLR** was 5.6%.
- **TBVPS** grew by 2%, ending 2022 at \$73.12.

Management's discussion and analysis

- As of December 31, 2022, the Firm had average eligible **High Quality Liquid Assets** (“HQLA”) of approximately \$733 billion and **unencumbered marketable securities** with a fair value of approximately \$694 billion, resulting in approximately \$1.4 trillion of liquidity sources. Refer to Liquidity Risk Management on pages 97-104 for additional information.

Refer to Consolidated Result of Operations and Consolidated Balance Sheets Analysis on pages 51-54 and pages 55-56, respectively, for a further discussion of the Firm's results.

Pre-provision profit, ROTCE, TCE, TBVPS, NII and NIR excluding Markets, and total net revenue on a managed basis are non-GAAP financial measures. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60 for a further discussion of each of these measures.

Business segment highlights

Selected business metrics for each of the Firm's four LOBs are presented below for the full year of 2022.

CCB ROE 29%	<ul style="list-style-type: none"> Average deposits up 10%; client investment assets down 10% Average loans up 1%; Card Services net charge-off rate of 1.47% Debit and credit card sales volume^(a) up 14% Active mobile customers^(b) up 9%
CIB ROE 14%	<ul style="list-style-type: none"> #1 ranking for Global Investment Banking fees with 8.0% wallet share for the year Total Markets revenue of \$29.0 billion, up 6%, with Fixed Income Markets up 10% and Equity Markets down 2%
CB ROE 16%	<ul style="list-style-type: none"> Gross Investment Banking revenue of \$3.0 billion, down 42% Average deposits down 2%; average loans up 9%
AWM ROE 25%	<ul style="list-style-type: none"> Assets under management (“AUM”) of \$2.8 trillion, down 11% Average deposits up 14%; average loans up 9%

(a) Excludes Commercial Card.

(b) Users of all mobile platforms who have logged in within the past 90 days.

Refer to the Business Segment Results on pages 61-62 for a detailed discussion of results by business segment.

Credit provided and capital raised

JPMorgan Chase continues to support consumers, businesses and communities around the globe. The Firm provided new and renewed credit and raised capital for wholesale and consumer clients during 2022, consisting of:

\$2.4 trillion	Total credit provided and capital raised (including loans and commitments) ^(a)
\$250 billion	Credit for consumers
\$33 billion	Credit for U.S. small businesses
\$1.1 trillion	Credit for corporations
\$1.0 trillion	Capital raised for corporate clients and non-U.S. government entities
\$65 billion	Credit and capital raised for nonprofit and U.S. government entities ^(a)

(a) Includes states, municipalities, hospitals and universities.

Recent events

- On January 20, 2023, JPMorgan Chase announced that J.P. Morgan Asset Management had received regulatory approval from the China Securities Regulatory Commission to complete its acquisition of China International Fund Management Co., Ltd.
- On January 17, 2023, JPMorgan Chase announced that Alicia Boler Davis had been elected as a director of the Firm, effective March 20, 2023. Ms. Davis serves as Chief Executive Officer of Alto Pharmacy.

Outlook

These current expectations are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements are based on the current beliefs and expectations of JPMorgan Chase's management, speak only as of the date of this Form 10-K, and are subject to significant risks and uncertainties. Refer to Forward-Looking Statements on page 154, and the Risk Factors section on pages 9-32 of this Form 10-K for a further discussion of certain of those risks and uncertainties and the other factors that could cause JPMorgan Chase's actual results to differ materially because of those risks and uncertainties. There is no assurance that actual results in 2023 will be in line with the outlook information set forth below, and the Firm does not undertake to update any forward-looking statements.

JPMorgan Chase's current outlook for full-year 2023 should be viewed against the backdrop of the global and U.S. economies, financial markets activity, the geopolitical environment, the competitive environment, client and customer activity levels, and regulatory and legislative developments in the U.S. and other countries where the Firm does business. Each of these factors will affect the performance of the Firm. The Firm will continue to make appropriate adjustments to its businesses and operations in response to ongoing developments in the business, economic, regulatory and legal environments in which it operates.

Full-year 2023

- Management expects net interest income to be approximately \$73 billion, market dependent.
- Management expects net interest income excluding Markets to be approximately \$74 billion, market dependent.
- Management expects adjusted expense to be approximately \$81 billion, market dependent.
- Management expects the net charge-off rate in Card Services to be approximately 2.6%.

Net interest income excluding Markets and adjusted expense are non-GAAP financial measures. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60.

Business Developments

War in Ukraine

The duration and potential outcomes of the war in Ukraine remain uncertain. The Firm has taken and continues to take steps to close positions and reduce certain of its business activities and exposures connected with the war, and to assist clients with fulfilling any pre-existing obligations and managing their Russia-related risks.

The Firm's exposure to Russia and Russia-associated clients and counterparties is not material to its financial condition or results of operations. However, the Firm continues to monitor potential secondary impacts of the war, including increased market volatility, inflationary pressures and the effects of financial and economic sanctions imposed by various governments, that could have adverse effects on the Firm's businesses.

The Firm also continues to monitor and manage the operational risks associated with the war, including compliance with the financial and economic sanctions and the increased risk of cyber attacks.

Refer to Wholesale Credit Portfolio on pages 116-126, Allowance for Credit Losses on pages 127-129, Market Risk Management on pages 131-138, Country Risk Management on pages 139-140 and Operational Risk Management on pages 142-144 for additional information.

For purposes of this Form 10-K, "Russia" refers to exposure to clients and counterparties of the Firm for which the largest proportion of their assets is located, or the largest proportion of their revenue is derived, in Russia, based on the Firm's internal country risk management framework; and "Russia-associated" refers to exposure to clients and counterparties of the Firm with respect to which economic or financial sanctions relating to the war in Ukraine have been imposed or which have close association with Russia.

Interbank Offered Rate ("LIBOR") transition

The Firm and other market participants are preparing for the final stages of the transition from the use of the London Interbank Offered Rate ("LIBOR") and other IBORs in accordance with the International Organization of Securities Commission's standards for transaction-based benchmark rates. The cessation of the publication of the remaining principal tenors of U.S. dollar LIBOR (i.e., overnight, one-month, three-month, six-month and 12-month LIBOR) ("LIBOR Cessation") is scheduled for June 30, 2023.

As of December 31, 2022, the Firm had significantly reduced the notional amount of its exposure to contracts that reference U.S. dollar LIBOR, including in derivatives, bilateral and syndicated loans, securities, and debt and preferred stock issuances, and is on-track to meet both its internal milestones for contract remediation as well as the industry milestones and recommendations published by National Working Groups, including the Alternative Reference Rates Committee in the U.S. The Firm also continues to engage with clients to assist them with transitioning their U.S. dollar LIBOR-linked contracts to replacement rates in anticipation of LIBOR Cessation. The majority of the Firm's remaining LIBOR exposure is to derivative contracts. The Firm will be participating in initiatives by the principal central counterparties ("CCPs") to convert cleared derivatives contracts linked to U.S. dollar LIBOR in the second quarter of 2023 which will remediate approximately 40% of the Firm's remaining U.S. dollar LIBOR derivatives exposure. The Firm expects that the majority of the remaining derivatives exposure will be remediated predominantly through contractual fallback provisions.

On March 15, 2022, the Adjustable Interest Rate (LIBOR) Act ("LIBOR Act") was signed into law in the U.S. The LIBOR Act provides a framework for replacing U.S. dollar LIBOR as the reference rate in legacy financial contracts that may not otherwise transition to a replacement rate upon LIBOR Cessation. In addition, the U.K. Financial Conduct Authority is proposing that the administrator of LIBOR be required to continue to publish the one-month, three-month and six-month tenors of U.S. dollar LIBOR on a "synthetic" basis which would allow market participants to use such rates through September 30, 2024. This proposal would apply to contracts that are outside the scope of the LIBOR Act, including U.S. dollar LIBOR-linked contracts that are not governed by U.S. law. Both the LIBOR Act and the proposed publication of "synthetic" LIBOR are intended to facilitate, and reduce the risks associated with, the transition from LIBOR, including the potential for disputes or litigation.

The Firm continues to make necessary changes to its risk management systems in connection with the transition from LIBOR, including modifications to its operational systems and models. In addition, the Firm continues to monitor and evaluate client, industry, market, regulatory and legislative developments relating to the transition from LIBOR. Refer to Part 1, Item 1A: Risk Factors on pages 9-32 of the 2022 Form 10-K and to Accounting and Reporting Developments on page 153 for additional information.

CONSOLIDATED RESULTS OF OPERATIONS

This section provides a comparative discussion of JPMorgan Chase's Consolidated Results of Operations on a reported basis for the two-year period ended December 31, 2022, unless otherwise specified. Refer to Consolidated Results of Operations on pages 52-54 of the Firm's Annual Report on Form 10-K for the year ended December 31, 2021 (the "2021 Form 10-K") for a discussion of the 2021 versus 2020 results. Factors that relate primarily to a single business segment are discussed in more detail within that business segment's results. Refer to pages 149-152 for a discussion of the Critical Accounting Estimates Used by the Firm that affect the Consolidated Results of Operations.

Revenue

Year ended December 31, (in millions)	2022	2021	2020
Investment banking fees	\$ 6,686	\$ 13,216	\$ 9,486
Principal transactions	19,912	16,304	18,021
Lending- and deposit-related fees	7,098	7,032	6,511
Asset management, administration and commissions	20,677	21,029	18,177
Investment securities gains/(losses)	(2,380)	(345)	802
Mortgage fees and related income	1,250	2,170	3,091
Card income	4,420	5,102	4,435
Other income ^(a)	4,322	4,830	4,865
Noninterest revenue	61,985	69,338	65,388
Net interest income	66,710	52,311	54,563
Total net revenue	\$ 128,695	\$ 121,649	\$ 119,951

(a) Included operating lease income of \$3.7 billion, \$4.9 billion and \$5.5 billion for the years ended December 31, 2022, 2021 and 2020, respectively. Also includes losses on tax-oriented investments. Refer to Note 6 for additional information.

2022 compared with 2021

Investment banking fees decreased in CIB, as volatile market conditions resulted in:

- lower equity and debt underwriting fees due to lower issuance activity, and
- lower advisory fees driven by a lower level of announced deals.

Refer to CIB segment results on pages 67-72 and Note 6 for additional information.

Principal transactions revenue increased, reflecting:

- higher net revenue in Fixed Income Markets, driven by a strong performance in the macro businesses amid volatile market conditions, particularly Currencies & Emerging Markets and Rates, partially offset by lower revenue in Securitized Products and Credit, and
- higher revenue associated with Equity Derivatives and Prime Finance in Equity Markets,

largely offset by

- a loss of \$836 million in Credit Adjustments & Other in CIB, compared with a gain of \$250 million in the prior year. The loss in the current year reflected funding spread widening and, to a lesser extent, losses on exposures relating to commodities and Russia and Russia-associated counterparties,
- net markdowns recorded in the second quarter of 2022 on held-for-sale positions, primarily unfunded commitments, in the bridge financing portfolio in CIB and CB,
- higher net losses on certain legacy private equity investments in Corporate, and
- net losses in Treasury and CIO related to cash deployment transactions, which were more than offset by the related net interest income earned on those transactions.

Principal transactions revenue in CIB may in certain cases have offsets across other revenue lines, including net interest income. The Firm assesses the performance of its CIB Markets business on a total revenue basis.

Refer to CIB, CB and Corporate segment results on pages 67-72, pages 73-75 and pages 79-80, respectively, and Note 6 for additional information.

Lending- and deposit-related fees increased due to higher service fee volume in CCB, predominantly offset by lower cash management fees in CB and CIB due to a higher level of credits earned by clients and applied against such fees. Refer to CCB, CIB and CB segment results on pages 63-66, pages 67-72 and pages 73-75, respectively, and Note 6 for additional information.

Asset management, administration and commissions revenue decreased driven by:

- lower asset management fees in AWM resulting from lower average market levels, predominantly offset by the removal of most money market fund fee waivers, and net long-term inflows,
 - lower custody fees in Securities Services, primarily associated with lower average market values of assets under custody, and
 - lower brokerage commissions, largely in AWM, reflecting reduced volumes,
- partially offset by
- higher commissions on travel-related services and annuity sales in CCB.

Refer to CCB, CIB and AWM segment results on pages 63-66, pages 67-72 and pages 76-78, respectively, and Note 6 for additional information.

Management's discussion and analysis

Investment securities gains/(losses) reflected higher net losses on sales of U.S. GSE and government agency MBS and U.S. Treasuries, associated with repositioning the investment securities portfolio in Treasury and CIO. Refer to Corporate segment results on pages 79-80 and Note 10 for additional information.

Mortgage fees and related income decreased driven by Home Lending, reflecting:

- lower production revenue due to lower margins and volume,
- largely offset by
- higher net mortgage servicing revenue, reflecting
 - the absence of a net loss in MSR risk management in the prior year primarily driven by updates to model inputs related to prepayment expectations, and
 - higher operating revenue due to a higher level of third-party loans serviced.

Refer to CCB segment results on pages 63-66, Note 6 and 15 for further information.

Card income decreased driven by higher amortization related to new account origination costs, partially offset by higher annual fees in CCB, and higher payments revenue on volume growth in commercial cards in CIB and CB.

Refer to CCB, CIB and CB segment results on pages 63-66, pages 67-72 and pages 73-75, respectively, and Note 6 for further information.

Other income decreased reflecting:

- lower auto operating lease income in CCB as a result of a decline in volume, and
 - net losses on certain investments in CIB and AWM, compared with net gains in the prior year,
- partially offset by
- an increase in Other Corporate from:
 - a gain of \$914M on the sale of Visa B shares,
 - higher net gains related to certain other investments, and
 - proceeds from an insurance settlement in the first quarter of 2022,
 - a gain on an equity-method investment received in partial satisfaction of a loan in CB,
 - the impact of movements in foreign exchange rates related to net investment hedges in Treasury and CIO, primarily as a result of the strengthening of the U.S. dollar, and
 - the absence of weather-related write-downs recorded in the prior year on certain renewable energy investments in CIB.

Refer to Note 2 for additional information on Visa B shares.

Net interest income increased driven by higher rates and loan growth, partially offset by lower Markets NII.

The Firm's average interest-earning assets were \$3.3 trillion, up \$133 billion, and the yield was 2.78%, up 97 basis points ("bps"). The net yield on these assets, on an FTE basis, was 2.00%, an increase of 36 bps. The net yield excluding Markets was 2.60%, up 69 bps.

Refer to the Consolidated average balance sheets, interest and rates schedule on pages 292-296 for further information. Net yield excluding Markets is a non-GAAP financial measure. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60 for a further discussion of Net yield excluding Markets.

Provision for credit losses

Year ended December 31, (in millions)	2022	2021	2020
Consumer, excluding credit card	\$ 506	\$ (1,933)	\$ 1,016
Credit card	3,353	(4,838)	10,886
Total consumer	3,859	(6,771)	11,902
Wholesale	2,476	(2,449)	5,510
Investment securities	54	(36)	68
Total provision for credit losses	\$ 6,389	\$ (9,256)	\$ 17,480

2022 compared with 2021

The **provision for credit losses** was \$6.4 billion, reflecting a net addition of \$3.5 billion to the allowance for credit losses and \$2.9 billion of net charge-offs. The net addition to the allowance for credit losses consisted of:

- \$2.3 billion in **wholesale**, driven by deterioration in the Firm's macroeconomic outlook, and loan growth predominantly in CB and CIB, and
- \$1.2 billion in **consumer**, predominantly driven by Card Services, reflecting higher outstanding balances and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede.

The prior year included a \$12.1 billion net reduction in the allowance for credit losses.

Deterioration in the Firm's macroeconomic outlook included both updates to the central scenario in the fourth quarter of 2022, which now reflects a mild recession, as well as the impact of the increased weight placed on the adverse scenarios beginning in the first quarter of 2022 due to the effects associated with higher inflation, changes in monetary policy, and geopolitical risks, including the war in Ukraine.

Net charge-offs were \$2.9 billion, flat compared with 2021, and included:

- a \$309 million decrease in Card Services, reflecting the ongoing financial strength of U.S. consumers. However, median deposit balances declined in the second half of 2022, impacted by the growth in consumer spending, offset by
- a \$190 million increase in net charge-offs in Auto and Banking & Wealth Management ("BWM") as net charge-offs in the prior year benefited from government stimulus and payment assistance programs, and an increase of \$76 million in CIB.

Refer to the segment discussions of CCB on pages 63-66, CIB on pages 67-72, CB on pages 73-75, AWM on pages 76-78, the Allowance for Credit Losses on pages 127-129, and Notes 1, 10 and 13 for further discussion of the credit portfolio and the allowance for credit losses.

Management's discussion and analysis

Noninterest expense

Year ended December 31, (in millions)	2022	2021	2020
Compensation expense	\$ 41,636	\$ 38,567	\$ 34,988
Noncompensation expense:			
Occupancy	4,696	4,516	4,449
Technology, communications and equipment ^(a)	9,358	9,941	10,338
Professional and outside services	10,174	9,814	8,464
Marketing	3,911	3,036	2,476
Other ^(b)	6,365	5,469	5,941
Total noncompensation expense	34,504	32,776	31,668
Total noninterest expense	\$ 76,140	\$ 71,343	\$ 66,656

- (a) Includes depreciation expense associated with auto operating lease assets.
 (b) Included Firmwide legal expense of \$266 million, \$426 million and \$1.1 billion for the years ended December 31, 2022, 2021 and 2020, respectively.

2022 compared with 2021

Compensation expense increased driven by additional headcount, primarily in technology and operations, as well as front office, and the impact of inflation, partially offset by lower revenue-related compensation in CIB.

Noncompensation expense increased as a result of:

- higher investments in the business, including marketing and technology, and
- higher structural expense, including travel and entertainment; regulatory assessments; occupancy expense associated with higher utilities and exit costs of certain leases; and other employee-related expense,

partially offset by

- lower volume-related expense, reflecting lower depreciation expense on lower Auto lease assets; and lower distribution fees in AWM, partially offset by higher operating losses and outside services, both in CCB; and
- lower legal expense.

The prior year included a \$550 million contribution to the Firm's Foundation.

Income tax expense

Year ended December 31, (in millions, except rate)	2022	2021	2020
Income before income tax expense	\$46,166	\$59,562	\$35,815
Income tax expense	8,490	11,228	6,684
Effective tax rate	18.4 %	18.9 %	18.7 %

2022 compared with 2021

The **effective tax rate** decreased driven by income tax benefits compared with income tax expense in the prior year related to tax audit settlements, largely offset by other tax adjustments and a change in the level and mix of income and expenses subject to U.S. federal and state and local taxes. Refer to Note 25 for further information.

CONSOLIDATED BALANCE SHEETS AND CASH FLOWS ANALYSIS

Consolidated balance sheets analysis

The following is a discussion of the significant changes between December 31, 2022 and 2021.

Selected Consolidated balance sheets data

December 31, (in millions)	2022	2021	Change
Assets			
Cash and due from banks	\$ 27,697	\$ 26,438	5 %
Deposits with banks	539,537	714,396	(24)
Federal funds sold and securities purchased under resale agreements	315,592	261,698	21
Securities borrowed	185,369	206,071	(10)
Trading assets	453,799	433,575	5
Available-for-sale securities	205,857	308,525	(33)
Held-to-maturity securities	425,305	363,707	17
Investment securities, net of allowance for credit losses	631,162	672,232	(6)
Loans	1,135,647	1,077,714	5
Allowance for loan losses	(19,726)	(16,386)	20
Loans, net of allowance for loan losses	1,115,921	1,061,328	5
Accrued interest and accounts receivable	125,189	102,570	22
Premises and equipment	27,734	27,070	2
Goodwill, MSRs and other intangible assets	60,859	56,691	7
Other assets	182,884	181,498	1
Total assets	\$ 3,665,743	\$ 3,743,567	(2)%

Cash and due from banks and deposits with banks

decreased primarily as a result of lower deposits across the LOBs and loan growth. Deposits with banks reflect the Firm's placement of its excess cash with various central banks, including the Federal Reserve Banks.

Federal funds sold and securities purchased under resale agreements

increased, reflecting:

- the impact of a lower level of netting on client-driven market-making activities and on collateral requirements in Markets,
- higher demand for securities to cover short positions in Fixed Income Markets, and
- an increase in the deployment of cash in Treasury and CIO.

Securities borrowed decreased driven by Markets, reflecting lower client-driven activities and lower demand for securities to cover short positions in Equity Markets.

Refer to Note 11 for additional information on securities purchased under resale agreements and securities borrowed.

Trading assets

increased due to:

- higher derivative receivables, primarily in foreign exchange, as a result of market movements, and
- an increase in the deployment of cash in Treasury and CIO.

Refer to Notes 2 and 5 for additional information.

Investment securities decreased, driven by lower available-for-sale ("AFS") securities, partially offset by higher held-to-maturity ("HTM") securities, which includes the impact of the transfer of \$78.3 billion of securities from AFS to HTM in 2022, for capital management purposes.

- The decrease in AFS securities was also due to paydowns, as well as unrealized losses, which are recognized in accumulated other comprehensive income ("AOCI"),

largely offset by net purchases, and

- the increase in HTM securities also reflected purchases partially offset by paydowns.

Refer to Corporate segment results on pages 79-80, Investment Portfolio Risk Management on page 130 and Notes 2 and 10 for additional information on investment securities.

Loans

increased, reflecting:

- higher balances in Card Services driven by higher consumer spending and net new originations,
 - higher originations and revolver utilization in CB, and
 - higher wholesale loans in CIB,
- partially offset by
- lower mortgage warehouse loans in Home Lending as sales outpaced originations due to higher interest rates, and
 - the impact from PPP loan forgiveness in BWM.

The **allowance for loan losses** increased, reflecting a net addition of \$3.3 billion to the allowance for loan losses, consisting of:

- \$2.1 billion in **wholesale**, resulting from deterioration in the Firm's macroeconomic outlook, and loan growth predominantly in CB and CIB, and
- \$1.2 billion in **consumer**, predominantly driven by Card Services, reflecting higher outstanding balances, and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede.

There was also a \$121 million addition to the allowance for lending-related commitments recognized in other liabilities

Management's discussion and analysis

on the Consolidated balance sheets, and a \$54 million addition to the allowance for investment securities.

Refer to Credit and Investment Risk Management on pages 106-130, and Notes 1, 2, 3, 12 and 13 for further discussion of loans and the allowance for loan losses.

Accrued interest and accounts receivable increased due to higher client receivables related to client-driven activities in Markets, as well as higher receivables in Payments related to the timing of payment activities, with December 31, 2022 falling on a weekend.

Premises and equipment, refer to Note 16 and 18 for additional information.

Selected Consolidated balance sheets data

December 31, (in millions)	2022	2021	Change
Liabilities			
Deposits	\$ 2,340,179	\$ 2,462,303	(5)
Federal funds purchased and securities loaned or sold under repurchase agreements	202,613	194,340	4
Short-term borrowings	44,027	53,594	(18)
Trading liabilities	177,976	164,693	8
Accounts payable and other liabilities	300,141	262,755	14
Beneficial interests issued by consolidated variable interest entities ("VIEs")	12,610	10,750	17
Long-term debt	295,865	301,005	(2)
Total liabilities	3,373,411	3,449,440	(2)
Stockholders' equity	292,332	294,127	(1)
Total liabilities and stockholders' equity	\$ 3,665,743	\$ 3,743,567	(2)%

Deposits decreased reflecting:

- attrition in CB and CIB, particularly non-operating deposits in CB, partially offset by net issuances of structured notes in Markets,
- net outflows into investments in AWM amid the rising interest rate environment, and
- a decline in balances in existing accounts in CCB due to higher customer spending, predominantly offset by net inflows into new accounts.

Federal funds purchased and securities loaned or sold under repurchase agreements increased due to:

- higher secured financing of trading assets in Markets, partially offset by
- lower secured financing of AFS investment securities in Treasury and CIO.

Short-term borrowings decreased predominantly as a result of lower financing requirements in Markets.

Refer to Liquidity Risk Management on pages 97-104 for additional information on deposits, federal funds purchased and securities loaned or sold under repurchase agreements, and short-term borrowings; and also to Notes 2 and 17 for deposits and Note 11 for federal funds purchased and securities loaned or sold under repurchase agreements.

Trading liabilities increased due to client-driven market-making activities, which resulted in higher levels of short positions in Markets. Refer to Notes 2 and 5 for additional information.

Goodwill, MSRs and other intangibles increased reflecting:

- higher MSRs as a result of higher market interest rates and net additions, partially offset by the realization of expected cash flows, and
- additions to goodwill associated with the acquisitions of Renovite Technologies, Inc. in the fourth quarter of 2022, Global Shares PLC and Figg, Inc. in the third quarter of 2022, and Frosch Travel Group, LLC and Volkswagen Payments S.A. in the second quarter of 2022.

Refer to Note 15 for additional information.

Other assets increased predominantly due to the impact of securities financing activities in Markets, offset by lower auto operating lease assets in CCB.

Accounts payable and other liabilities increased due to higher client payables related to client-driven activities in Markets, including Prime Finance, as well as higher payables in Payments related to the timing of payment activities, with December 31, 2022 falling on a weekend. Refer to Note 19 for additional information.

Beneficial interests issued by consolidated VIEs increased driven by higher issuance of commercial paper as a result of an increase in loan balances in the Firm-administered multi-seller conduits. Refer to Liquidity Risk Management on pages 97-104; and Notes 14 and 28 for additional information on Firm-sponsored VIEs and loan securitization trusts.

Long-term debt decreased driven by:

- fair value hedge accounting adjustments in Treasury and CIO as a result of higher rates, and a decline in the fair value of structured notes in Markets,

largely offset by

- net issuances of senior debt in Treasury and CIO and structured notes in Markets. Refer to Liquidity Risk Management on pages 97-104 and Note 20 for additional information.

Stockholders' equity reflects net unrealized losses in AOCI, predominantly driven by the impact of higher interest rates on the AFS portfolio and cash flow hedges in Treasury and CIO. Refer to Consolidated Statements of Changes in Stockholders' Equity on page 162, Capital Actions on page 94, and Note 24 for additional information.

Consolidated cash flows analysis

The following is a discussion of cash flow activities during the years ended December 31, 2022 and 2021. Refer to Consolidated cash flows analysis on page 57 of the Firm's 2021 Form 10-K for a discussion of the 2020 activities.

(in millions)	Year ended December 31,		
	2022	2021	2020
Net cash provided by/(used in)			
Operating activities	\$ 107,119	\$ 78,084	\$ (79,910)
Investing activities	(137,819)	(129,344)	(261,912)
Financing activities	(126,257)	275,993	596,645
Effect of exchange rate changes on cash	(16,643)	(11,508)	9,155
Net increase/(decrease) in cash and due from banks and deposits with banks	\$(173,600)	\$ 213,225	\$ 263,978

Operating activities

JPMorgan Chase's operating assets and liabilities primarily support the Firm's lending and capital markets activities. These assets and liabilities can vary significantly in the normal course of business due to the amount and timing of cash flows, which are affected by client-driven and risk management activities and market conditions. The Firm believes that cash flows from operations, available cash and other liquidity sources, and its capacity to generate cash through secured and unsecured sources, are sufficient to meet its operating liquidity needs.

- In 2022, cash provided resulted from higher accounts payable and other liabilities, lower securities borrowed, and net proceeds from sales, securitizations, and paydowns of loans held-for-sale, partially offset by higher trading assets.
- In 2021, cash provided resulted from lower trading assets and higher accounts payable and other liabilities, partially offset by higher securities borrowed and lower trading liabilities.

Investing activities

The Firm's investing activities predominantly include originating held-for-investment loans, investing in the investment securities portfolio and other short-term instruments.

- In 2022, cash used resulted from net originations of loans and higher securities purchased under resale agreements, partially offset by net proceeds from investment securities.
- In 2021, cash used resulted from net purchases of investment securities and higher net originations of loans, partially offset by lower securities purchased under resale agreements.

Financing activities

The Firm's financing activities include acquiring customer deposits and issuing long-term debt and preferred stock.

- In 2022, cash used reflected lower deposits, partially offset by net proceeds from long- and short-term borrowings.
- In 2021, cash provided reflected higher deposits and net proceeds from long- and short-term borrowings, partially offset by a decrease in securities loaned or sold under repurchase agreements.
- For both periods, cash was used for repurchases of common stock and cash dividends on common and preferred stock.

* * *

Refer to Consolidated Balance Sheets Analysis on pages 55-56, Capital Risk Management on pages 86-96, and Liquidity Risk Management on pages 97-104, and the Consolidated Statements of Cash Flows on page 163 for a further discussion of the activities affecting the Firm's cash flows.

Management's discussion and analysis

EXPLANATION AND RECONCILIATION OF THE FIRM'S USE OF NON-GAAP FINANCIAL MEASURES

Non-GAAP financial measures

The Firm prepares its Consolidated Financial Statements in accordance with U.S. GAAP; these financial statements appear on pages 159-163. That presentation, which is referred to as "reported" basis, provides the reader with an understanding of the Firm's results that can be tracked consistently from year-to-year and enables a comparison of the Firm's performance with the U.S. GAAP financial statements of other companies.

In addition to analyzing the Firm's results on a reported basis, management reviews Firmwide results, including the overhead ratio, on a "managed" basis; these Firmwide managed basis results are non-GAAP financial measures. The Firm also reviews the results of the LOBs on a managed basis. The Firm's definition of managed basis starts, in each case, with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue for the Firm (and each of the reportable business segments) on an FTE basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. These financial measures allow

management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense. These adjustments have no impact on net income as reported by the Firm as a whole or by the LOBs.

Management also uses certain non-GAAP financial measures at the Firm and business-segment level because these other non-GAAP financial measures provide information to investors about the underlying operational performance and trends of the Firm or of the particular business segment, as the case may be, and therefore facilitate a comparison of the Firm or the business segment with the performance of its relevant competitors. Refer to Business Segment Results on pages 61-80 for additional information on these non-GAAP measures. Non-GAAP financial measures used by the Firm may not be comparable to similarly named non-GAAP financial measures used by other companies.

The following summary table provides a reconciliation from the Firm's reported U.S. GAAP results to managed basis.

Year ended December 31, (in millions, except ratios)	2022			2021			2020		
	Reported	Fully taxable-equivalent adjustments ^(a)	Managed basis	Reported	Fully taxable-equivalent adjustments ^(a)	Managed basis	Reported	Fully taxable-equivalent adjustments ^(a)	Managed basis
Other income	\$ 4,322	\$ 3,148	\$ 7,470	\$ 4,830	\$ 3,225	\$ 8,055	\$ 4,865	\$ 2,560	\$ 7,425
Total noninterest revenue	61,985	3,148	65,133	69,338	3,225	72,563	65,388	2,560	67,948
Net interest income	66,710	434	67,144	52,311	430	52,741	54,563	418	54,981
Total net revenue	128,695	3,582	132,277	121,649	3,655	125,304	119,951	2,978	122,929
Total noninterest expense	76,140	NA	76,140	71,343	NA	71,343	66,656	NA	66,656
Pre-provision profit	52,555	3,582	56,137	50,306	3,655	53,961	53,295	2,978	56,273
Provision for credit losses	6,389	NA	6,389	(9,256)	NA	(9,256)	17,480	NA	17,480
Income before income tax expense	46,166	3,582	49,748	59,562	3,655	63,217	35,815	2,978	38,793
Income tax expense	8,490	3,582	12,072	11,228	3,655	14,883	6,684	2,978	9,662
Net income	\$37,676	NA	\$37,676	\$48,334	NA	\$48,334	\$29,131	NA	\$29,131
Overhead ratio	59 %	NM	58 %	59 %	NM	57 %	56 %	NM	54 %

(a) Predominantly recognized in CIB, CB and Corporate.

Net interest income, net yield, and noninterest revenue excluding CIB Markets

In addition to reviewing net interest income, net yield, and noninterest revenue on a managed basis, management also reviews these metrics excluding CIB Markets, as shown below. CIB Markets consists of Fixed Income Markets and Equity Markets. These metrics, which exclude CIB Markets, are non-GAAP financial measures. Management reviews these metrics to assess the performance of the Firm's lending, investing (including asset-liability management) and deposit-raising activities, apart from any volatility associated with CIB Markets activities. In addition, management also assesses CIB Markets business performance on a total revenue basis as offsets may occur across revenue lines. Management believes that these measures provide investors and analysts with alternative measures to analyze the revenue trends of the Firm.

Year ended December 31, (in millions, except rates)	2022	2021	2020
Net interest income – reported	\$ 66,710	\$ 52,311	\$ 54,563
Fully taxable-equivalent adjustments	434	430	418
Net interest income – managed basis^(a)	\$ 67,144	\$ 52,741	\$ 54,981
Less: Markets net interest income ^(b)	4,789	8,243	8,374
Net interest income excluding Markets^(a)	\$ 62,355	\$ 44,498	\$ 46,607
Average interest-earning assets	\$3,349,079	\$3,215,942	\$2,779,710
Less: Average Markets interest-earning assets ^(b)	953,195	888,238	751,131
Average interest-earning assets excluding Markets	\$2,395,884	\$2,327,704	\$2,028,579
Net yield on average interest-earning assets – managed basis	2.00 %	1.64 %	1.98 %
Net yield on average Markets interest-earning assets ^(b)	0.50	0.93	1.11
Net yield on average interest-earning assets excluding Markets	2.60 %	1.91 %	2.30 %
Noninterest revenue – reported	\$ 61,985	\$ 69,338	\$ 65,388
Fully taxable-equivalent adjustments	3,148	3,225	2,560
Noninterest revenue – managed basis	\$ 65,133	\$ 72,563	\$ 67,948
Less: Markets noninterest revenue ^(b)	24,195	19,151	21,109
Noninterest revenue excluding Markets	\$ 40,938	\$ 53,412	\$ 46,839
Memo: Total Markets net revenue^(b)	\$ 28,984	\$ 27,394	\$ 29,483

(a) Interest includes the effect of related hedges. Taxable-equivalent amounts are used where applicable.

(b) Refer to pages 70-71 for further information on CIB Markets.

Calculation of certain U.S. GAAP and non-GAAP financial measures

Certain U.S. GAAP and non-GAAP financial measures are calculated as follows:

Book value per share (“BVPS”)

Common stockholders' equity at period-end / Common shares at period-end

Overhead ratio

Total noninterest expense / Total net revenue

ROA

Reported net income / Total average assets

ROE

Net income* / Average common stockholders' equity

ROTCE

Net income* / Average tangible common equity

TBVPs

Tangible common equity at period-end / Common shares at period-end

* Represents net income applicable to common equity

In addition, the Firm reviews other non-GAAP measures such as

- Adjusted expense, which represents noninterest expense excluding Firmwide legal expense, and
- Pre-provision profit, which represents total net revenue less total noninterest expense.

Management believes that these measures help investors understand the effect of these items on reported results and provide an alternative presentation of the Firm's performance.

The Firm also reviews the allowance for loan losses to period-end loans retained excluding trade finance and conduits, a non-GAAP financial measure, to provide a more meaningful assessment of CIB's allowance coverage ratio.

Management's discussion and analysis

TCE, ROTCE and TBVPS

TCE, ROTCE and TBVPS are each non-GAAP financial measures. TCE represents the Firm's common stockholders' equity (i.e., total stockholders' equity less preferred stock) less goodwill and identifiable intangible assets (other than MSRs), net of related deferred tax liabilities. ROTCE measures the Firm's net income applicable to common equity as a percentage of average TCE. TBVPS represents the Firm's TCE at period-end divided by common shares at period-end. TCE, ROTCE and TBVPS are utilized by the Firm, as well as investors and analysts, in assessing the Firm's use of equity.

The following summary table provides a reconciliation from the Firm's common stockholders' equity to TCE.

(in millions, except per share and ratio data)	Period-end		Average		
	Dec 31, 2022	Dec 31, 2021	Year ended December 31,		
			2022	2021	2020
Common stockholders' equity	\$ 264,928	\$ 259,289	\$ 253,068	\$ 250,968	\$ 236,865
Less: Goodwill	51,662	50,315	50,952	49,584	47,820
Less: Other intangible assets	1,224	882	1,112	876	781
Add: Certain deferred tax liabilities ^(a)	2,510	2,499	2,505	2,474	2,399
Tangible common equity	\$ 214,552	\$ 210,591	\$ 203,509	\$ 202,982	\$ 190,663
Return on tangible common equity	NA	NA	18 %	23 %	14 %
Tangible book value per share	\$ 73.12	\$ 71.53	NA	NA	NA

(a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.

BUSINESS SEGMENT RESULTS

The Firm is managed on an LOB basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment.

The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is evaluated by the Firm's Operating Committee. Segment results are presented on a managed basis. Refer to Explanation and Reconciliation of the Firm's use of Non-GAAP Financial Measures, on pages 58-60 for a definition of managed basis.

JPMorgan Chase						
Consumer Businesses			Wholesale Businesses			
Consumer & Community Banking		Corporate & Investment Bank		Commercial Banking	Asset & Wealth Management	
Banking & Wealth Management ^(a)	Home Lending	Card Services & Auto ^(b)	Banking	Markets & Securities Services	Middle Market Banking	Asset Management
<ul style="list-style-type: none"> • Consumer Banking • J.P. Morgan Wealth Management • Business Banking 	<ul style="list-style-type: none"> • Home Lending Production • Home Lending Servicing • Real Estate Portfolios 	<ul style="list-style-type: none"> • Card Services • Auto 	<ul style="list-style-type: none"> • Investment Banking • Payments • Lending 	<ul style="list-style-type: none"> • Fixed Income Markets • Equity Markets • Securities Services • Credit Adjustments & Other 	<ul style="list-style-type: none"> • Corporate Client Banking • Commercial Real Estate Banking 	<ul style="list-style-type: none"> • Global Private Bank

(a) In the fourth quarter of 2022, Consumer & Business Banking was renamed Banking & Wealth Management ("BWM").

(b) In the fourth quarter of 2022, Card & Auto was renamed Card Services & Auto.

Description of business segment reporting methodology

Results of the business segments are intended to present each segment as if it were a stand-alone business. The management reporting process that derives business segment results includes the allocation of certain income and expense items. The Firm also assesses the level of capital required for each LOB on at least an annual basis. The Firm periodically assesses the assumptions, methodologies and reporting classifications used for segment reporting, and further refinements may be implemented in future periods. The Firm's LOBs also provide various business metrics which are utilized by the Firm and its investors and analysts in assessing performance.

Revenue sharing

When business segments join efforts to sell products and services to the Firm's clients and customers, the participating business segments may agree to share revenue from those transactions. Revenue is generally recognized in the segment responsible for the related product or service, with allocations to the other segment(s) involved in the transaction. The segment results reflect these revenue-sharing agreements.

Expense Allocation

Where business segments use services provided by corporate support units, or another business segment, the costs of those services are allocated to the respective business segments. The expense is generally

allocated based on the actual cost and use of services provided. In contrast, certain costs and investments related to corporate support units, technology and operations that are not currently utilized by any LOB, are not allocated to the business segments and are retained in Corporate. Expense retained in Corporate generally includes costs that would not be incurred if the segments were stand-alone businesses, and other items not aligned with a particular business segment.

Funds transfer pricing

Funds transfer pricing ("FTP") is the process by which the Firm allocates interest income and expense to the LOBs and Other Corporate and transfers the primary interest rate risk and liquidity risk to Treasury and CIO.

The funds transfer pricing process considers the interest rate and liquidity risk characteristics of assets and liabilities and off-balance sheet products. Periodically, the methodology and assumptions utilized in the FTP process are adjusted to reflect economic conditions and other factors, which may impact the allocation of net interest income to the segments.

As a result of the rising interest rate environment, the cost of funds for assets and the credits earned for liabilities have generally increased, impacting the business segments' net interest income. During the period ended December 31, 2022, this has resulted in higher cost of funds for loans and contributed to margin expansion on deposits.

Management's discussion and analysis

Foreign exchange risk

Foreign exchange risk is transferred from the LOBs and Other Corporate to Treasury and CIO for certain revenues and expenses. Treasury and CIO manages these risks centrally and reports the impact of foreign exchange rate movements related to the transferred risk in its results. Refer to Market Risk Management on page 137 for additional information.

Debt expense and preferred stock dividend allocation

As part of the funds transfer pricing process, almost all of the cost of the credit spread component of outstanding unsecured long-term debt and preferred stock dividends is allocated to the reportable business segments, while the balance of the cost is retained in Corporate. The methodology to allocate the cost of unsecured long-term debt and preferred stock dividends to the business segments is aligned with the relevant regulatory capital requirements and funding needs of the LOBs, as applicable. The allocated cost of unsecured long-term debt is included in a business segment's net interest income, and net income is reduced by preferred stock dividends to arrive at a

business segment's net income applicable to common equity.

Refer to Capital Risk Management on pages 86-96 for additional information.

Capital allocation

The amount of capital assigned to each business segment is referred to as equity. The Firm's allocation methodology incorporates Basel III Standardized Risk-weighted assets ("RWA"), Basel III Advanced RWA, the global systemically important banks ("GSIB") surcharge, and a simulation of capital in a severe stress environment. At least annually, the assumptions, judgments and methodologies used to allocate capital are reassessed and, as a result, the capital allocated to the LOBs may change. As of January 1, 2023, the Firm has changed its line of business capital allocations primarily as a result of updates to the Firm's capital requirements and changes in RWA for each LOB.

Refer to Line of business equity on page 93 for additional information on capital allocation.

Segment Results - Managed Basis

The following tables summarize the Firm's results by segment for the periods indicated.

Year ended December 31, (in millions, except ratios)	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking		
	2022	2021	2020	2022	2021	2020	2022	2021	2020
Total net revenue	\$ 55,017	\$ 50,073	\$ 51,268	\$ 47,899	\$ 51,749	\$ 49,284	\$ 11,533	\$ 10,008	\$ 9,313
Total noninterest expense	31,471	29,256	27,990	27,087	25,325	23,538	4,719	4,041	3,798
Pre-provision profit/(loss)	23,546	20,817	23,278	20,812	26,424	25,746	6,814	5,967	5,515
Provision for credit losses	3,813	(6,989)	12,312	1,158	(1,174)	2,726	1,268	(947)	2,113
Net income/(loss)	14,871	20,930	8,217	14,970	21,134	17,094	4,213	5,246	2,578
Return on equity ("ROE")	29%	41%	15%	14 %	25%	20%	16 %	21%	11%

Year ended December 31, (in millions, except ratios)	Asset & Wealth Management			Corporate			Total		
	2022	2021	2020	2022	2021	2020	2022	2021	2020
Total net revenue	\$17,748	\$ 16,957	\$ 14,240	\$ 80	\$ (3,483)	\$ (1,176)	\$ 132,277	\$ 125,304	\$ 122,929
Total noninterest expense	11,829	10,919	9,957	1,034	1,802	1,373	76,140	71,343	66,656
Pre-provision profit/(loss)	5,919	6,038	4,283	(954)	(5,285)	(2,549)	56,137	53,961	56,273
Provision for credit losses	128	(227)	263	22	81	66	6,389	(9,256)	17,480
Net income/(loss)	4,365	4,737	2,992	(743)	(3,713)	(1,750)	37,676	48,334	29,131
Return on equity ("ROE")	25 %	33%	28%	NM	NM	NM	14%	19%	12%

Selected Firmwide Metrics

The following tables present key metrics for Wealth Management, which consists of the Global Private Bank in AWM and J.P. Morgan Wealth Management in CCB; and total revenue and key metrics for J.P. Morgan Payments, which consists of payments activities in CIB and CB. This presentation is intended to provide investors with additional information concerning Wealth Management and J.P. Morgan Payments, each of which consists of similar business activities conducted across LOBs to serve different types of clients and customers.

Selected metrics - Wealth Management

Year ended December 31,	2022	2021	2020
Client assets (in billions) ^(a)	\$ 2,438	\$ 2,456	\$ 2,020
Number of client advisors	8,166	7,463	6,879

(a) Consists of Global Private Bank in AWM and client investment assets in J.P. Morgan Wealth Management in CCB.

Selected metrics - J.P. Morgan Payments

(in millions, except where otherwise noted)	2022	2021	2020
Year ended December 31,			
Total net revenue	\$13,909	\$ 9,861	\$ 9,599
Merchant processing volume (in billions)	2,158.4	1,886.7	1,597.3
Average deposits (in billions)	779	800	651

The following sections provide a comparative discussion of the Firm's results by segment as of or for the years ended December 31, 2022 and 2021.

CONSUMER & COMMUNITY BANKING

Consumer & Community Banking offers products and services to consumers and small businesses through bank branches, ATMs, digital (including mobile and online) and telephone banking. CCB is organized into **Banking & Wealth Management** (including Consumer Banking, J.P. Morgan Wealth Management and Business Banking), **Home Lending** (including Home Lending Production, Home Lending Servicing and Real Estate Portfolios) and **Card Services & Auto**. **Banking & Wealth Management** offers deposit, investment and lending products, cash management, payments and services. **Home Lending** includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. **Card Services** issues credit cards and offers travel services. **Auto** originates and services auto loans and leases.

Selected income statement data			
Year ended December 31, (in millions, except ratios)	2022	2021	2020
Revenue			
Lending- and deposit-related fees	\$ 3,316	\$ 3,034	\$ 3,166
Asset management, administration and commissions	3,754	3,514	2,780
Mortgage fees and related income	1,236	2,159	3,079
Card income	2,679	3,563	3,068
All other income ^(a)	4,104	5,016	5,647
Noninterest revenue	15,089	17,286	17,740
Net interest income	39,928	32,787	33,528
Total net revenue	55,017	50,073	51,268
Provision for credit losses	3,813	(6,989)	12,312
Noninterest expense			
Compensation expense	13,092	12,142	11,014
Noncompensation expense ^(b)	18,379	17,114	16,976
Total noninterest expense	31,471	29,256	27,990
Income before income tax expense	19,733	27,806	10,966
Income tax expense	4,862	6,876	2,749
Net income	\$ 14,871	\$ 20,930	\$ 8,217
Revenue by line of business			
Banking & Wealth Management ^(c)	\$ 30,262	\$ 23,980	\$ 22,955
Home Lending	3,674	5,291	6,018
Card Services & Auto ^(d)	21,081	20,802	22,295
Mortgage fees and related income details:			
Production revenue	497	2,215	2,629
Net mortgage servicing revenue ^(e)	739	(56)	450
Mortgage fees and related income	\$ 1,236	\$ 2,159	\$ 3,079
Financial ratios			
Return on equity	29 %	41 %	15 %
Overhead ratio	57	58	55

- (a) Included operating lease income of \$3.6 billion, \$4.8 billion and \$5.4 billion for the years ended December 31, 2022, 2021 and 2020, respectively.
- (b) Included depreciation expense on leased assets of \$2.4 billion, \$3.3 billion and \$4.2 billion for the years ended December 31, 2022, 2021 and 2020, respectively.
- (c) In the fourth quarter of 2022, Consumer & Business Banking was renamed Banking & Wealth Management.
- (d) In the fourth quarter of 2022, Card & Auto was renamed Card Services & Auto.
- (e) Included MSR risk management results of \$93 million, \$(525) million and \$(18) million for the years ended December 31, 2022, 2021 and 2020, respectively.

Management's discussion and analysis

2022 compared with 2021

Net income was \$14.9 billion, down 29%, reflecting a net increase in the provision for credit losses compared with a net benefit in the prior year.

Net revenue was \$55.0 billion, an increase of 10%.

Net interest income was \$39.9 billion, up 22%, predominantly driven by:

- margin expansion on higher rates as well as growth in deposits in Banking & Wealth Management ("BWM"), and higher revolving loans in Card Services,

partially offset by

- lower NII associated with PPP loan forgiveness in BWM, and tighter loan spreads in Home Lending.

Noninterest revenue was \$15.1 billion, down 13%, reflecting:

- lower production revenue from lower margins and volume in Home Lending,
- lower auto operating lease income as a result of a decline in volume, and
- lower card income reflecting higher amortization related to new account origination costs partially offset by higher annual fees in Card Services, while net interchange income was relatively flat,

partially offset by

- higher net mortgage servicing revenue, reflecting the absence of a net loss in MSR risk management in the prior year primarily driven by updates to model inputs related to prepayment expectations, as well as higher operating revenue on a higher level of third-party loans serviced,
- higher commissions reflecting travel-related services in Card Services and increased annuity sales in BWM, and
- higher deposit-related fees due to higher service fee volume in BWM.

Refer to Note 6 for additional information on card income

and asset management, administration and commissions.

Refer to Note 15 for further information regarding changes in the value of the MSR asset and related hedges, and mortgage fees and related income.

Noninterest expense was \$31.5 billion, up 8%, reflecting:

- investments in the business and higher structural expenses, predominantly driven by compensation, technology and marketing,

partially offset by

- lower volume- and revenue-related expenses, predominantly driven by lower depreciation expense on lower auto lease assets, partially offset by higher operating losses.

The provision for credit losses was \$3.8 billion, driven by:

- net charge-offs of \$2.7 billion, down from \$2.8 billion in the prior year and included
 - a \$309 million decrease in Card Services, reflecting the ongoing financial strength of U.S. consumers. However, median deposit balances declined in the second half of 2022, impacted by the growth in consumer spending,

largely offset by

- a \$190 million increase in net charge-offs in Auto and BWM as net charge-offs in the prior year benefited from government stimulus and payment assistance programs, and
- a \$1.1 billion net addition to the allowance for credit losses driven by
 - \$950 million in Card Services, reflecting higher outstanding balances, and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede, and
 - \$175 million in Home Lending.

The prior year included a \$9.8 billion reduction in the allowance for credit losses across CCB.

Refer to Credit and Investment Risk Management on pages 106-130 and Allowance for Credit Losses on pages 127-129 for a further discussion of the credit portfolios and the allowance for credit losses.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)			
	2022	2021	2020
Selected balance sheet data (period-end)			
Total assets	\$ 514,085	\$ 500,370	\$ 496,705
Loans:			
Banking & Wealth Management ^(a)	29,008	35,095	48,810
Home Lending ^(b)	172,554	180,529	182,121
Card Services	185,175	154,296	144,216
Auto	68,191	69,138	66,432
Total loans	454,928	439,058	441,579
Deposits	1,131,611	1,148,110	958,706
Equity	50,000	50,000	52,000
Selected balance sheet data (average)			
Total assets	\$ 497,263	\$ 489,771	\$ 501,584
Loans:			
Banking & Wealth Management	31,545	44,906	43,064
Home Lending ^(c)	176,285	181,049	197,148
Card Services	163,335	140,405	146,633
Auto	68,098	67,624	61,476
Total loans	439,263	433,984	448,321
Deposits	1,162,680	1,054,956	851,390
Equity	50,000	50,000	52,000
Headcount	135,347	128,863	122,894

- (a) At December 31, 2022, 2021 and 2020, included \$350 million, \$5.4 billion and \$19.2 billion of loans, respectively, in Business Banking under the PPP. Refer to Credit Portfolio on pages 108-109 for a further discussion of the PPP.
- (b) At December 31, 2022, 2021 and 2020, Home Lending loans held-for-sale and loans at fair value were \$3.0 billion, \$14.9 billion and \$9.7 billion, respectively.
- (c) Average Home Lending loans held-for sale and loans at fair value were \$7.3 billion, \$15.4 billion and \$11.1 billion for the years ended December 31, 2022, 2021 and 2020, respectively.

Selected metrics

As of or for the year ended December 31, (in millions, except ratio data)			
	2022	2021	2020
Credit data and quality statistics			
Nonaccrual loans ^{(a)(b)}	\$ 3,899 ^(f)	\$ 4,875 ^(f)	\$ 5,492
Net charge-offs/(recoveries)			
Banking & Wealth Management	370	289	263
Home Lending	(229)	(275)	(169)
Card Services	2,403	2,712	4,286
Auto	144	35	123
Total net charge-offs/ (recoveries)	\$ 2,688	\$ 2,761	\$ 4,503
Net charge-off/(recovery) rate			
Banking & Wealth Management ^(c)	1.17%	0.64%	0.61%
Home Lending	(0.14)	(0.17)	(0.09)
Card Services	1.47	1.94	2.93
Auto	0.21	0.05	0.20
Total net charge-off/ (recovery) rate	0.62%	0.66%	1.03%
30+ day delinquency rate			
Home Lending ^{(d)(e)}	0.83%	1.25%	1.15%
Card Services	1.45	1.04	1.68
Auto	1.01	0.64	0.69
90+ day delinquency rate - Card Services	0.68%	0.50%	0.92%
Allowance for loan losses			
Banking & Wealth Management	\$ 722	\$ 697	\$ 1,372
Home Lending	867	660	1,813
Card Services	11,200	10,250	17,800
Auto	715	733	1,042
Total allowance for loan losses	\$13,504	\$12,340	\$22,027

- (a) At December 31, 2022, 2021 and 2020, nonaccrual loans excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of \$187 million, \$342 million and \$558 million, respectively. These amounts have been excluded based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.
- (b) At December 31, 2022, 2021 and 2020, generally excludes loans that were under payment deferral programs offered in response to the COVID-19 pandemic. Refer to Credit Portfolio on pages 108-109 for further information on consumer assistance. Includes loans to customers that have exited COVID-19 related payment deferral programs and are 90 or more days past due, predominantly all of which were considered collateral-dependent at time of exit.
- (c) At December 31, 2022, 2021 and 2020, included \$350 million, \$5.4 billion and \$19.2 billion of loans, respectively, in Business Banking under the PPP. The Firm does not expect to realize material credit losses on PPP loans because the loans are guaranteed by the SBA. Refer to Credit Portfolio on pages 108-109 for a further discussion of the PPP.
- (d) At December 31, 2022, 2021 and 2020, the principal balance of loans under payment deferral programs offered in response to the COVID-19 pandemic was \$449 million, \$1.1 billion and \$9.1 billion in Home Lending, respectively. Loans that are performing according to their modified terms are generally not considered delinquent. Refer to Credit Portfolio on pages 108-109 for further information on consumer assistance.
- (e) At December 31, 2022, 2021 and 2020, excluded mortgage loans insured by U.S. government agencies of \$258 million, \$405 million and \$744 million, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.
- (f) At December 31, 2022 and 2021, nonaccrual loans excluded \$101 million and \$506 million of PPP loans 90 or more days past due and guaranteed by the SBA, respectively.

Management's discussion and analysis

Selected metrics

As of or for the year ended December 31, (in billions, except ratios and where otherwise noted)	2022	2021	2020
Business Metrics			
CCB households (in millions)	69.3	66.3	63.4
Number of branches	4,787	4,790	4,908
Active digital customers (in thousands) ^(a)	63,136	58,857	55,274
Active mobile customers (in thousands) ^(b)	49,710	45,452	40,899
Debit and credit card sales volume	\$1,555.4	\$1,360.7	\$1,081.2
Total payments transaction volume (in trillions) ^(c)	5.6	5.0	4.0
Banking & Wealth Management			
Average deposits	\$1,145.7	\$1,035.4	\$ 832.5
Deposit margin	1.71 %	1.27 %	1.58 %
Business Banking average loans	\$ 22.3	\$ 37.5	\$ 37.9
Business Banking origination volume	4.3	13.9 ^(f)	26.6 ^(f)
Client investment assets ^(d)	647.1	718.1	590.2
Number of client advisors	5,029	4,725	4,417
Home Lending			
Mortgage origination volume by channel			
Retail	\$ 38.5	\$ 91.8	\$ 72.9
Correspondent	26.9	70.9	40.9
Total mortgage origination volume^(e)	\$ 65.4	\$ 162.7	\$ 113.8
Third-party mortgage loans serviced (period-end)	\$ 584.3	\$ 519.2	\$ 447.3
MSR carrying value (period-end)	8.0	5.5	3.3
Card Services			
Sales volume, excluding commercial card	\$1,064.7	\$ 893.5	\$ 702.7
Net revenue rate	9.87 %	10.51 %	10.92 %
Net yield on average loans	9.77	9.88	10.42
New accounts opened (in millions)	9.6	8.0	5.4
Auto			
Loan and lease origination volume	\$ 30.4	\$ 43.6	\$ 38.4
Average auto operating lease assets	14.3	19.1	22.0

- (a) Users of all web and/or mobile platforms who have logged in within the past 90 days.
- (b) Users of all mobile platforms who have logged in within the past 90 days.
- (c) Total payments transaction volume includes debit and credit card sales volume and gross outflows of ACH, ATM, teller, wires, BillPay, PayChase, Zelle, person-to-person and checks.
- (d) Includes assets invested in managed accounts and J.P. Morgan mutual funds where AWM is the investment manager. Refer to AWM segment results on pages 76-78 for additional information.
- (e) Firmwide mortgage origination volume was \$81.8 billion, \$182.4 billion and \$133.4 billion for the years ended December 31, 2022, 2021 and 2020, respectively.
- (f) Included origination volume under the PPP of \$10.6 billion and \$21.9 billion for the years ended December 31, 2021 and 2020, respectively. The program ended on May 31, 2021 for new applications.

CORPORATE & INVESTMENT BANK

The Corporate & Investment Bank, which consists of Banking and Markets & Securities Services, offers a broad suite of investment banking, market-making, prime brokerage, lending, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, merchants, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Payments, which provides payments services enabling clients to manage payments and receipts globally, and cross-border financing. Markets & Securities Services includes Markets, a global market-maker across products, including cash and derivative instruments, which also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Securities Services also includes Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Selected income statement data

Year ended December 31, (in millions)	2022	2021	2020
Revenue			
Investment banking fees	\$ 6,929	\$ 13,359	\$ 9,477
Principal transactions	19,926	15,764	17,560
Lending- and deposit-related fees	2,419	2,514	2,070
Asset management, administration and commissions	5,065	5,024	4,721
All other income ^(a)	1,660	1,548	1,292
Noninterest revenue	35,999	38,209	35,120
Net interest income	11,900	13,540	14,164
Total net revenue^(b)	47,899	51,749	49,284
Provision for credit losses	1,158	(1,174)	2,726
Noninterest expense			
Compensation expense	13,918	13,096	11,612
Noncompensation expense	13,169	12,229	11,926
Total noninterest expense	27,087	25,325	23,538
Income before income tax expense	19,654	27,598	23,020
Income tax expense	4,684	6,464	5,926
Net income	\$ 14,970	\$ 21,134	\$ 17,094

- (a) Includes card income of \$1.0 billion, \$910 million and \$840 million for the years ended December 31, 2022, 2021 and 2020, respectively.
- (b) Includes tax-equivalent adjustments, predominantly due to income tax credits and other tax benefits related to alternative energy investments; income tax credits and amortization of the cost of investments in affordable housing projects; and tax-exempt income from municipal bonds of \$3.0 billion, \$3.0 billion and \$2.4 billion for the years ended December 31, 2022, 2021 and 2020, respectively.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2022	2021	2020
Financial ratios			
Return on equity	14 %	25 %	20 %
Overhead ratio	57	49	48
Compensation expense as percentage of total net revenue	29	25	24
Revenue by business			
Investment Banking	\$ 6,510	\$ 12,506	\$ 8,871
Payments	7,376	6,270	5,560
Lending	1,377	1,001	1,146
Total Banking	15,263	19,777	15,577
Fixed Income Markets	18,617	16,865	20,878
Equity Markets	10,367	10,529	8,605
Securities Services	4,488	4,328	4,253
Credit Adjustments & Other ^(a)	(836)	250	(29)
Total Markets & Securities Services	32,636	31,972	33,707
Total net revenue	\$47,899	\$51,749	\$49,284

(a) Consists primarily of centrally managed credit valuation adjustments ("CVA"), funding valuation adjustments ("FVA") on derivatives, other valuation adjustments, and certain components of fair value option elected liabilities, which are primarily reported in principal transactions revenue. Results are presented net of associated hedging activities and net of CVA and FVA amounts allocated to Fixed Income Markets and Equity Markets. Refer to Notes 2, 3 and 24 for additional information.

Management's discussion and analysis

2022 compared with 2021

Net income was \$15.0 billion, down 29%.

Net revenue was \$47.9 billion, down 7%.

Banking revenue was \$15.3 billion, down 23%.

- Investment Banking revenue was \$6.5 billion, down 48%, driven by lower Investment Banking fees, which were also down 48%, as volatile market conditions resulted in lower fees across products, and \$251 million of markdowns on held-for-sale positions, primarily unfunded commitments, in the bridge financing portfolio in the second quarter of 2022. The Firm ranked #1 for Global Investment Banking fees, according to Dealogic.
 - Equity underwriting fees were \$1.0 billion, down 74%, and debt underwriting fees were \$2.8 billion, down 43%, due to lower issuance activity.
 - Advisory fees were \$3.1 billion, down 30%, driven by a lower level of announced deals.
- Payments revenue was \$7.4 billion, up 18%, and included the net impact of equity investments. Excluding this net impact, revenue was \$7.8 billion, up 33%, driven by deposit margin expansion on higher rates and growth in fees on higher volumes.
- Lending revenue was \$1.4 billion, up 38%, driven by higher net interest income primarily on higher loans, as well as fair value gains on hedges of retained loans, compared with losses in the prior year.

Markets & Securities Services revenue was \$32.6 billion, up 2%. Markets revenue was \$29.0 billion, up 6%.

- Fixed Income Markets revenue was \$18.6 billion, up 10%, driven by strong performance in the macro businesses amid volatile market conditions, particularly in Currencies & Emerging Markets and Rates, partially offset by lower revenue in Securitized Products.
- Equity Markets revenue was \$10.4 billion, down 2%, driven by lower revenue in Cash Equities, largely offset by Equity Derivatives.
- Securities Services revenue was \$4.5 billion, up 4%, driven by deposit margin expansion on higher rates and growth in fees, largely offset by lower average market values of assets under custody and lower deposits.
- Credit Adjustments & Other was a loss of \$836 million, reflecting funding spread widening, and, to a lesser extent, losses on exposures relating to commodities and Russia and Russia-associated counterparties, compared with a gain of \$250 million in the prior year.

Noninterest expense was \$27.1 billion, up 7%, driven by higher structural expense and investments in the business, including higher compensation, partially offset by lower revenue-related compensation as well as lower legal expense.

The provision for credit losses was \$1.2 billion, predominantly driven by a net addition to the allowance for credit losses, reflecting deterioration in the Firm's macroeconomic outlook and loan growth.

The provision for credit losses in the prior year was a net benefit of \$1.2 billion, driven by a net reduction in the allowance for credit losses.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)			
	2022	2021	2020
Selected balance sheet data (period-end)			
Total assets	\$1,334,296	\$1,259,896	\$1,095,926
Loans:			
Loans retained ^(a)	187,642	159,786	133,296
Loans held-for-sale and loans at fair value ^(b)	42,304	50,386	39,588
Total loans	229,946	210,172	172,884
Equity	103,000	83,000	80,000
Selected balance sheet data (average)			
Total assets	\$1,406,250	\$1,334,518	\$1,121,942
Trading assets-debt and equity instruments	405,916	448,099	425,060
Trading assets-derivative receivables	77,802	68,203	69,243
Loans:			
Loans retained ^(a)	172,627	145,137	135,676
Loans held-for-sale and loans at fair value ^(b)	46,846	51,072	33,792
Total loans	219,473	196,209	169,468
Equity	103,000	83,000	80,000
Headcount	73,452	67,546	61,733

- (a) Loans retained includes credit portfolio loans, loans held by consolidated Firm-administered multi-seller conduits, trade finance loans, other held-for-investment loans and overdrafts.
- (b) Loans held-for-sale and loans at fair value primarily reflect lending related positions originated and purchased in CIB Markets, including loans held for securitization.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)			
	2022	2021	2020
Credit data and quality statistics			
Net charge-offs/(recoveries)	\$ 82	\$ 6	\$ 370
Nonperforming assets:			
Nonaccrual loans:			
Nonaccrual loans retained ^(a)	718	584	1,008
Nonaccrual loans held-for-sale and loans at fair value ^(b)	848	844	1,662
Total nonaccrual loans	1,566	1,428	2,670
Derivative receivables	296	316	56
Assets acquired in loan satisfactions	87	91	85
Total nonperforming assets	1,949	1,835	2,811
Allowance for credit losses:			
Allowance for loan losses	2,292	1,348	2,366
Allowance for lending-related commitments	1,448	1,372	1,534
Total allowance for credit losses	3,740	2,720	3,900
Net charge-off/(recovery) rate ^(c)	0.05 %	– %	0.27 %
Allowance for loan losses to period-end loans retained	1.22	0.84	1.77
Allowance for loan losses to period-end loans retained, excluding trade finance and conduits ^(d)	1.67	1.12	2.54
Allowance for loan losses to nonaccrual loans retained ^(a)	319	231	235
Nonaccrual loans to total period-end loans	0.68	0.68	1.54

- (a) Allowance for loan losses of \$104 million, \$58 million and \$278 million were held against these nonaccrual loans at December 31, 2022, 2021 and 2020, respectively.
- (b) At December 31, 2022, 2021 and 2020, nonaccrual loans excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of \$115 million, \$281 million and \$316 million, respectively. These amounts have been excluded based upon the government guarantee.
- (c) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.
- (d) Management uses allowance for loan losses to period-end loans retained, excluding trade finance and conduits, a non-GAAP financial measure, to provide a more meaningful assessment of CIB's allowance coverage ratio. Refer to Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures on pages 58-60.

Management's discussion and analysis

Investment banking fees

(in millions)	Year ended December 31,		
	2022	2021	2020
Advisory	\$ 3,051	\$ 4,381	\$ 2,368
Equity underwriting	1,034	3,953	2,758
Debt underwriting ^(a)	2,844	5,025	4,351
Total investment banking fees	\$ 6,929	\$ 13,359	\$ 9,477

(a) Represents long-term debt and loan syndications.

League table results – wallet share

Year ended December 31,	2022		2021		2020	
	Rank	Share	Rank	Share	Rank	Share
Based on fees^(a)						
M&A^(b)	#	2	8.2 %	#	2	9.6 %
Global		2	9.1		2	10.8
U.S.		2	9.4		2	9.4
Equity and equity-related^(c)						
Global	1	5.8	2	8.8	2	8.9
U.S.	1	13.9	2	11.7	2	12.1
Long-term debt^(d)						
Global	1	7.0	1	8.4	1	8.8
U.S.	1	12.2	1	12.1	1	12.8
Loan syndications						
Global	1	11.2	1	10.9	1	11.1
U.S.	1	12.8	1	12.6	1	12.3
Global investment banking fees^(e)	#	1	8.0 %	#	1	9.3 %

(a) Source: Dealogic as of January 2, 2023. Reflects the ranking of revenue wallet and market share.

(b) Global M&A excludes any withdrawn transactions. U.S. M&A revenue wallet represents wallet from client parents based in the U.S.

(c) Global equity and equity-related ranking includes rights offerings and Chinese A-Shares.

(d) Long-term debt rankings include investment-grade, high-yield, supranationals, sovereigns, agencies, covered bonds, asset-backed securities ("ABS") and mortgage-backed securities ("MBS"); and exclude money market, short-term debt, and U.S. municipal securities.

(e) Global investment banking fees exclude money market, short-term debt and shelf securities.

Markets revenue

The following table summarizes selected income statement data for the Markets businesses. Markets includes both Fixed Income Markets and Equity Markets. Markets revenue consists of principal transactions, fees, commissions and other income, as well as net interest income. The Firm assesses its Markets business performance on a total revenue basis, as offsets may occur across revenue line items. For example, securities that generate net interest income may be risk-managed by derivatives that are reflected at fair value in principal transactions revenue. Refer to Notes 6 and 7 for a description of the composition of these income statement line items.

Principal transactions reflects revenue on financial instruments and commodities transactions that arise from client-driven market-making activity. Principal transactions revenue includes amounts recognized upon executing new transactions with market participants, as well as "inventory-related revenue", which is revenue recognized from gains and losses on derivatives and other instruments that the Firm has been holding in anticipation of, or in response to, client demand, and changes in the fair value of instruments used by the Firm to actively manage the risk exposure arising from such inventory. Principal transactions revenue recognized upon executing new transactions with market participants is affected by many factors including the level of client activity, the bid-offer spread (which is the

difference between the price at which a market participant is willing and able to sell an instrument to the Firm and the price at which another market participant is willing and able to buy it from the Firm, and vice versa), market liquidity and volatility. These factors are interrelated and sensitive to the same factors that drive inventory-related revenue, which include general market conditions, such as interest rates, foreign exchange rates, credit spreads, and equity and commodity prices, as well as other macroeconomic conditions.

For the periods presented below, the predominant source of principal transactions revenue was the amount recognized upon executing new transactions.

Year ended December 31, (in millions, except where otherwise noted)	2022			2021			2020		
	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets	Fixed Income Markets	Equity Markets	Total Markets
Principal transactions	\$ 11,682	\$ 8,846	\$ 20,528	\$ 7,911	\$ 7,519	\$ 15,430	\$ 11,857	\$ 6,087	\$ 17,944
Lending- and deposit-related fees	303	22	325	321	17	338	226	10	236
Asset management, administration and commissions	550	2,007	2,557	545	1,967	2,512	411	2,087	2,498
All other income	916	(131)	785	972	(101)	871	493	(62)	431
Noninterest revenue	13,451	10,744	24,195	9,749	9,402	19,151	12,987	8,122	21,109
Net interest income	5,166	(377)	4,789	7,116	1,127	8,243	7,891	483	8,374
Total net revenue	\$ 18,617	\$ 10,367	\$ 28,984	\$ 16,865	\$ 10,529	\$ 27,394	\$ 20,878	\$ 8,605	\$ 29,483
Loss days^(a)			7			4			4

(a) Loss days represent the number of days for which CIB Markets, which consists of Fixed Income Markets and Equity Markets, posted losses to total net revenue. The loss days determined under this measure differ from the measure used to determine backtesting gains and losses. Daily backtesting gains and losses include positions in the Firm's Risk Management value-at-risk ("VaR") measure and exclude certain components of total net revenue, which may more than offset backtesting gains or losses on a particular day. For more information on daily backtesting gains and losses, refer to the VaR discussion on pages 133-135.

Selected metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)	2022	2021	2020
Assets under custody ("AUC") by asset class (period-end) (in billions):			
Fixed Income	\$ 14,361	\$ 16,098	\$ 15,840
Equity	10,748	12,962	11,489
Other ^(a)	3,526	4,161	3,651
Total AUC	\$ 28,635	\$ 33,221	\$ 30,980
Merchant processing volume (in billions) ^(b)	\$ 2,158.4	\$ 1,886.7	\$ 1,597.3
Client deposits and other third party liabilities (average) ^(c)	\$ 687,391	\$ 714,910	\$ 610,555

(a) Consists of mutual funds, unit investment trusts, currencies, annuities, insurance contracts, options and other contracts.

(b) Represents total merchant processing volume across CIB, CCB and CB.

(c) Client deposits and other third-party liabilities pertain to the Payments and Securities Services businesses.

Management's discussion and analysis

International metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)	2022	2021	2020
Total net revenue^(a)			
Europe/Middle East/Africa	\$ 15,303	\$ 13,954	\$ 13,872
Asia-Pacific	7,846	7,555	7,524
Latin America/Caribbean	2,239	1,833	1,931
Total international net revenue	25,388	23,342	23,327
North America	22,511	28,407	25,957
Total net revenue	\$ 47,899	\$ 51,749	\$ 49,284
Loans retained (period-end)^(a)			
Europe/Middle East/Africa	\$ 39,424	\$ 33,084	\$ 27,659
Asia-Pacific	15,571	14,471	12,802
Latin America/Caribbean	8,599	7,006	5,425
Total international loans	63,594	54,561	45,886
North America	124,048	105,225	87,410
Total loans retained	\$ 187,642	\$ 159,786	\$ 133,296
Client deposits and other third-party liabilities (average)^(b)			
Europe/Middle East/Africa	\$ 247,203	\$ 243,867	\$ 211,592
Asia-Pacific	129,134	132,241	124,145
Latin America/Caribbean	39,917	46,045	37,664
Total international	\$ 416,254	\$ 422,153	\$ 373,401
North America	271,137	292,757	237,154
Total client deposits and other third-party liabilities	\$ 687,391	\$ 714,910	\$ 610,555
AUC (period-end)^(b) (in billions)			
North America	\$ 19,219	\$ 21,655	\$ 20,028
All other regions	9,416	11,566	10,952
Total AUC	\$ 28,635	\$ 33,221	\$ 30,980

(a) Total net revenue and loans retained (excluding loans held-for-sale and loans at fair value) are based on the location of the trading desk, booking location, or domicile of the client, as applicable.

(b) Client deposits and other third-party liabilities pertaining to the Payments and Securities Services businesses, and AUC, are based on the domicile of the client.

COMMERCIAL BANKING

Commercial Banking provides comprehensive financial solutions, including lending, payments, investment banking and asset management products across three primary client segments: Middle Market Banking, Corporate Client Banking and Commercial Real Estate Banking. Other includes amounts not aligned with a primary client segment.

Middle Market Banking covers small and midsized companies, local governments and nonprofit clients.

Corporate Client Banking covers large corporations.

Commercial Real Estate Banking covers investors, developers, and owners of multifamily, office, retail, industrial and affordable housing properties.

Selected income statement data

Year ended December 31, (in millions)	2022	2021	2020
Revenue			
Lending- and deposit-related fees	\$ 1,243	\$ 1,392	\$ 1,187
All other income ^(a)	2,093	2,537	1,880
Noninterest revenue	3,336	3,929	3,067
Net interest income	8,197	6,079	6,246
Total net revenue^(b)	11,533	10,008	9,313
Provision for credit losses	1,268	(947)	2,113
Noninterest expense			
Compensation expense	2,296	1,973	1,854
Noncompensation expense	2,423	2,068	1,944
Total noninterest expense	4,719	4,041	3,798
Income before income tax expense	5,546	6,914	3,402
Income tax expense	1,333	1,668	824
Net income	\$ 4,213	\$ 5,246	\$ 2,578

(a) Includes card income of \$685 million, \$624 million and \$525 million for the years ended December 31, 2022, 2021 and 2020, respectively.

(b) Total net revenue included tax-equivalent adjustments from income tax credits related to equity investments in designated community development entities and in entities established for rehabilitation of historic properties, as well as tax-exempt income related to municipal financing activities of \$322 million, \$330 million and \$350 million for the years ended December 31, 2022, 2021 and 2020, respectively.

2022 compared with 2021

Net income was \$4.2 billion, down 20%, reflecting a net increase in the provision for credit losses compared with a net benefit in the prior year.

Net revenue was \$11.5 billion, up 15%. Net interest income was \$8.2 billion, up 35%, driven by deposit margin expansion on higher rates and growth in loans, predominantly offset by the impact of higher funding costs and lower deposits.

Noninterest revenue was \$3.3 billion, down 15%, driven by lower investment banking revenue and net markdowns on held-for-sale positions, primarily unfunded commitments, in the bridge financing portfolio. The decreases were partially offset by a gain on an equity method investment received in partial satisfaction of a loan.

Noninterest expense was \$4.7 billion, up 17%, largely driven by higher volume-and revenue-related expense, as well as structural expense, including higher compensation expense, and expense associated with growth in payments.

The provision for credit losses was \$1.3 billion, predominantly driven by a net addition to the allowance for credit losses, reflecting deterioration in the Firm's macroeconomic outlook and loan growth.

The provision for credit losses in the prior year was a net benefit of \$947 million, driven by a net reduction in the allowance for credit losses.

Management's discussion and analysis

CB product revenue consists of the following:

Lending includes a variety of financing alternatives, which are primarily provided on a secured basis; collateral includes receivables, inventory, equipment, real estate or other assets. Products include term loans, revolving lines of credit, bridge financing, asset-based structures, leases, and standby letters of credit.

Payments includes revenue from a broad range of products and services that CB clients use to manage payments and receipts globally, as well as invest and manage funds.

Investment banking includes investment banking fees and markets revenue from a full range of products and services providing CB clients with advisory, loan syndications, capital-raising in equity and debt markets, and risk management solutions.

Other revenue primarily includes tax-equivalent adjustments generated from Community Development Banking and activity derived from principal transactions.

Selected income statement data (continued)

Year ended December 31, (in millions, except ratios)	2022	2021	2020
Revenue by product			
Lending	\$ 4,524	\$ 4,629	\$ 4,396
Payments ^(a)	5,882	3,791	3,820
Investment banking ^{(a)(b)}	873	1,473	964
Other	254	115	133
Total net revenue	\$ 11,533	\$ 10,008	\$ 9,313
Investment banking revenue, gross ^(c)	\$ 2,978	\$ 5,092	\$ 3,348
Revenue by client segment			
Middle Market Banking	\$ 5,134	\$ 4,004	\$ 3,640
Corporate Client Banking	3,918	3,508	3,203
Commercial Real Estate Banking	2,461	2,419	2,313
Other	20	77	157
Total net revenue	\$ 11,533	\$ 10,008	\$ 9,313
Financial ratios			
Return on equity	16 %	21 %	11 %
Overhead ratio	41	40	41

- (a) In the fourth quarter of 2022, certain revenue from CIB Markets products was reclassified from investment banking to payments. Prior-period amounts have been revised to conform with the current presentation.
- (b) Includes CB's share of revenue from investment banking products sold to CB clients through the CIB.
- (c) Includes gross revenues earned by the Firm for investment banking and payments products sold to CB clients that are subject to a revenue sharing arrangement with the CIB. Refer to Business Segment Results on page 61 for a discussion of revenue sharing.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2022	2021	2020
Selected balance sheet data (period-end)			
Total assets	\$ 257,106	\$ 230,776	\$ 228,911
Loans:			
Loans retained	233,879	206,220	207,880
Loans held-for-sale and loans at fair value	707	2,223	2,245
Total loans	\$ 234,586	\$ 208,443	\$ 210,125
Equity	25,000	24,000	22,000
Period-end loans by client segment			
Middle Market Banking ^(a)	\$ 72,625	\$ 61,159	\$ 61,115
Corporate Client Banking	53,840	45,315	47,420
Commercial Real Estate Banking	107,999	101,751	101,146
Other	122	218	444
Total loans^(a)	\$ 234,586	\$ 208,443	\$ 210,125
Selected balance sheet data (average)			
Total assets	\$ 243,108	\$ 225,548	\$ 233,156
Loans:			
Loans retained	222,388	201,920	217,767
Loans held-for-sale and loans at fair value	1,350	3,122	1,129
Total loans	\$ 223,738	\$ 205,042	\$ 218,896
Client deposits and other third-party liabilities	294,261	301,502	237,825
Equity	25,000	24,000	22,000
Average loans by client segment			
Middle Market Banking	\$ 67,830	\$ 60,128	\$ 61,558
Corporate Client Banking	50,281	44,361	54,172
Commercial Real Estate Banking	105,459	100,331	102,479
Other	168	222	687
Total loans	\$ 223,738	\$ 205,042	\$ 218,896
Headcount	14,687	12,902	11,675

- (a) At December 31, 2022, 2021 and 2020, total loans included \$132 million, \$1.2 billion and \$6.6 billion of loans under the PPP, of which \$123 million, \$1.1 billion and \$6.4 billion were in Middle Market Banking, respectively. Refer to Credit Portfolio on pages 108-109 for a further discussion of the PPP.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2022	2021	2020
Credit data and quality statistics			
Net charge-offs/(recoveries)	\$ 84	\$ 71	\$ 401
Nonperforming assets			
Nonaccrual loans:			
Nonaccrual loans retained ^(a)	766	740	1,286
Nonaccrual loans held-for-sale and loans at fair value	—	—	120
Total nonaccrual loans	766	740	1,406
Assets acquired in loan satisfactions	—	17	24
Total nonperforming assets	766	757	1,430
Allowance for credit losses:			
Allowance for loan losses	3,324	2,219	3,335
Allowance for lending-related commitments	830	749	651
Total allowance for credit losses	4,154	2,968	3,986
Net charge-off/(recovery) rate ^(b)	0.04%	0.04%	0.18%
Allowance for loan losses to period-end loans retained	1.42	1.08	1.60
Allowance for loan losses to nonaccrual loans retained ^(a)	434	300	259
Nonaccrual loans to period-end total loans	0.33	0.36	0.67

(a) Allowance for loan losses of \$153 million, \$124 million and \$273 million was held against nonaccrual loans retained at December 31, 2022, 2021 and 2020, respectively.

(b) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.

(c) At December 31, 2022 and 2021, nonaccrual loans excluded \$18 million and \$114 million, respectively, of PPP loans 90 or more days past due and guaranteed by the SBA.

Management's discussion and analysis

ASSET & WEALTH MANAGEMENT

Asset & Wealth Management, with client assets of \$4.0 trillion, is a global leader in investment and wealth management.

Asset Management

Offers multi-asset investment management solutions across equities, fixed income, alternatives and money market funds to institutional and retail investors providing for a broad range of clients' investment needs.

Global Private Bank

Provides retirement products and services, brokerage, custody, estate planning, lending, deposits and investment management to high net worth clients.

The majority of AWM's client assets are in actively managed portfolios.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2022	2021	2020
Revenue			
Asset management, administration and commissions	\$12,172	\$12,333	\$10,610
All other income	335	738	212
Noninterest revenue	12,507	13,071	10,822
Net interest income	5,241	3,886	3,418
Total net revenue	17,748	16,957	14,240
Provision for credit losses	128	(227)	263
Noninterest expense			
Compensation expense	6,336	5,692	4,959
Noncompensation expense	5,493	5,227	4,998
Total noninterest expense	11,829	10,919	9,957
Income before income tax expense	5,791	6,265	4,020
Income tax expense	1,426	1,528	1,028
Net income	\$ 4,365	\$ 4,737	\$ 2,992
Revenue by line of business			
Asset Management	\$ 8,818	\$ 9,246	\$ 7,654
Global Private Bank	8,930	7,711	6,586
Total net revenue	\$17,748	\$16,957	\$14,240
Financial ratios			
Return on equity	25 %	33 %	28 %
Overhead ratio	67	64	70
Pre-tax margin ratio:			
Asset Management	30	35	29
Global Private Bank	35	39	27
Asset & Wealth Management	33	37	28

2022 compared with 2021

Net income was \$4.4 billion, down 8%.

Net revenue was \$17.7 billion, up 5%. Net interest income was \$5.2 billion, up 35%. Noninterest revenue was \$12.5 billion, down 4%.

Revenue from Asset Management was \$8.8 billion, down 5%, predominantly driven by:

- net investment valuation losses compared to net gains in the prior year and,
- lower asset management fees reflecting a decline in market levels and the impact of net liquidity outflows, predominantly offset by the removal of most money market fund fee waivers.

Revenue from Global Private Bank was \$8.9 billion, up 16%, driven by:

- margin expansion on higher rates and higher average deposits; and to a lesser extent higher average loans and wider spreads,

partially offset by

- lower brokerage and placement fees on reduced volume, and lower management fees.

Noninterest expense was \$11.8 billion, up 8%, driven by higher structural expense and investments in the business, largely compensation.

The provision for credit losses was \$128 million, driven by a net addition to the allowance for credit losses.

The provision for credit losses in the prior year was a net benefit of \$227 million driven by a net reduction in the allowance for credit losses.

Asset Management has two high-level measures of its overall fund performance.

- Percentage of mutual fund assets under management in funds rated 4- or 5-star:** Mutual fund rating services rank funds based on their risk adjusted performance over various periods. A 5-star rating is the best rating and represents the top 10% of industry-wide ranked funds. A 4-star rating represents the next 22.5% of industry-wide ranked funds. A 3-star rating represents the next 35% of industry-wide ranked funds. A 2-star rating represents the next 22.5% of industry-wide ranked funds. A 1-star rating is the worst rating and represents the bottom 10% of industrywide ranked funds. An overall Morningstar rating is derived from a weighted average of the performance associated with a fund's three-, five and ten- year (if applicable) Morningstar Rating metrics. For U.S.-domiciled funds, separate star ratings are provided at the individual share class level. The Nomura "star rating" is based on three-year risk-adjusted performance only. Funds with fewer than three years of history are not rated and hence excluded from these rankings. All ratings, the assigned peer categories and the asset values used to derive these rankings are sourced from the applicable fund rating provider. Where applicable, the fund rating providers redenominate asset values into U.S. dollars. The percentage of AUM is based on star ratings at the share class level for U.S.-domiciled funds, and at a "primary share class" level to represent the star rating of all other funds, except for Japan, for which Nomura provides ratings at the fund level. The performance data may have been different if all share classes had been included. Past performance is not indicative of future results.
- Percentage of mutual fund assets under management in funds ranked in the 1st or 2nd quartile (one, three and five years):** All quartile rankings, the assigned peer categories and the asset values used to derive these rankings are sourced from the fund rating providers. Quartile rankings are based on the net-of-fee absolute return of each fund. Where applicable, the fund rating providers redenominate asset values into U.S. dollars. The percentage of AUM is based on fund performance and associated peer rankings at the share class level for U.S.-domiciled funds, at a "primary share class" level to represent the quartile ranking for U.K., Luxembourg and Hong Kong SAR funds and at the fund level for all other funds. The performance data may have been different if all share classes had been included. Past performance is not indicative of future results.

"Primary share class" means the C share class for European funds and Acc share class for Hong Kong SAR and Taiwan funds. If these share classes are not available, the oldest share class is used as the primary share class.

Selected metrics

As of or for the year ended December 31, (in millions, except ranking data, ratios and headcount)	2022	2021	2020
% of JPM mutual fund assets rated as 4- or 5-star ^(a)	73 %	69 %	63 %
% of JPM mutual fund assets ranked in 1 st or 2 nd quartile: ^(b)			
1 year	65	53	63
3 years	75	72	69
5 years	81	80	72
Selected balance sheet data (period-end)^(c)			
Total assets	\$232,037	\$234,425	\$203,384
Loans	214,006	218,271	186,608
Deposits	233,130	282,052	198,755
Equity	17,000	14,000	10,500
Selected balance sheet data (average)^(c)			
Total assets	\$232,438	\$217,187	\$181,432
Loans	215,582	198,487	166,311
Deposits	261,489	230,296	161,955
Equity	17,000	14,000	10,500
Headcount	26,041	22,762	20,683
Number of Global Private Bank client advisors	3,137	2,738	2,462
Credit data and quality statistics^(c)			
Net charge-offs/(recoveries)	\$ (7)	\$ 26	\$ (14)
Nonaccrual loans	459	708	964
Allowance for credit losses:			
Allowance for loan losses	\$ 494	\$ 365	\$ 598
Allowance for lending-related commitments	20	18	38
Total allowance for credit losses	\$ 514	\$ 383	\$ 636
Net charge-off/(recovery) rate	— %	0.01 %	(0.01)%
Allowance for loan losses to period-end loans	0.23	0.17	0.32
Allowance for loan losses to nonaccrual loans	108	52	62
Nonaccrual loans to period-end loans	0.21	0.32	0.52

(a) Represents the Morningstar Rating for all domiciled funds except for Japan domiciled funds which use Nomura. Includes only Asset Management retail open-ended mutual funds that have a rating. Excludes money market funds, Undiscovered Managers Fund, and Brazil domiciled funds.

(b) Quartile ranking sourced from Morningstar, Lipper and Nomura based on country of domicile. Includes only Asset Management retail open-ended mutual funds that are ranked by the aforementioned sources. Excludes money market funds, Undiscovered Managers Fund, and Brazil domiciled funds.

(c) Loans, deposits and related credit data and quality statistics relate to the Global Private Bank business.

Management's discussion and analysis

Client assets

2022 compared with 2021

Client assets were \$4.0 trillion, a decrease of 6%. Assets under management were \$2.8 trillion, a decrease of 11% driven by lower market levels and net outflows from liquidity products, partially offset by continued net inflows into long term products.

Client assets

December 31, (in billions)	2022	2021	2020
Assets by asset class			
Liquidity	\$ 654	\$ 708	\$ 641
Fixed income	638	693	671
Equity	670	779	595
Multi-asset	603	732	656
Alternatives	201	201	153
Total assets under management	2,766	3,113	2,716
Custody/brokerage/ administration/deposits	1,282	1,182	936
Total client assets^(a)	\$ 4,048	\$ 4,295	\$ 3,652

Assets by client segment

Private Banking	\$ 751	\$ 805	\$ 689
Global Institutional	1,252	1,430	1,273
Global Funds	763	878	754
Total assets under management	\$ 2,766	\$ 3,113	\$ 2,716
Private Banking	\$ 1,964	\$ 1,931	\$ 1,581
Global Institutional	1,314	1,479	1,311
Global Funds	770	885	760
Total client assets^(a)	\$ 4,048	\$ 4,295	\$ 3,652

(a) Includes CCB client investment assets invested in managed accounts and J.P. Morgan mutual funds where AWM is the investment manager.

Client assets (continued)

Year ended December 31, (in billions)	2022	2021	2020
Assets under management rollforward			
Beginning balance	\$ 3,113	\$ 2,716	\$ 2,328
Net asset flows:			
Liquidity	(55)	68	104
Fixed income	13	36	48
Equity	35	85	33
Multi-asset	(9)	17	5
Alternatives	8	26	6
Market/performance/other impacts	(339)	165	192
Ending balance, December 31	\$ 2,766	\$ 3,113	\$ 2,716
Client assets rollforward			
Beginning balance	\$ 4,295	\$ 3,652	\$ 3,089
Net asset flows	49	389	276
Market/performance/other impacts	(296)	254	287
Ending balance, December 31	\$ 4,048	\$ 4,295	\$ 3,652

International metrics

Year ended December 31, (in billions, except where otherwise noted)	2022	2021	2020
Total net revenue (in millions)^(a)			
Europe/Middle East/Africa	\$ 3,240	\$ 3,571	\$ 2,956
Asia-Pacific	1,836	2,017	1,665
Latin America/Caribbean	967	886	782
Total international net revenue	6,043	6,474	5,403
North America	11,705	10,483	8,837
Total net revenue	\$ 17,748	\$ 16,957	\$ 14,240
Assets under management			
Europe/Middle East/Africa	\$ 487	\$ 561	\$ 517
Asia-Pacific	218	254	224
Latin America/Caribbean	69	79	70
Total international assets under management	774	894	811
North America	1,992	2,219	1,905
Total assets under management	\$ 2,766	\$ 3,113	\$ 2,716

Client assets

Europe/Middle East/Africa	\$ 610	\$ 687	\$ 622
Asia-Pacific	331	381	330
Latin America/Caribbean	189	195	166
Total international client assets	1,130	1,263	1,118
North America	2,918	3,032	2,534
Total client assets	\$ 4,048	\$ 4,295	\$ 3,652

(a) Regional revenue is based on the domicile of the client.

CORPORATE

The Corporate segment consists of Treasury and Chief Investment Office (“CIO”) and Other Corporate. Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm’s liquidity, funding, capital, structural interest rate and foreign exchange risks.

Other Corporate includes staff functions and expense that is centrally managed as well as certain Firm initiatives and activities not aligned to a specific LOB. The major Other Corporate functions include Real Estate, Technology, Legal, Corporate Finance, Human Resources, Internal Audit, Risk Management, Compliance, Control Management, Corporate Responsibility and various Other Corporate groups.

Selected income statement and balance sheet data

Year ended December 31, (in millions, except headcount)	2022	2021	2020
Revenue			
Principal transactions	\$ (227)	\$ 187	\$ 245
Investment securities gains/(losses)	(2,380)	(345)	795
All other income	809	226	159
Noninterest revenue	(1,798)	68	1,199
Net interest income	1,878	(3,551)	(2,375)
Total net revenue^(a)	80	(3,483)	(1,176)
Provision for credit losses	22	81	66
Noninterest expense	1,034	1,802	1,373
Income/(loss) before income tax expense/(benefit)			
	(976)	(5,366)	(2,615)
Income tax expense/(benefit)	(233)	(1,653)	(865)
Net income/(loss)	\$ (743)	\$ (3,713)	\$ (1,750)
Total net revenue			
Treasury and CIO	(439)	(3,464)	(1,368)
Other Corporate	519	(19)	192
Total net revenue	\$ 80	\$ (3,483)	\$ (1,176)
Net income/(loss)			
Treasury and CIO	(197)	(3,057)	(1,403)
Other Corporate	(546)	(656)	(347)
Total net income/(loss)	\$ (743)	\$ (3,713)	\$ (1,750)
Total assets (period-end)	\$ 1,328,219	\$ 1,518,100	\$ 1,359,831
Loans (period-end)	2,181	1,770	1,657
Deposits	14,203 ^(b)	396	318
Headcount	44,196	38,952	38,366

(a) Included tax-equivalent adjustments, driven by tax-exempt income from municipal bonds, of \$235 million, \$257 million and \$241 million for the years ended December 31, 2022, 2021 and 2020, respectively.

(b) Predominantly relates to the Firm's international consumer growth initiatives.

2022 compared with 2021

Net loss was \$743 million, compared with a net loss of \$3.7 billion in the prior year.

Net revenue was \$80 million, compared with a loss of \$3.5 billion driven by higher net interest income due to higher rates, partially offset by lower noninterest revenue.

Noninterest revenue was a loss of \$1.8 billion, compared with a gain of \$68 million driven by:

- higher net investment securities losses on sales of U.S. GSE and government agency MBS, and U.S. Treasuries associated with repositioning the investment securities portfolio,
- the impact of movements in foreign exchange on certain revenues, primarily as result of the U.S. dollar strengthening,
- net losses related to cash deployment transactions, which were more than offset by the related net interest income earned on those transactions,
- net losses, including hedging costs on an equity method investment related to the Firm's international consumer growth initiatives, and
- net losses on certain legacy private equity investments compared with net gains in prior year.

partially offset by

- a gain on the sale of Visa B shares. In connection with the sale, the Firm entered into a derivative instrument with the purchaser of the shares under which the Firm retains the risk associated with changes in the rate at which the shares are convertible into Visa Class A common shares (“Visa A shares”). Refer to Note 2 for additional information,
- higher net gains related to certain Other Corporate investments, and
- proceeds from an insurance settlement in the first quarter of 2022.

Noninterest expense was \$1.0 billion, down \$768 million, predominantly driven by:

- lower structural expense reflecting the impact of movements in foreign exchange on certain expenses primarily as a result of the U.S. dollar strengthening, and lower retained technology expense, and
- a lower contribution to the Firm's Foundation.

partially offset by

- higher investments, including the costs associated with the Firm's international consumer growth initiatives.

The net impact of movements in foreign exchange rates associated with the foreign exchange risk that is transferred to Treasury and CIO on certain revenues and expenses was not material to net income. Refer to Foreign Exchange Risk on page 62 for additional information.

Management's discussion and analysis

Refer to Note 10 and Note 13 for additional information on the investment securities portfolio and the allowance for credit losses.

The current period income tax benefit was driven by benefits related to tax audit settlements as well as other tax adjustments, partially offset by a change in the level and mix of income and expenses subject to U.S. federal and state and local taxes that also impacted the Firm's tax reserves.

Other Corporate also reflects the Firm's international consumer growth initiatives, which include Chase U.K., the Firm's digital retail bank in the U.K.; Nutmeg, a digital wealth manager in the U.K.; and a 40% ownership stake in C6 Bank, a digital bank in Brazil, which closed in the first quarter of 2022.

Treasury and CIO overview

Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks. The risks managed by Treasury and CIO arise from the activities undertaken by the Firm's four major reportable business segments to serve their respective client bases, which generate both on- and off-balance sheet assets and liabilities.

Treasury and CIO seeks to achieve the Firm's asset-liability management objectives generally by investing in high-quality securities that are managed for the longer-term as part of the Firm's investment securities portfolio. Treasury and CIO also uses derivatives to meet the Firm's asset-liability management objectives. Refer to Note 5 for further information on derivatives. In addition, Treasury and CIO manages the Firm's cash position primarily through deposits at central banks and investments in short-term instruments. Refer to Liquidity Risk Management on pages 97-104 for further information on liquidity and funding risk. Refer to Market Risk Management on pages 131-138 for information on interest rate and foreign exchange risks.

The investment securities portfolio predominantly consists of U.S. and non-U.S. government securities, U.S. GSE and government agency and nonagency mortgage-backed securities, collateralized loan obligations, obligations of U.S. states and municipalities and other ABS. At December 31, 2022, the Treasury and CIO investment securities portfolio, net of the allowance for credit losses, was \$629.3 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available and, where not available, based primarily upon internal risk ratings). Refer to Note 10 for further information on the Firm's investment securities portfolio and internal risk ratings.

Selected income statement and balance sheet data

As of or for the year ended December 31, (in millions)	2022	2021	2020
Investment securities gains/ (losses)	\$ (2,380)	\$ (345)	\$ 795
Available-for-sale securities (average)	\$ 239,924	\$ 306,827	\$ 413,367
Held-to-maturity securities (average) ^(a)	412,180	285,086	94,569
Investment securities portfolio (average)	\$ 652,104	\$ 591,913	\$ 507,936
Available-for-sale securities (period-end)	\$ 203,981	\$ 306,352	\$ 386,065
Held-to-maturity securities (period-end) ^(a)	425,305	363,707	201,821
Investment securities portfolio, net of allowance for credit losses (period-end) ^(b)	\$ 629,286	\$ 670,059	\$ 587,886

(a) During 2022, 2021 and 2020, the Firm transferred \$78.3 billion, \$104.5 billion and \$164.2 billion of investment securities, respectively, from AFS to HTM for capital management purposes.

(b) At December 31, 2022, 2021 and 2020, the allowance for credit losses on investment securities was \$67 million, \$42 million and \$78 million, respectively.

FIRMWIDE RISK MANAGEMENT

Risk is an inherent part of JPMorgan Chase's business activities. When the Firm extends a consumer or wholesale loan, advises customers and clients on their investment decisions, makes markets in securities, or offers other products or services, the Firm takes on some degree of risk. The Firm's overall objective is to manage its business, and the associated risks, in a manner that balances serving the interests of its clients, customers and investors, and protecting the safety and soundness of the Firm.

The Firm believes that effective risk management requires, among other things:

- Acceptance of responsibility, including identification and escalation of risks by all individuals within the Firm;
- Ownership of risk identification, assessment, data and management within each of the LOBs and Corporate; and
- A Firmwide risk governance and oversight structure.

The Firm follows a disciplined and balanced compensation framework with strong internal governance and independent oversight by the Board of Directors (the "Board"). The impact of risk and control issues is carefully considered in the Firm's performance evaluation and incentive compensation processes.

Risk governance framework

The Firm's risk governance framework involves understanding drivers of risks, types of risks, and impacts of risks.

The Firm's risk governance and oversight functions align to:



Drivers of risks are factors that cause a risk to exist. Drivers of risks include, but are not limited to, the economic environment, regulatory or government policy, competitor or market evolution, business decisions, process or judgment error, deliberate wrongdoing, dysfunctional markets, and natural disasters.

Types of risks are categories by which risks manifest themselves. The Firm's risks are generally categorized in the following four risk types:

- Strategic risk is the risk to earnings, capital, liquidity or reputation associated with poorly designed or failed business plans or inadequate responses to changes in the operating environment.
- Credit and investment risk is the risk associated with the default or change in credit profile of a client, counterparty or customer; or loss of principal or a reduction in expected returns on investments, including

consumer credit risk, wholesale credit risk, and investment portfolio risk.

- Market risk is the risk associated with the effect of changes in market factors, such as interest and foreign exchange rates, equity and commodity prices, credit spreads or implied volatilities, on the value of assets and liabilities held for both the short and long term.
- Operational risk is the risk of an adverse outcome resulting from inadequate or failed internal processes or systems; human factors; or external events impacting the Firm's processes or systems. Operational risk includes compliance, conduct, legal, and estimations and model risk.

Impacts of risks are consequences of risks, both quantitative and qualitative. There may be many consequences of risks manifesting, including quantitative impacts such as a reduction in earnings and capital, liquidity outflows, and fines or penalties, or qualitative impacts such as damage to the Firm's reputation, loss of clients and customers, and regulatory and enforcement actions.

The Firm's risk governance framework is managed on a Firmwide basis. The Firm has an Independent Risk Management ("IRM") function, which is comprised of Risk Management and Compliance. The Firm's Chief Executive Officer ("CEO") appoints, subject to approval by the Risk Committee of the Board of Directors (the "Board Risk Committee"), the Firm's Chief Risk Officer ("CRO") to lead the IRM function and maintain the risk governance framework of the Firm. The framework is subject to approval by the Board Risk Committee through its review and approval of the Risk Governance and Oversight Policy.

The Firm's CRO oversees and delegates authority to the Firmwide Risk Executives ("FREs"), the Chief Risk Officers of the LOBs and Corporate ("LOB CROs"), and the Firm's Chief Compliance Officer ("CCO"), who, in turn, establish Risk Management and Compliance organizations, develop the Firm's risk governance policies and standards, and define and oversee the implementation of the Firm's risk governance framework. The LOB CROs oversee risks that arise in their LOBs and Corporate, while FREs oversee risks that span across the LOBs and Corporate, functions and regions. Each area of the Firm giving rise to risk is expected to operate within the parameters identified by the IRM function, and within its own management-identified risk and control standards.

Three lines of defense

The Firm's "three lines of defense" are as follows:

The first line of defense consists of each LOB, Treasury and CIO, and certain Other Corporate initiatives, including their aligned Operations, Technology and Control Management. The first line of defense own the identification of risks within their respective organizations and the design and execution of controls to manage those risks.

Management's discussion and analysis

Responsibilities also include adherence to applicable laws, rules and regulations and implementation of the risk governance framework established by IRM, which may include policies, standards, limits, thresholds and controls.

The second line of defense is the IRM function, which is separate from, and independently assesses and challenges, the first line of defense risk management practices. IRM is also responsible for the identification of risks within its respective organization, adherence to applicable laws, rules and regulations and for the development and implementation of policies and standards with respect to its own processes.

The third line of defense is Internal Audit, an independent function that provides objective assessment of the adequacy and effectiveness of Firmwide processes, controls, governance and risk management. The Internal Audit function is headed by the General Auditor, who reports to the Audit Committee and administratively to the CEO.

In addition, there are other functions that contribute to the Firmwide control environment but are not considered part of a particular line of defense, including Finance, Human Resources and Legal. These other functions are responsible for the identification of risks within their respective organizations, adherence to applicable laws, rules and regulations and implementation of the risk governance framework established by IRM.

Risk identification and ownership

The LOBs and Corporate own the identification of risks within their respective organizations, as well as the design and execution of controls, including IRM-specified controls, to manage those risks. To support this activity, the Firm has a risk identification framework designed to facilitate each LOB and Corporate's responsibility to identify material risks inherent to the Firm's business and operational activities, catalog them in a central repository and review material risks on a regular basis. The IRM function reviews and challenges the LOB and Corporate's identified risks, maintains the central repository and provides the consolidated Firmwide results to the Firmwide Risk Committee ("FRC") and the Board Risk Committee.

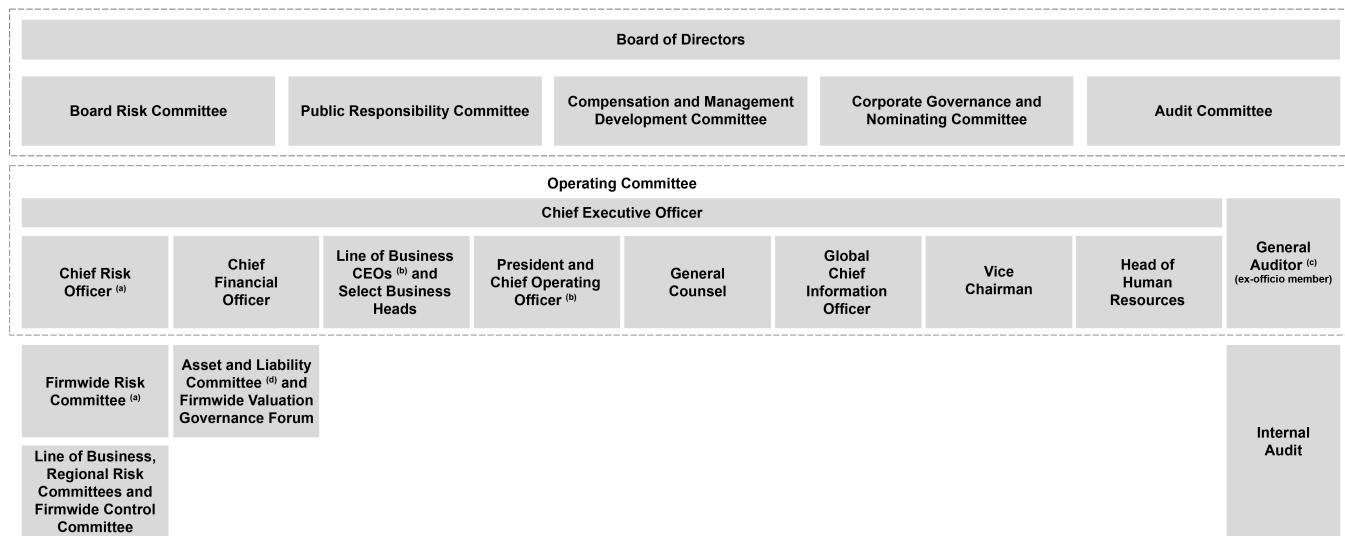
Risk appetite

The Firm's overall appetite for risk is governed by "Risk Appetite" frameworks for quantitative and qualitative risks. Periodically the Firm's risk appetite is set and approved by senior management (including the CEO and CRO) and approved by the Board Risk Committee. Quantitative and qualitative risks are assessed to monitor and measure the Firm's capacity to take risk consistent with its stated risk appetite. Risk appetite results are reported to the Board Risk Committee.

Risk governance and oversight structure

The independent status of the IRM function is supported by a risk governance and oversight structure that provides channels for the escalation of risks and issues to senior management, the FRC, and the Board of Directors, as appropriate.

The chart below illustrates the committees of the Board of Directors and key senior management-level committees in the Firm's risk governance and oversight structure. In addition, there are other committees, forums and channels of escalation that support the oversight of risk that are not shown in the chart below or described in this Form 10-K.



^(a) The Firm's CRO may escalate directly to the Board Risk Committee. The Firmwide Risk Committee escalates to the Board Risk Committee, as appropriate.

^(b) The CEO of the Corporate & Investment Bank is also the Firm's President and Chief Operating Officer.

^(c) The General Auditor reports to the Audit Committee and administratively to the Firm's CEO.

^(d) The Asset and Liability Committee escalates to the Firm's CEO or the Board of Directors (including its committees).

The Firm's Operating Committee, which consists of the Firm's CEO, CRO, Chief Financial Officer ("CFO"), General Counsel, CEOs of the LOBs and other senior executives, is accountable to and may refer matters to the Firm's Board of Directors. The Operating Committee is responsible for escalating to the Board the information necessary to facilitate the Board's exercise of its duties.

Board oversight

The Firm's Board of Directors actively oversees the business and affairs of the Firm. This includes monitoring the Firm's financial performance and condition and reviewing the strategic objectives and plans of the Firm. The Board carries out a significant portion of its oversight responsibilities through its principal standing committees, each of which consists solely of independent members of the Board. The Board Risk Committee is the principal committee that oversees risk matters. The Audit Committee oversees the control environment, and the Compensation & Management Development Committee oversees compensation and other management-related matters. Each committee of the Board oversees reputational risks, conduct risks, and ESG matters within its scope of responsibility.

The JPMorgan Chase Bank, N.A. Board of Directors is responsible for the oversight of management of the bank, which it discharges both acting directly and through the principal standing committees of the Firm's Board of Directors. Risk and control oversight on behalf of JPMorgan Chase Bank N.A. is primarily the responsibility of the Board

Risk Committee and the Audit Committee, respectively, and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee.

The Board Risk Committee assists the Board in its oversight of management's responsibility to implement a global risk management framework reasonably designed to identify, assess and manage the Firm's risks. The Board Risk Committee's responsibilities include approval of applicable primary risk policies and review of certain associated frameworks, analysis and reporting established by management. Breaches in risk appetite and parameters, issues that may have a material adverse impact on the Firm, including capital and liquidity issues, and other significant risk-related matters are escalated to the Board Risk Committee, as appropriate.

The Audit Committee assists the Board in its oversight of management's responsibility to ensure that there is an effective system of controls reasonably designed to safeguard the Firm's assets and income, ensure the integrity of the Firm's financial statements, and maintain compliance with the Firm's ethical standards, policies, plans and procedures, and with laws and regulations. It also assists the Board in its oversight of the qualifications, independence and performance of the Firm's independent registered public accounting firm, and of the performance of the Firm's Internal Audit function.

Management's discussion and analysis

The Compensation & Management Development Committee (“CMDC”) assists the Board in its oversight of the Firm’s compensation principles and practices. The CMDC reviews and approves the Firm’s compensation and qualified benefits programs. The Committee reviews the performance of Operating Committee members against their goals, and approves their compensation awards. In addition, the CEO’s award is subject to ratification by the independent directors of the Board. The CMDC also reviews the development of and succession for key executives. As part of the Board’s role of reinforcing, demonstrating and communicating the “tone at the top,” the CMDC oversees the Firm’s culture, including reviewing updates from management regarding significant conduct issues and any related actions with respect to employees, including compensation actions.

The Public Responsibility Committee oversees and reviews the Firm’s positions and practices on public responsibility matters such as community investment, fair lending, sustainability, consumer practices and other public policy issues that reflect the Firm’s values and character and could impact the Firm’s reputation among its stakeholders. The Committee also provides guidance on these matters to management and the Board, as appropriate.

The Corporate Governance & Nominating Committee exercises general oversight with respect to the governance of the Board of Directors. It reviews the qualifications of and recommends to the Board proposed nominees for election to the Board. The Committee evaluates and recommends to the Board corporate governance practices applicable to the Firm. It also reviews the framework for assessing the Board’s performance and self-evaluation.

Management oversight

The Firm’s senior management-level committees that are primarily responsible for key risk-related functions include:

The Firmwide Risk Committee (“FRC”) is the Firm’s highest management-level risk committee. It oversees the risks inherent in the Firm’s business and provides a forum for discussion of topics, and issues that are raised or escalated by its members and other committees.

The Firmwide Control Committee (“FCC”) is an escalation committee for senior management to review and discuss the Firmwide operational risk environment including identified issues, operational risk metrics and significant events that have been escalated.

Line of Business and Regional Risk Committees are responsible for overseeing the governance, limits, and controls that have been established within the scope of their respective activities. These committees review the ways in which the particular LOB or the businesses operating in a particular region could be exposed to adverse outcomes, with a focus on identifying, accepting, escalating and/or requiring remediation of matters brought to these committees.

Line of Business and Corporate Function Control Committees oversee the operational risk and control environment of their respective business or function, inclusive of Operational Risk, Compliance and Conduct Risks. As part of that mandate, they are responsible for reviewing indicators of elevated or emerging risks and other data that may impact the level of operational risk in a business or function, addressing key operational risk issues, with an emphasis on processes with control concerns and overseeing control remediation.

The Asset and Liability Committee (“ALCO”) is responsible for overseeing the Firm’s asset and liability management (“ALM”), including the activities and frameworks supporting management of the balance sheet, liquidity risk, interest rate risk, and capital risk.

The Firmwide Valuation Governance Forum (“VGF”) is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm.

Risk governance and oversight functions

The Firm manages its risk through risk governance and oversight functions. The scope of a particular function or business activity may include one or more drivers, types and/or impacts of risk. For example, Country Risk Management oversees country risk which may be a driver of risk or an aggregation of exposures that could give rise to multiple risk types such as credit or market risk.

The following sections discuss the risk governance and oversight functions that have been established to manage the risks inherent in the Firm’s business activities.

Risk governance and oversight functions	Page
Strategic Risk	85
Capital Risk	86-96
Liquidity Risk	97-104
Reputation Risk	105
Consumer Credit Risk	110-115
Wholesale Credit Risk	116-126
Investment Portfolio Risk	130
Market Risk	131-138
Country Risk	139-140
Climate Risk	141
Operational Risk	142-148
Compliance Risk	145
Conduct Risk	146
Legal Risk	147
Estimations and Model Risk	148

STRATEGIC RISK MANAGEMENT

Strategic risk is the risk to earnings, capital, liquidity or reputation associated with poorly designed or failed business plans or inadequate responses to changes in the operating environment.

Management and oversight

The Operating Committee, together with the senior leadership of each LOB and Corporate, is responsible for managing the Firm's most significant strategic risks. IRM engages regularly in strategic business discussions and decision-making, including participation in relevant business reviews and senior management meetings, risk and control committees and other relevant governance forums, and acquisition and new business initiative reviews. The Board of Directors oversees management's strategic decisions, and the Board Risk Committee oversees IRM and the Firm's risk governance framework.

In the process of developing business plans and strategic initiatives, LOB and Corporate senior management identify the associated risks that are incorporated into the Firmwide Risk Identification framework and their impact on risk appetite.

In addition, IRM conducts a qualitative assessment of the LOB and Corporate strategic initiatives to assess their impact on the risk profile of the Firm.

The Firm's strategic planning process, which includes the development of the Firm's strategic plan and other strategic initiatives, is one component of managing the Firm's strategic risk. The strategic plan outlines the Firm's strategic framework and initiatives, and includes components such as budget, risk appetite, capital, earnings and asset-liability management objectives. Guided by the Firm's How We Do Business Principles, the Operating Committee and senior management teams in each LOB and Corporate review and update the strategic plan periodically, including evaluating the strategic framework and performance against prior-year initiatives, assessing the operating environment, refining existing strategies and developing new strategies.

The Firm's strategic plan, together with IRM's assessment, are provided to the Board as part of its review and approval of the Firm's strategic plan, and the plan is also reflected in the Firm's budget.

The Firm's balance sheet strategy, which focuses on risk-adjusted returns, strong capital and robust liquidity, is also a component in the management of strategic risk. Refer to Capital Risk Management on pages 86-96 for further information on capital risk. Refer to Liquidity Risk Management on pages 97-104 for further information on liquidity risk. Refer to Reputation Risk Management on page 105 for further information on reputation risk.

CAPITAL RISK MANAGEMENT

Capital risk is the risk the Firm has an insufficient level or composition of capital to support the Firm's business activities and associated risks during normal economic environments and under stressed conditions.

A strong capital position is essential to the Firm's business strategy and competitive position. Maintaining a strong balance sheet to manage through economic volatility is considered a strategic imperative of the Firm's Board of Directors, CEO and Operating Committee. The Firm's fortress balance sheet philosophy focuses on risk-adjusted returns, strong capital and robust liquidity. The Firm's capital risk management strategy focuses on maintaining long-term stability to enable the Firm to build and invest in market-leading businesses, including in highly stressed environments. Senior management considers the implications on the Firm's capital prior to making significant decisions that could impact future business activities. In addition to considering the Firm's earnings outlook, senior management evaluates all sources and uses of capital with a view to ensuring the Firm's capital strength.

Capital risk management

The Firm has a Capital Risk Management function whose primary objective is to provide independent oversight of capital risk across the Firm.

Capital Risk Management's responsibilities include:

- Defining, monitoring and reporting capital risk metrics;
- Establishing, calibrating and monitoring capital risk limits and indicators, including capital risk appetite;
- Developing a process to classify, monitor and report capital limit breaches;
- Performing an assessment of the Firm's capital management activities, including changes made to the Contingency Capital Plan described below; and
- Conducting assessments of the Firm's regulatory capital framework intended to ensure compliance with applicable regulatory capital rules.

Capital management

Treasury and CIO is responsible for capital management.

The primary objectives of the Firm's capital management are to:

- Maintain sufficient capital in order to continue to build and invest in the Firm's businesses through the cycle and in stressed environments;
- Retain flexibility to take advantage of future investment opportunities;
- Promote the Firm's ability to serve as a source of strength to its subsidiaries;
- Ensure the Firm operates above the minimum regulatory capital ratios as well as maintain "well-capitalized" status for the Firm and its insured depository institution ("IDI") subsidiaries at all times under applicable regulatory capital requirements;

- Meet capital distribution objectives; and
- Maintain sufficient capital resources to operate throughout a resolution period in accordance with the Firm's preferred resolution strategy.

The Firm addresses these objectives through:

- Establishing internal minimum capital requirements and maintaining a strong capital governance framework. The internal minimum capital levels consider the Firm's regulatory capital requirements as well as an internal assessment of capital adequacy, in normal economic cycles and in stress events;
- Retaining flexibility in order to react to a range of potential events; and
- Regular monitoring of the Firm's capital position and following prescribed escalation protocols, both at the Firm and material legal entity levels.

Governance

Committees responsible for overseeing the Firm's capital management include the Capital Governance Committee, the Firmwide ALCO and LOB and regional ALCOs, and the CIO, Treasury and Corporate ("CTC") Risk Committee. In addition, the Board Risk Committee periodically reviews the Firm's capital risk tolerance. Refer to Firmwide Risk Management on pages 81-84 for additional discussion of the Firmwide ALCO and other risk-related committees.

Capital planning and stress testing

Comprehensive Capital Analysis and Review

The Federal Reserve requires large Bank Holding Companies ("BHCs"), including the Firm, to submit at least annually a capital plan that has been reviewed and approved by the Board of Directors. The Federal Reserve uses Comprehensive Capital Analysis and Review ("CCAR") and other stress testing processes to ensure that large BHCs have sufficient capital during periods of economic and financial stress, and have robust, forward-looking capital assessment and planning processes in place that address each BHC's unique risks to enable it to absorb losses under certain stress scenarios. Through CCAR, the Federal Reserve evaluates each BHC's capital adequacy and internal capital adequacy assessment processes ("ICAAP"), as well as its plans to make capital distributions, such as dividend payments or stock repurchases. The Federal Reserve uses results under the severely adverse scenario from its supervisory stress test to determine each firm's Stress Capital Buffer ("SCB") requirement for the coming year.

On June 27, 2022, the Firm announced that it had completed the Federal Reserve's 2022 CCAR stress test process. On August 4, 2022, the Federal Reserve affirmed the Firm's 2022 SCB requirement of 4.0% (up from 3.2%), and the Firm's Standardized CET1 capital ratio requirement, including regulatory buffers, of 12.0% (up from 11.2%). The 2022 SCB requirement became effective on October 1, 2022, and will remain in effect until September 30, 2023.

Refer to Capital actions on page 94 for information on actions taken by the Firm's Board of Directors.

Internal Capital Adequacy Assessment Process

Annually, the Firm prepares the ICAAP, which informs the Board of Directors of the ongoing assessment of the Firm's processes for managing the sources and uses of capital as well as compliance with supervisory expectations for capital planning and capital adequacy. The Firm's ICAAP integrates stress testing protocols with capital planning. The Firm's Audit Committee is responsible for reviewing and approving the capital planning framework.

Stress testing assesses the potential impact of alternative economic and business scenarios on the Firm's earnings and capital. Economic scenarios, and the parameters underlying those scenarios, are defined centrally and applied uniformly across the businesses. These scenarios are articulated in terms of macroeconomic factors, which are key drivers of business results; global market shocks, which generate short-term but severe trading losses; and idiosyncratic operational risk events. The scenarios are intended to capture and stress key vulnerabilities and idiosyncratic risks facing the Firm. In addition to CCAR and other periodic stress testing, management also considers tailored stress scenarios and sensitivity analyses, as necessary.

Contingency Capital Plan

The Firm's Contingency Capital Plan establishes the capital management framework for the Firm and specifies the principles underlying the Firm's approach towards capital management in normal economic conditions and in stressed environments. The Contingency Capital Plan defines how the Firm calibrates its targeted capital levels and meets minimum capital requirements, monitors the ongoing appropriateness of planned capital distributions, and sets out the capital contingency actions that are expected to be taken or considered at various levels of capital depletion during a period of stress.

Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements and standards for the Firm's IDI subsidiaries, including JPMorgan Chase Bank, N.A. The U.S. capital requirements generally follow the Capital Accord of the Basel Committee, as amended from time to time.

Basel III Overview

The capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. BHCs and banks, including the Firm and its IDI subsidiaries, including JPMorgan Chase Bank, N.A. The minimum amount of regulatory capital that must be held by BHCs and banks is determined by calculating RWA, which are on-balance sheet assets and off-balance sheet exposures, weighted according to risk. Two comprehensive approaches are prescribed for calculating RWA: a standardized approach ("Basel III Standardized"), and an advanced approach ("Basel III Advanced"). For each of the risk-based capital ratios, the capital adequacy of the Firm is evaluated against the lower of the Standardized or Advanced approaches compared to their respective regulatory capital ratio requirements. The Firm's Basel III Standardized risk-based ratios are currently more binding than the Basel III Advanced risk-based ratios.

Basel III establishes capital requirements for calculating credit risk RWA and market risk RWA, and in the case of Basel III Advanced, operational risk RWA. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced. In addition to the RWA calculated under these approaches, the Firm may supplement such amounts to incorporate management judgment and feedback from its regulators.

Basel III also includes a requirement for Advanced Approaches banking organizations, including the Firm, to calculate the SLR. Refer to SLR on page 93 for additional information.

Key Regulatory Developments

CECL regulatory capital transition.

Until December 31, 2021, the Firm's capital reflected a two year delay of the effects of CECL provided by the Federal Reserve Board in response to the COVID-19 pandemic.

Beginning January 1, 2022, the \$2.9 billion CECL capital benefit is being phased out at 25% per year over a three-year period. As of December 31, 2022, the Firm's CET1 capital reflected the remaining \$2.2 billion benefit associated with the CECL capital transition provisions.

Additionally, effective January 1, 2022, the Firm phased out 25% of the other CECL capital transition provisions which impacted Tier 2 capital, adjusted average assets, total leverage exposure and RWA, as applicable.

Refer to Note 1 for further information on the CECL accounting guidance.

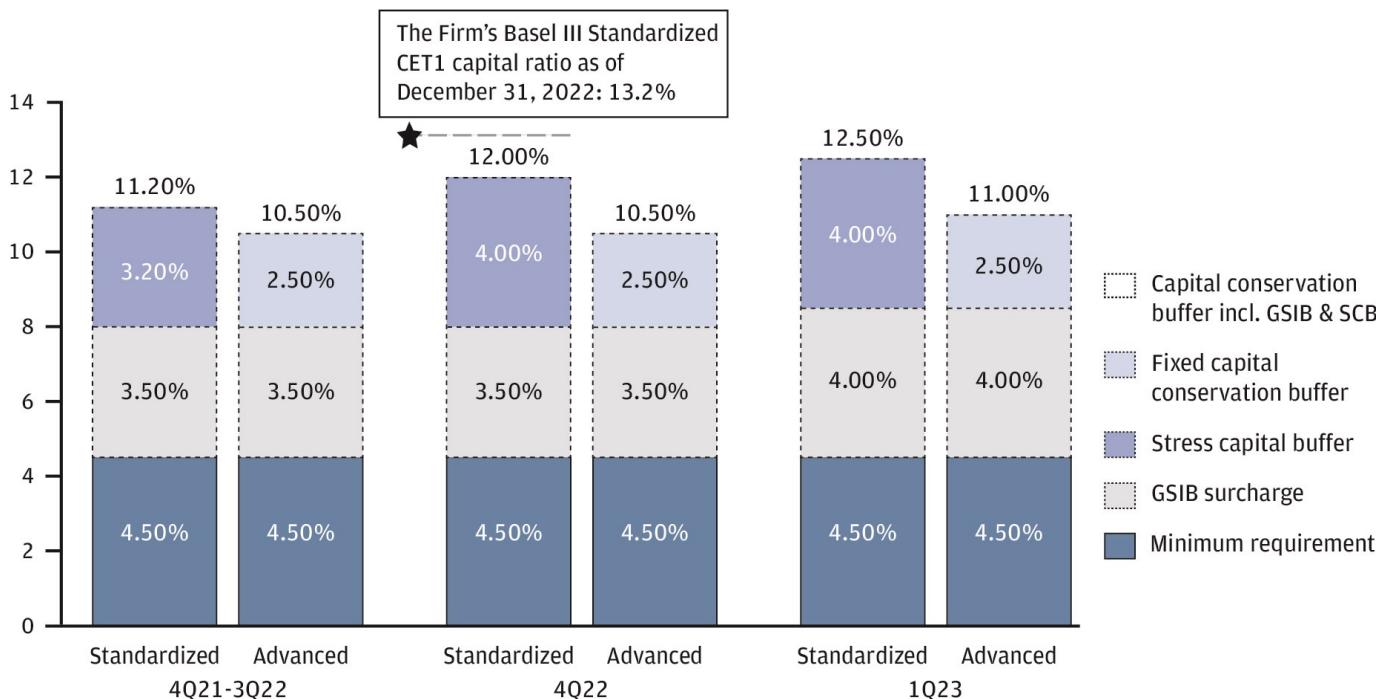
Management's discussion and analysis

Standardized Approach for Counterparty Credit Risk. On January 1, 2022, the Firm adopted “Standardized Approach for Counterparty Credit Risk” (“SA-CCR”), which replaced the Current Exposure Method used to measure derivatives counterparty exposure under the Standardized and Advanced approach RWA where internal models are not used, as well as leverage exposure used to calculate the SLR in the regulatory capital framework. The rule issued by the U.S. banking regulators in November 2019 applies to Basel III Advanced Approaches banking organizations, such as the Firm and JPMorgan Chase Bank, N.A.

The adoption of SA-CCR on January 1, 2022 increased the Firm’s Standardized RWA by approximately \$40 billion based on the Firm’s derivatives exposure as of December 31, 2021, which resulted in a decrease of approximately 30 bps to the Firm’s CET1 capital ratio and a modest decrease in its total leverage exposure. In addition, the adoption of SA-CCR increased the Firm’s Advanced RWA, but to a lesser extent than Standardized RWA.

Risk-based Capital Regulatory Requirements

The following chart presents the Firm's Basel III CET1 capital ratio requirements under the Basel III rules currently in effect.



All banking institutions are currently required to have a minimum CET1 capital ratio of 4.5% of risk-weighted assets.

Certain banking organizations, including the Firm, are required to hold additional levels of capital to serve as a “capital conservation buffer”. The capital conservation buffer incorporates a GSIB surcharge, a discretionary countercyclical capital buffer and a fixed capital conservation buffer of 2.5% for Advanced regulatory capital requirements and a variable SCB requirement, floored at 2.5%, for Standardized regulatory capital requirements.

Under the Federal Reserve’s GSIB rule, the Firm is required to assess its GSIB surcharge on an annual basis under two separately prescribed methods based on data for the previous fiscal year-end, and is subject to the higher of the two. “Method 1” reflects the GSIB surcharge as prescribed by the Basel Committee’s assessment methodology, and is calculated by the Financial Stability Board (“FSB”) across five criteria: size, cross-jurisdictional activity, interconnectedness, complexity and substitutability. “Method 2”, calculated by the Firm, modifies the Method 1 requirements to include a measure of short-term wholesale funding in place of substitutability, and introduces a GSIB score “multiplication factor”.

Management's discussion and analysis

The following table presents the Firm's effective GSIB surcharge for the years ended December 31, 2023, 2022 and 2021. For 2023, the Firm's effective GSIB surcharge under Method 1 and Method 2 has increased to 2.5% and 4.0%, respectively.

	2023	2022	2021
Method 1	2.5 %	2.0 %	2.0 %
Method 2	4.0 %	3.5 %	3.5 %

On November 21, 2022, the FSB released its annual GSIB list based upon data as of December 31, 2021, which affirmed the Firm's Method 1 GSIB surcharge of 2.5% (up from 2.0%), effective January 1, 2023.

The Firm's Method 2 surcharge calculated using data as of December 31, 2021 is 4.5%, which will be effective January 1, 2024. The Firm's estimated Method 2 surcharge calculated using data as of December 31, 2022 is 4.5%. Accordingly, based on the GSIB rule currently in effect, the Firm's effective GSIB surcharge is expected to increase to 4.5% on January 1, 2024.

The U.S. federal regulatory capital standards include a framework for setting a discretionary countercyclical capital buffer taking into account the macro financial environment in which large, internationally active banks function. As of December 31, 2022, the U.S. countercyclical capital buffer remained at 0%. The Federal Reserve will continue to review the buffer at least annually. The buffer can be increased if the Federal Reserve, FDIC and OCC determine that systemic risks are meaningfully above normal and can be calibrated up to an additional 2.5% of RWA subject to a 12-month implementation period.

Failure to maintain regulatory capital equal to or in excess of the risk-based regulatory capital minimum plus the capital conservation buffer (inclusive of the GSIB surcharge) and any countercyclical buffer will result in limitations to the amount of capital that the Firm may distribute, such as through dividends and common share repurchases, as well as certain executive discretionary bonus payments.

Risk-based Capital Targets

The Firm's current target for its Basel III Standardized CET1 capital ratio is 13.0% for the first quarter of 2023, increasing to 13.5% for the first quarter of 2024 with consideration for an increase in the GSIB surcharge in 2024, and assuming no change in the Stress Capital Buffer. The Firm's quarterly capital ratios may vary from these targets dependent on market conditions. These targets are based on the Basel III capital rules currently in effect.

Total Loss-Absorbing Capacity

The Federal Reserve's TLAC rule requires the U.S. GSIB top-tier holding companies, including the Firm, to maintain minimum levels of external TLAC and eligible long-term debt ("eligible LTD"). Refer to TLAC on page 95 for additional information.

Leverage-based Capital Regulatory Requirements

Supplementary leverage ratio

Banking organizations subject to the Basel III Advanced approach are currently required to have a minimum SLR of 3.0%. Certain banking organizations, including the Firm, are also required to hold an additional 2.0% leverage buffer.

The SLR is defined as Tier 1 capital under Basel III divided by the Firm's total leverage exposure. Total leverage exposure is calculated by taking the Firm's total average on-balance sheet assets, less amounts permitted to be deducted for Tier 1 capital, and adding certain off-balance sheet exposures, such as undrawn commitments and derivatives potential future exposure.

Failure to maintain an SLR equal to or greater than the regulatory requirement will result in limitations on the amount of capital that the Firm may distribute such as through dividends and common share repurchases, as well as on certain executive discretionary bonus payments.

Other regulatory capital

In addition to meeting the capital ratio requirements of Basel III, the Firm and its IDI subsidiaries must also maintain minimum capital and leverage ratios in order to be "well-capitalized" under the regulations issued by the Federal Reserve and the Prompt Corrective Action ("PCA") requirements of the FDIC Improvement Act ("FDICIA"), respectively. Refer to Note 27 for additional information.

Additional information regarding the Firm's capital ratios, as well as the U.S. federal regulatory capital standards to which the Firm is subject, is presented in Note 27. Refer to the Firm's Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website, for further information on the Firm's Basel III measures.

The following tables present the Firm's risk-based capital metrics under both the Basel III Standardized and Advanced approaches and leverage-based capital metrics. Refer to Note 27 for JPMorgan Chase Bank, N.A.'s risk-based and leverage-based capital metrics.

(in millions, except ratios)	Standardized			Advanced		
	December 31, 2022	December 31, 2021	Capital ratio requirements ^(b)	December 31, 2022	December 31, 2021	Capital ratio requirements ^(b)
Risk-based capital metrics:^(a)						
CET1 capital	\$ 218,934	\$ 213,942		\$ 218,934	\$ 213,942	
Tier 1 capital	245,631	246,162		245,631	246,162	
Total capital	277,769	274,900		264,583	265,796	
Risk-weighted assets	1,653,538	1,638,900		1,609,773	1,547,920	
CET1 capital ratio	13.2 %	13.1 %	12.0 %	13.6 %	13.8 %	10.5 %
Tier 1 capital ratio	14.9	15.0	13.5	15.3	15.9	12.0
Total capital ratio	16.8	16.8	15.5	16.4	17.2	14.0

(a) The capital metrics reflect the CECL capital transition provisions.

(b) Represents minimum requirements and regulatory buffers applicable to the Firm for the period ended December 31, 2022. For the period ended December 31, 2021, the Basel III Standardized CET1, Tier 1, and Total capital ratio requirements applicable to the Firm were 11.2%, 12.7%, and 14.7%, respectively. Refer to Note 27 for additional information.

Three months ended (in millions, except ratios)	December 31, 2022	December 31, 2021	Capital ratio requirements ^(c)
Leverage-based capital metrics:^(a)			
Adjusted average assets ^(b)	\$ 3,703,873	\$ 3,782,035	
Tier 1 leverage ratio	6.6 %	6.5 %	4.0 %
Total leverage exposure	\$ 4,367,092	\$ 4,571,789	
SLR	5.6 %	5.4 %	5.0 %

(a) The capital metrics reflect the CECL capital transition provisions.

(b) Adjusted average assets, for purposes of calculating the leverage ratios, includes quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill, inclusive of estimated equity method goodwill, and other intangible assets.

(c) Represents minimum requirements and regulatory buffers applicable to the Firm. Refer to Note 27 for additional information.

Management's discussion and analysis

Capital components

The following table presents reconciliations of total stockholders' equity to Basel III CET1 capital, Tier 1 capital and Total capital as of December 31, 2022 and 2021.

(in millions)	December 31, 2022	December 31, 2021
Total stockholders' equity	\$ 292,332	\$ 294,127
Less: Preferred stock	27,404	34,838
Common stockholders' equity	264,928	259,289
Add:		
Certain deferred tax liabilities ^(a)	2,510	2,499
Other CET1 capital adjustments ^(b)	6,221	3,351
Less:		
Goodwill	53,501 ^(f)	50,315
Other intangible assets	1,224	882
Standardized/Advanced CET1 capital	218,934	213,942
Add: Preferred stock	27,404	34,838
Less: Other Tier 1 adjustments ^(c)	707	2,618
Standardized/Advanced Tier 1 capital	\$ 245,631	\$ 246,162
Long-term debt and other instruments qualifying as Tier 2 capital	\$ 13,569	\$ 14,106
Qualifying allowance for credit losses ^(d)	19,353	15,012
Other	(784)	(380)
Standardized Tier 2 capital	\$ 32,138	\$ 28,738
Standardized Total capital	\$ 277,769	\$ 274,900
Adjustment in qualifying allowance for credit losses for Advanced Tier 2 capital ^(e)	(13,186)	(9,104)
Advanced Tier 2 capital	\$ 18,952	\$ 19,634
Advanced Total capital	\$ 264,583	\$ 265,796

- (a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating CET1 capital.
- (b) As of December 31, 2022 and 2021, includes a net benefit associated with cash flow hedges and debit valuation adjustments ("DVA") related to structured notes recorded in AOCI of \$5.2 billion and \$1.4 billion and the benefit from the CECL capital transition provisions of \$2.2 billion and \$2.9 billion, respectively.
- (c) As of December 31, 2021, Other Tier 1 adjustments included \$2.0 billion of Series Z preferred stock called for redemption on December 31, 2021 and subsequently redeemed on February 1, 2022.
- (d) Represents the allowance for credit losses eligible for inclusion in Tier 2 capital up to 1.25% of credit risk RWA, including the impact of the CECL capital transition provision with any excess deducted from RWA.
- (e) Represents an adjustment to qualifying allowance for credit losses for the excess of eligible credit reserves over expected credit losses up to 0.6% of credit risk RWA, including the impact of the CECL capital transition provision with any excess deducted from RWA.
- (f) Goodwill deducted from capital includes goodwill associated with equity method investments in nonconsolidated financial institutions based on regulatory requirements. Refer to Principal investment risk on page 130 for additional information.

Capital rollforward

The following table presents the changes in Basel III CET1 capital, Tier 1 capital and Tier 2 capital for the year ended December 31, 2022.

Year Ended December 31, (in millions)	2022
Standardized/Advanced CET1 capital at December 31, 2021	\$ 213,942
Net income applicable to common equity	36,081
Dividends declared on common stock	(11,893)
Net purchase of treasury stock	(1,921)
Changes in additional paid-in capital	629
Changes related to AOCI applicable to capital:	
Unrealized gains/(losses) on investment securities	(11,764)
Translation adjustments, net of hedges ^(a)	(611)
Fair value hedges	98
Defined benefit pension and other postretirement employee benefit ("OPEB") plans	(1,241)
Changes related to other CET1 capital adjustments ^(b)	(4,386)
Change in Standardized/Advanced CET1 capital	4,992
Standardized/Advanced CET1 capital at December 31, 2022	\$ 218,934
Standardized/Advanced Tier 1 capital at December 31, 2021	\$ 246,162
Change in CET1 capital ^(b)	4,992
Redemptions of noncumulative perpetual preferred stock	(5,434)
Other	(89)
Change in Standardized/Advanced Tier 1 capital	(531)
Standardized/Advanced Tier 1 capital at December 31, 2022	\$ 245,631
Standardized Tier 2 capital at December 31, 2021	\$ 28,738
Change in long-term debt and other instruments qualifying as Tier 2	(537)
Change in qualifying allowance for credit losses ^(b)	4,341
Other	(404)
Change in Standardized Tier 2 capital	3,400
Standardized Tier 2 capital at December 31, 2022	\$ 32,138
Standardized Total capital at December 31, 2022	\$ 277,769
Advanced Tier 2 capital at December 31, 2021	\$ 19,634
Change in long-term debt and other instruments qualifying as Tier 2	(537)
Change in qualifying allowance for credit losses ^(b)	259
Other	(404)
Change in Advanced Tier 2 capital	(682)
Advanced Tier 2 capital at December 31, 2022	\$ 18,952
Advanced Total capital at December 31, 2022	\$ 264,583

- (a) Includes foreign currency translation adjustments and the impact of related derivatives.
- (b) Includes the impact of the CECL capital transition provisions.

RWA rollforward

The following table presents changes in the components of RWA under Basel III Standardized and Advanced approaches for the year ended December 31, 2022. The amounts in the rollforward categories are estimates, based on the predominant driver of the change.

Year ended December 31, 2022 (in millions)	Standardized			Advanced			Total RWA
	Credit risk RWA ^(c)	Market risk RWA	Total RWA	Credit risk RWA ^(c)	Market risk RWA	Operational risk RWA	
December 31, 2021	\$ 1,543,452	\$ 95,448	\$ 1,638,900	\$ 1,047,042	\$ 95,506	\$ 405,372	\$ 1,547,920
Model & data changes ^(a)	(7,313)	(3,808)	(11,121)	966	(3,808)	–	(2,842)
Movement in portfolio levels ^(b)	32,397	(6,638)	25,759	30,068	(6,266)	40,893	64,695
Changes in RWA	25,084	(10,446)	14,638	31,034	(10,074)	40,893	61,853
December 31, 2022	\$ 1,568,536	\$ 85,002	\$ 1,653,538	\$ 1,078,076	\$ 85,432	\$ 446,265	\$ 1,609,773

- (a) Model & data changes refer to material movements in levels of RWA as a result of revised methodologies and/or treatment per regulatory guidance (exclusive of rule changes).
- (b) Movement in portfolio levels (inclusive of rule changes) refers to: for Credit risk RWA, impact of SA-CCR adoption on January 1, 2022, changes in book size including position rolloffs in legacy portfolios in Home Lending, changes in composition and credit quality, market movements, and deductions for excess eligible credit reserves not eligible for inclusion in Tier 2 capital; for Market risk RWA, changes in position, market movements, and changes in the Firm's regulatory multiplier from Regulatory VaR backtesting exceptions; and for Operational risk RWA, updates to cumulative losses and macroeconomic model inputs.
- (c) As of December 31, 2022 and 2021, the Basel III Standardized Credit risk RWA included wholesale and retail off balance-sheet RWA of \$210.1 billion and \$218.5 billion, respectively; and the Basel III Advanced Credit risk RWA included wholesale and retail off balance-sheet RWA of \$180.8 billion and \$188.5 billion, respectively.

Refer to the Firm's Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website, for further information on Credit risk RWA, Market risk RWA and Operational risk RWA.

Supplementary leverage ratio

The following table presents the components of the Firm's SLR.

Three months ended (in millions, except ratio)	December 31, 2022	December 31, 2021
Tier 1 capital	\$ 245,631	\$ 246,162
Total average assets	3,755,271	3,831,655
Less: Regulatory capital adjustments ^(a)	51,398	49,620
Total adjusted average assets ^(b)	3,703,873	3,782,035
Add: Off-balance sheet exposures ^(c)	663,219	789,754
Total leverage exposure	\$ 4,367,092	\$ 4,571,789
SLR	5.6 %	5.4 %

- (a) For purposes of calculating the SLR, includes quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill, inclusive of estimated equity method goodwill, other intangible assets and adjustments for the CECL capital transition provisions.
- (b) Adjusted average assets used for the calculation of Tier 1 leverage ratio.
- (c) Off-balance sheet exposures are calculated as the average of the three month-end spot balances on applicable regulatory exposures during the reporting quarter. Effective January 1, 2022, includes the impact of the SA-CCR adoption. Refer to the Firm's Pillar 3 Regulatory Capital Disclosures reports for additional information.

Line of business equity

Each business segment is allocated capital by taking into consideration a variety of factors including capital levels of similarly rated peers and applicable regulatory capital requirements. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

The Firm's allocation methodology incorporates Basel III Standardized RWA, Basel III Advanced RWA, the GSIB surcharge, and a simulation of capital in a severe stress environment. At least annually, the assumptions, judgments and methodologies used to allocate capital are reassessed and, as a result, the capital allocated to the LOBs may change. As of January 1, 2023, the Firm has changed its line of business capital allocations primarily as a result of updates to the Firm's capital requirements and changes in RWA for each LOB.

The following table presents the capital allocated to each business segment.

Line of business equity (Allocated capital)

(in billions)	January 1, 2023	December 31,	
		2022	2021
Consumer & Community Banking	\$ 52.0	\$ 50.0	\$ 50.0
Corporate & Investment Bank	108.0	103.0	83.0
Commercial Banking	28.5	25.0	24.0
Asset & Wealth Management	16.0	17.0	14.0
Corporate	60.4	69.9	88.3
Total common stockholders' equity	\$ 264.9	\$ 264.9	\$ 259.3

Management's discussion and analysis

Capital actions

Common stock dividends

The Firm's common stock dividends are planned as part of the Capital Management governance framework in line with the Firm's capital management objectives.

The Firm's quarterly common stock dividend is currently \$1.00 per share. The Firm's dividends are subject to approval by the Board of Directors on a quarterly basis. Refer to Note 21 and Note 26 for information regarding dividend restrictions.

The following table shows the common dividend payout ratio based on net income applicable to common equity.

Year ended December 31,	2022	2021	2020
Common dividend payout ratio	33 %	25 %	40 %

Common stock

Effective May 1, 2022, the Firm is authorized to purchase up to \$30 billion of common shares under its common share repurchase program, which superseded the previously approved repurchase program under which the Firm was authorized to purchase up to \$30 billion of common shares.

On July 14, 2022, the Firm announced that it had temporarily suspended share repurchases in anticipation of the increase in the Firm's regulatory capital requirements. The Firm had set a target for achieving CET1 capital of 13.0% by the first quarter of 2023. The Firm met and exceeded that target in the fourth quarter of 2022, and resumed repurchasing shares under its common share repurchase program in the first quarter of 2023.

The following table sets forth the Firm's repurchases of common stock for the years ended December 31, 2022, 2021 and 2020.

Year ended December 31, (in millions)	2022	2021 ^(a)	2020 ^(b)
Total number of shares of common stock repurchased	23.1	119.7	50.0
Aggregate purchase price of common stock repurchases	\$ 3,122	\$ 18,448	\$ 6,397

(a) As directed by the Federal Reserve, total net repurchases and common stock dividends in the first and second quarter of 2021 were restricted and could not exceed the average of the Firm's net income for the four preceding calendar quarters. Effective July 1, 2021, the Firm became subject to the normal capital distribution restrictions provided under the regulatory capital framework.

(b) On March 15, 2020, in response to the economic disruptions caused by the COVID-19 pandemic, the Firm temporarily suspended repurchases of its common stock. Subsequently, the Federal Reserve directed all large banks, including the Firm, to discontinue net share repurchases through the end of 2020.

The Board of Directors' authorization to repurchase common shares is utilized at management's discretion, and the timing of purchases and the exact amount of common shares that may be repurchased is subject to various factors, including market conditions; legal and regulatory considerations affecting the amount and timing of repurchase activity; the Firm's capital position (taking into account goodwill and intangibles); internal capital generation; and alternative investment opportunities. The \$30 billion common share repurchase program approved by the Board does not establish specific price targets or timetables. The repurchase program may be suspended by management at any time; and may be executed through open market purchases or privately negotiated transactions, or utilizing Rule 10b5-1 plans, which are written trading plans that the Firm may enter into from time to time under Rule 10b5-1 of the Securities Exchange Act of 1934 and which allow the Firm to repurchase its common shares during periods when it may otherwise not be repurchasing common shares – for example, during internal trading blackout periods.

Refer to Part II, Item 5: Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities on page 34 of the 2022 Form 10-K for additional information regarding repurchases of the Firm's equity securities.

Refer to capital planning and stress testing on pages 86-87 for additional information.

Preferred stock

Preferred stock dividends declared were \$1.6 billion for each of the years ended December 31, 2022, 2021 and 2020.

During the year ended December 31, 2022, the Firm redeemed several series of non-cumulative preferred stock. Refer to Note 21 for additional information on the Firm's preferred stock, including the issuance and redemption of preferred stock.

Subordinated Debt

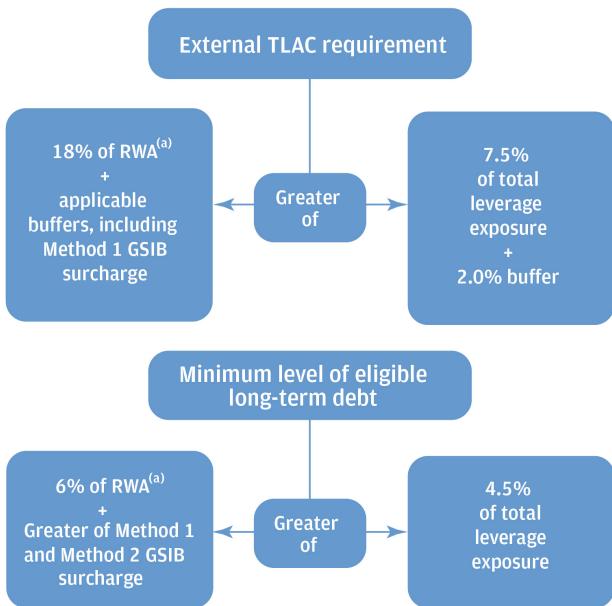
Refer to Long-term funding and issuance on page 103 and Note 20 for additional information on the Firm's subordinated debt.

Other capital requirements

Total Loss-Absorbing Capacity

The Federal Reserve's TLAC rule requires the U.S. GSIB top-tier holding companies, including the Firm, to maintain minimum levels of external TLAC and eligible long-term debt.

The external TLAC requirements and the minimum level of eligible long-term debt requirements are shown below:



(a) RWA is the greater of Standardized and Advanced compared to their respective regulatory capital ratio requirements.

Failure to maintain TLAC equal to or in excess of the regulatory minimum plus applicable buffers will result in limitations on the amount of capital that the Firm may distribute, such as through dividends and common share repurchases, as well as on certain executive discretionary bonus payments.

The following table presents the eligible external TLAC and eligible LTD amounts, as well as a representation of these amounts as a percentage of the Firm's total RWA and total leverage exposure applying the impact of the CECL capital transition provisions as of December 31, 2022 and 2021.

(in billions, except ratio)	December 31, 2022		December 31, 2021	
	External TLAC	LTD	External TLAC	LTD
Total eligible amount	\$ 486.0	\$ 228.5	\$ 464.6	\$ 210.4
% of RWA	29.4 %	13.8 %	28.4 %	12.8 %
Regulatory requirements	22.5	9.5	22.5	9.5
Surplus/(shortfall)	\$ 114.0	\$ 71.4	\$ 95.9	\$ 54.7
% of total leverage exposure	11.1 %	5.2 %	10.2 %	4.6 %
Regulatory requirements	9.5	4.5	9.5	4.5
Surplus/(shortfall)	\$ 71.2	\$ 32.0	\$ 30.3	\$ 4.6

As of January 1, 2023, the regulatory requirement for TLAC to RWA and LTD to RWA ratios has increased by 50 bps to 23.0% and 10.0%, respectively, due to the increase in the Firm's GSIB requirements. Refer to Risk-based Capital Regulatory Requirements on pages 89-90 for further information on the GSIB surcharge.

Refer to Liquidity Risk Management on pages 97-104 for further information on long-term debt issued by the Parent Company.

Refer to Part I, Item 1A: Risk Factors on pages 9-32 of the 2022 Form 10-K for information on the financial consequences to holders of the Firm's debt and equity securities in a resolution scenario.

Management's discussion and analysis

U.S. broker-dealer regulatory capital

J.P. Morgan Securities

JPMorgan Chase's principal U.S. broker-dealer subsidiary is J.P. Morgan Securities. J.P. Morgan Securities is subject to the regulatory capital requirements of Rule 15c3-1 under the Securities Exchange Act of 1934 (the "Net Capital Rule"). J.P. Morgan Securities is also registered as a futures commission merchant and is subject to regulatory capital requirements, including those imposed by the SEC, the Commodity Futures Trading Commission ("CFTC"), the Financial Industry Regulatory Authority ("FINRA") and the National Futures Association ("NFA").

J.P. Morgan Securities has elected to compute its minimum net capital requirements in accordance with the "Alternative Net Capital Requirements" of the Net Capital Rule.

The following table presents J.P. Morgan Securities' net capital:

December 31, 2022		
(in millions)	Actual	Minimum
Net Capital	\$ 24,989	\$ 5,628

J.P. Morgan Securities is registered with the SEC as a security-based swap dealer and with the CFTC as a swap dealer. As a result of additional SEC and CFTC capital and financial reporting requirements for security-based swap dealers and swap dealers, J.P. Morgan Securities is subject to alternative minimum net capital requirements and required to hold "tentative net capital" in excess of \$5.0 billion. J.P. Morgan Securities is also required to notify the SEC and CFTC in the event that its tentative net capital is less than \$6.0 billion. Tentative net capital is net capital before deducting market and credit risk charges as defined by the Net Capital Rule. As of December 31, 2022, J.P. Morgan Securities maintained tentative net capital in excess of the minimum and notification requirements.

Non-U.S. subsidiary regulatory capital

J.P. Morgan Securities plc

J.P. Morgan Securities plc is a wholly-owned subsidiary of JPMorgan Chase Bank, N.A. and has authority to engage in banking, investment banking and broker-dealer activities. J.P. Morgan Securities plc is jointly regulated in the U.K. by the Prudential Regulation Authority ("PRA") and the Financial Conduct Authority ("FCA"). J.P. Morgan Securities plc is subject to the European Union ("EU") Capital Requirements Regulation ("CRR"), as adopted in the U.K., and the PRA capital rules, each of which have implemented Basel III and thereby subject J.P. Morgan Securities plc to its requirements.

The Bank of England requires that U.K. banks, including U.K. regulated subsidiaries of overseas groups, maintain minimum requirements for own funds and eligible liabilities ("MREL"). As of December 31, 2022, J.P. Morgan Securities plc was compliant with its MREL requirements, which became fully phased-in on January 1, 2022.

Effective January 1, 2023, J.P. Morgan Securities plc was required to meet the minimum leverage capital requirement established by the PRA of 3.25%, plus regulatory buffers. As of December 31, 2022, J.P. Morgan Securities plc was compliant with its leverage requirements.

The following table presents J.P. Morgan Securities plc's capital metrics:

December 31, 2022		
(in millions, except ratios)	Actual	Regulatory Minimum ratios ^(a)
Total capital	\$ 54,218	
CET1 capital ratio	22.4 %	4.5 %
Tier 1 capital ratio	25.4 %	6.0 %
Total capital ratio	32.6 %	8.0 %

(a) Represents minimum Pillar 1 requirements specified by the PRA. J.P. Morgan Securities plc's capital ratios as of December 31, 2022 exceeded the minimum requirements, including the additional capital requirements specified by the PRA.

J.P. Morgan SE

JPMSE is a wholly-owned subsidiary of JPMorgan Chase Bank, N.A. and has authority to engage in banking, investment banking and markets activities. JPMSE is regulated by the European Central Bank as well as the local regulators in each of the countries in which it operates, and it is subject to EU capital requirements under Basel III.

JPMSE is required by the EU Single Resolution Board to maintain MREL. As of December 31, 2022, JPMSE was compliant with its MREL requirements.

The following table presents JPMSE's capital metrics:

December 31, 2022		
(in millions, except ratios)	Actual	Regulatory Minimum ratios ^(a)
Total capital	\$ 38,879	
CET1 capital ratio	19.7 %	4.5 %
Tier 1 capital ratio	19.7 %	6.0 %
Total capital ratio	33.8 %	8.0 %
Tier 1 leverage ratio	6.0 %	3.0 %

(a) Represents minimum Pillar 1 requirements specified by the EU CRR. J.P. Morgan SE's capital and leverage ratios as of December 31, 2022 exceeded the minimum requirements, including the additional capital requirements specified by the European Banking Authority.

LIQUIDITY RISK MANAGEMENT

Liquidity risk is the risk that the Firm will be unable to meet its contractual and contingent financial obligations as they arise or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.

Liquidity risk management

The Firm has a Liquidity Risk Management (“LRM”) function whose primary objective is to provide independent oversight of liquidity risk across the Firm. Liquidity Risk Management’s responsibilities include:

- Defining, monitoring and reporting liquidity risk metrics;
- Independently establishing and monitoring limits and indicators, including liquidity risk appetite;
- Developing a process to classify, monitor and report limit breaches;
- Performing an independent review of liquidity risk management processes to evaluate their adequacy and effectiveness based on LRM’s Independent Review Framework;
- Monitoring and reporting internal Firmwide and legal entity liquidity stress tests, regulatory defined metrics, as well as liquidity positions, balance sheet variances and funding activities; and
- Approving or escalating for review new or updated liquidity stress assumptions.

Liquidity management

Treasury and CIO is responsible for liquidity management. The primary objectives of the Firm’s liquidity management are to:

- Ensure that the Firm’s core businesses and material legal entities are able to operate in support of client needs and meet contractual and contingent financial obligations through normal economic cycles as well as during stress events, and
- Manage an optimal funding mix and availability of liquidity sources.

The Firm addresses these objectives through:

- Analyzing and understanding the liquidity characteristics of the assets and liabilities of the Firm, LOBs and legal entities, taking into account legal, regulatory, and operational restrictions;
- Developing internal liquidity stress testing assumptions;
- Defining and monitoring Firmwide and legal entity-specific liquidity strategies, policies, reporting and contingency funding plans;
- Managing liquidity within the Firm’s approved liquidity risk appetite tolerances and limits;
- Managing compliance with regulatory requirements related to funding and liquidity risk; and
- Setting FTP in accordance with underlying liquidity characteristics of balance sheet assets and liabilities as well as certain off-balance sheet items.

As part of the Firm’s overall liquidity management strategy, the Firm manages liquidity and funding using a centralized, global approach designed to:

- Optimize liquidity sources and uses;
- Monitor exposures;
- Identify constraints on the transfer of liquidity between the Firm’s legal entities; and
- Maintain the appropriate amount of surplus liquidity at a Firmwide and legal entity level, where relevant.

Governance

Committees responsible for liquidity governance include the Firmwide ALCO as well as LOB and regional ALCOs, the Treasurer Committee, and the CTC Risk Committee. In addition, the Board Risk Committee reviews and recommends to the Board of Directors, for formal approval, the Firm’s liquidity risk tolerances, liquidity strategy, and liquidity policy. Refer to Firmwide Risk Management on pages 81-84 for further discussion of ALCO and other risk-related committees.

Internal stress testing

Liquidity stress tests are intended to ensure that the Firm has sufficient liquidity under a variety of adverse scenarios, including scenarios analyzed as part of the Firm’s resolution and recovery planning. Stress scenarios are produced for JPMorgan Chase & Co. (“Parent Company”) and the Firm’s material legal entities on a regular basis, and other stress tests are performed in response to specific market events or concerns. Liquidity stress tests assume all of the Firm’s contractual financial obligations are met and take into consideration:

- Varying levels of access to unsecured and secured funding markets;
- Estimated non-contractual and contingent cash outflows;
- Considerations of credit rating downgrades;
- Collateral haircuts; and
- Potential impediments to the availability and transferability of liquidity between jurisdictions and material legal entities such as regulatory, legal or other restrictions.

Liquidity outflows are modeled across a range of time horizons and currency dimensions and contemplate both market and idiosyncratic stresses.

Results of stress tests are considered in the formulation of the Firm’s funding plan and assessment of its liquidity position. The Parent Company acts as a source of funding for the Firm through equity and long-term debt issuances, and its intermediate holding company, JPMorgan Chase Holdings LLC (the “IHC”), provides funding support to the ongoing operations of the Parent Company and its subsidiaries. The Firm maintains liquidity at the Parent Company, the IHC, and operating subsidiaries at levels sufficient to comply with liquidity risk tolerances and

Management's discussion and analysis

minimum liquidity requirements, and to manage through periods of stress when access to normal funding sources may be disrupted.

Contingency funding plan

The Firm's Contingency Funding Plan ("CFP") sets out the strategies for addressing and managing liquidity resource needs during a liquidity stress event and incorporates liquidity risk limits, indicators and risk appetite tolerances. The CFP also identifies the alternative contingent funding and liquidity resources available to the Firm and its legal entities in a period of stress.

LCR and HQLA

The LCR rule requires that the Firm and JPMorgan Chase Bank, N.A. maintain an amount of eligible HQLA that is sufficient to meet their respective estimated total net cash outflows over a prospective 30 calendar-day period of significant stress. Eligible HQLA, for purposes of calculating the LCR, is the amount of unencumbered HQLA that satisfy certain operational considerations as defined in the LCR rule. HQLA primarily consist of cash and certain high-quality liquid securities as defined in the LCR rule.

Under the LCR rule, the amount of eligible HQLA held by JPMorgan Chase Bank, N.A. that is in excess of its stand-alone 100% minimum LCR requirement, and that is not transferable to non-bank affiliates, must be excluded from the Firm's reported eligible HQLA.

Estimated net cash outflows are based on standardized stress outflow and inflow rates prescribed in the LCR rule, which are applied to the balances of the Firm's assets, sources of funds, and obligations. The LCR for both the Firm and JPMorgan Chase Bank, N.A. is required to be a minimum of 100%.

The following table summarizes the Firm and JPMorgan Chase Bank, N.A.'s average LCR for the three months ended December 31, 2022, September 30, 2022 and December 31, 2021 based on the Firm's interpretation of the LCR framework.

Average amount (in millions)	Three months ended		
	December 31, 2022	September 30, 2022	December 31, 2021
JPMorgan Chase & Co.:			
HQLA			
Eligible cash ^(a)	\$ 542,847	\$ 589,158	\$ 703,384
Eligible securities ^{(b)(c)}	190,201	126,913	34,738
Total HQLA^(d)	\$ 733,048	\$ 716,071	\$ 738,122
Net cash outflows	\$ 652,580	\$ 635,072	\$ 664,801
LCR	112 %	113 %	111 %
Net excess eligible HQLA^(d)	\$ 80,468	\$ 80,999	\$ 73,321
JPMorgan Chase Bank, N.A.:			
LCR	151 %	165 %	178 %
Net excess eligible HQLA	\$ 356,733	\$ 450,260	\$ 555,300

(a) Represents cash on deposit at central banks, primarily the Federal Reserve Banks.

- (b) Predominantly U.S. Treasuries, U.S. GSE and government agency MBS, and sovereign bonds net of applicable haircuts under the LCR rule.
- (c) Eligible HQLA securities may be reported in securities borrowed or purchased under resale agreements, trading assets, or investment securities on the Firm's Consolidated balance sheets.
- (d) Excludes average excess eligible HQLA at JPMorgan Chase Bank, N.A. that are not transferable to non-bank affiliates.

JPMorgan Chase Bank, N.A.'s average LCR decreased during the three months ended December 31, 2022, compared with the three months ended September 30, 2022 reflecting a decrease in JPMorgan Chase Bank, N.A.'s HQLA, primarily due to a reduction in cash associated with a decline in deposits, and loan growth.

JPMorgan Chase Bank, N.A.'s average LCR for the three months ended December 31, 2022 decreased when compared with the same period in the prior year, reflecting a decrease in JPMorgan Chase Bank, N.A.'s HQLA as a result of a reduction in cash from loan growth and a decline in deposits as well as lower market values of HQLA-eligible investment securities. Refer to Note 10 for additional information on the Firm's investment securities portfolio.

The Firm and JPMorgan Chase Bank, N.A.'s average LCR fluctuates from period to period due to changes in its eligible HQLA and estimated net cash outflows as a result of ongoing business activity. Refer to the Firm's U.S. LCR Disclosure reports, which are available on the Firm's website, for a further discussion of the Firm's LCR.

Other liquidity sources

In addition to the assets reported in the Firm's eligible HQLA discussed above, the Firm had unencumbered marketable securities, such as equity and debt securities, that the Firm believes would be available to raise liquidity. This includes excess eligible HQLA securities at JPMorgan Chase Bank, N.A. that are not transferable to non-bank affiliates. The fair value of these securities was approximately \$694 billion and \$914 billion as of December 31, 2022 and 2021, respectively, although the amount of liquidity that could be raised at any particular time would be dependent on prevailing market conditions. The fair value decreased compared to December 31, 2021, primarily due to a decrease in excess eligible HQLA securities at JPMorgan Chase Bank, N.A., as noted above.

The Firm also had available borrowing capacity at the FHLBs and the discount window at the Federal Reserve Banks as a result of collateral pledged by the Firm to such banks of approximately \$323 billion and \$308 billion as of December 31, 2022 and 2021, respectively. This borrowing capacity excludes the benefit of cash and securities reported in the Firm's eligible HQLA or other unencumbered securities that are currently pledged at the Federal Reserve Banks discount window and other central banks. Available borrowing capacity increased from December 31, 2021 primarily due to increased credit card receivables pledged at the Federal Reserve Banks. Although available, the Firm does not view this borrowing capacity at the Federal Reserve Banks discount window and the other central banks as a primary source of liquidity.

NSFR

The net stable funding ratio (“NSFR”) is a liquidity requirement for large banking organizations that is intended to measure the adequacy of “available” stable funding that is sufficient to meet their “required” amounts of stable funding over a one-year horizon.

As of December 31, 2022, the Firm and JPMorgan Chase Bank, N.A. were compliant with the 100% minimum NSFR requirement, based on the Firm’s current interpretation of the final rule. The Firm will be required to publicly disclose its quarterly average NSFR semiannually beginning in the second half of 2023.

Management's discussion and analysis

Funding

Sources of funds

Management believes that the Firm's unsecured and secured funding capacity is sufficient to meet its on- and off-balance sheet obligations, which includes both short- and long-term cash requirements.

The Firm funds its global balance sheet through diverse sources of funding including stable deposits, secured and unsecured funding in the capital markets and stockholders' equity. Deposits are the primary funding source for JPMorgan Chase Bank, N.A. Additionally, JPMorgan Chase Bank, N.A. may access funding through short- or long-term secured borrowings, through the issuance of unsecured

long-term debt, or from borrowings from the IHC. The Firm's non-bank subsidiaries are primarily funded from long-term unsecured borrowings and short-term secured borrowings which are primarily securities loaned or sold under repurchase agreements. Excess funding is invested by Treasury and CIO in the Firm's investment securities portfolio or deployed in cash or other short-term liquid investments based on their interest rate and liquidity risk characteristics.

Refer to Note 28 for additional information on off-balance sheet obligations.

Deposits

The table below summarizes, by LOB and Corporate, the period-end and average deposit balances as of and for the years ended December 31, 2022 and 2021.

As of or for the year ended December 31, (in millions)			Average	
	2022	2021	2022	2021
Consumer & Community Banking	\$ 1,131,611	\$ 1,148,110	\$ 1,162,680	\$ 1,054,956
Corporate & Investment Bank	689,893	707,791	739,700	760,048
Commercial Banking	271,342	323,954	294,180	301,343
Asset & Wealth Management	233,130	282,052	261,489	230,296
Corporate	14,203	396	9,866	511
Total Firm	\$ 2,340,179	\$ 2,462,303	\$ 2,467,915	\$ 2,347,154

Deposits provide a stable source of funding and reduce the Firm's reliance on the wholesale funding markets. A significant portion of the Firm's deposits are consumer deposits and wholesale operating deposits, which are both considered to be stable sources of liquidity. Wholesale operating deposits are considered to be stable sources of liquidity because they are generated from customers that maintain operating service relationships with the Firm.

The Firm believes that average deposit balances are generally more representative of deposit trends than period-end deposit balances. However, during periods of market disruption those trends could be affected.

Average deposits were higher for the year ended December 31, 2022 compared to the year ended December 31, 2021, reflecting:

- growth in CCB from existing and new accounts across both consumer and small business customers, partially offset by a decline in deposits starting in the second half of 2022, impacted by growth in customer spending, and
- net inflows in AWM resulting from the residual effects of certain government actions, partially offset by migration into investments starting in the second quarter of 2022 as a result of the rising interest rate environment

partially offset by

- lower average deposits in CIB and CB due to attrition, also as a result of the rising interest rate environment.

Period-end deposits decreased reflecting:

- attrition in CB and CIB, particularly non-operating deposits in CB, partially offset by net issuances of structured notes in Markets,
- net outflows into investments in AWM amid the rising interest rate environment, and
- a decline in balances in existing accounts in CCB due to higher customer spending, predominantly offset by net inflows into new accounts.

The increase in deposits for both spot and averages in Corporate was driven by the Firm's international consumer growth initiatives.

Refer to the discussion of the Firm's Consolidated Balance Sheets Analysis and the Business Segment Results on pages 55-56 and pages 61-80, respectively, for further information on deposit and liability balance trends.

Certain deposits are covered by insurance protection that provides additional funding stability and results in a benefit to the LCR. Deposit insurance protection may be available to depositors in the countries in which the deposits are placed. For example, the Federal Deposit Insurance Corporation ("FDIC") provides deposit insurance protection for deposits placed in a U.S. depository institution. At December 31, 2022 and 2021, the Firmwide estimated uninsured deposits were \$1,383.7 billion and \$1,489.6 billion, respectively, primarily reflecting wholesale operating deposits.

Total uninsured deposits include time deposits. The table below presents an estimate of uninsured U.S. and non-U.S. time deposits, and their remaining maturities. The Firm's estimates of its uninsured U.S. time deposits are based on data that the Firm calculates periodically under applicable FDIC regulations. For purposes of this presentation, all non-U.S. time deposits are deemed to be uninsured.

	December 31, 2022		December 31, 2021	
(in millions)	U.S.	Non-U.S.	U.S.	Non-U.S.
Three months or less	\$ 43,513	\$ 68,765	\$ 29,359	\$ 49,342
Over three months but within 6 months	8,670	3,658	6,235	2,172
Over six months but within 12 months	7,035	2,850	913	459
Over 12 months	787	2,634	526	2,562
Total	\$ 60,005	\$ 77,907	\$ 37,033	\$ 54,535

The following table provides a summary of the average balances and average interest rates of JPMorgan Chase's deposits for the years ended December 31, 2022, 2021, and 2020.

(Unaudited) Year ended December 31, (in millions, except interest rates)	Average balances			Average interest rates		
	2022	2021	2020	2022	2021	2020
U.S. offices						
Noninterest-bearing	\$ 691,206	\$ 648,170	^(c)	\$ 495,722	NA	NA
Interest-bearing						
Demand ^(a)	324,512	322,122	^(c)	269,888	0.92 %	0.06 %
Savings ^(b)	971,788	930,866	^(c)	739,916	0.28	0.06
Time	62,022	48,628		59,053	2.07	0.26
Total interest-bearing deposits	1,358,322	1,301,616		1,068,857	0.52	0.07
Total deposits in U.S. offices	2,049,528	1,949,786		1,564,579	0.34	0.05
Non-U.S. offices						
Noninterest-bearing	28,043	26,315		21,805	NA	NA
Interest-bearing						
Demand	324,740	313,304		267,545	0.57	(0.10)
Time	65,604	57,749		52,822	1.85	(0.09)
Total interest-bearing deposits	390,344	371,053		320,367	0.78	(0.10)
Total deposits in non-U.S. offices	418,387	397,368		342,172	0.73	(0.09)
Total deposits	\$ 2,467,915	\$ 2,347,154		\$ 1,906,751	0.41 %	0.02 %
						0.12 %

(a) Includes Negotiable Order of Withdrawal ("NOW") accounts, and certain trust accounts.

(b) Includes Money Market Deposit Accounts ("MMDAs").

(c) Prior-period amounts have been revised to conform with the current presentation.

Refer to Note 17 for additional information on deposits.

The table below shows the loan and deposit balances, the loans-to-deposits ratios, and deposits as a percentage of total liabilities, as of December 31, 2022 and 2021.

As of December 31, (in billions except ratios)	2022	2021
Deposits	\$ 2,340.2	\$ 2,462.3
Deposits as a % of total liabilities	69 %	71 %
Loans	\$ 1,135.6	\$ 1,077.7
Loans-to-deposits ratio	49 %	44 %

Management's discussion and analysis

The following table summarizes short-term and long-term funding, excluding deposits, as of December 31, 2022 and 2021, and average balances for the years ended December 31, 2022 and 2021. Refer to the Consolidated Balance Sheets Analysis on pages 55-56 and Note 11 for additional information.

Sources of funds (excluding deposits)

As of or for the year ended December 31, (in millions)	2022	2021	2022	2021	Average
Commercial paper	\$ 12,557	\$ 15,108	\$ 16,151	\$ 12,285	
Other borrowed funds	8,418	9,999	12,250	12,903	
Federal funds purchased	1,684	1,769	1,567	2,197	
Total short-term unsecured funding	\$ 22,659	\$ 26,876	\$ 29,968	\$ 27,385	
Securities sold under agreements to repurchase ^(a)	\$ 198,382	\$ 189,806	\$ 236,192	\$ 250,229	
Securities loaned ^(a)	2,547	2,765	5,003	6,876	
Other borrowed funds	23,052	28,487	25,211	28,138	
Obligations of Firm-administered multi-seller conduits ^(b)	9,236	6,198	7,387	9,283	
Total short-term secured funding	\$ 233,217	\$ 227,256	\$ 273,793	\$ 294,526	
Senior notes	\$ 188,025	\$ 191,488	\$ 189,047	\$ 181,290	
Subordinated debt	21,803	20,531	20,125	20,877	
Structured notes ^(c)	70,839	73,956	68,656	75,152	
Total long-term unsecured funding	\$ 280,667	\$ 285,975	\$ 277,828	\$ 277,319	
Credit card securitization ^(b)	\$ 1,999	\$ 2,397	\$ 1,950	\$ 3,156	
FHLB advances	11,093	11,110	11,103	12,174	
Other long-term secured funding ^(d)	4,105	3,920	3,837	4,384	
Total long-term secured funding	\$ 17,197	\$ 17,427	\$ 16,890	\$ 19,714	
Preferred stock^(e)	\$ 27,404	\$ 34,838	\$ 31,893	\$ 33,027	
Common stockholders' equity^(e)	\$ 264,928	\$ 259,289	\$ 253,068	\$ 250,968	

(a) Primarily consists of short-term securities loaned or sold under agreements to repurchase.

(b) Included in beneficial interests issued by consolidated variable interest entities on the Firm's Consolidated balance sheets.

(c) Includes certain TLAC-eligible long-term unsecured debt issued by the Parent Company.

(d) Includes long-term structured notes which are secured.

(e) Refer to Capital Risk Management on pages 86-96, Consolidated statements of changes in stockholders' equity on page 162, Note 21 and Note 22 for additional information on preferred stock and common stockholders' equity.

Short-term funding

The Firm's sources of short-term secured funding primarily consist of securities loaned or sold under agreements to repurchase. These instruments are secured predominantly by high-quality securities collateral, including government-issued debt and U.S. GSE and government agency MBS. Securities sold under agreements to repurchase increased at December 31, 2022, compared with December 31, 2021, due to higher secured financing of trading assets in Markets, partially offset by lower secured financing of AFS investment securities in Treasury and CIO.

The balances associated with securities loaned or sold under agreements to repurchase fluctuate over time due to investment and financing activities of clients, the Firm's demand for financing, the ongoing management of the mix of the Firm's liabilities, including its secured and unsecured financing (for both the investment securities and market-making portfolios), and other market and portfolio factors.

The Firm's sources of short-term unsecured funding primarily consist of issuances of wholesale commercial paper and other borrowed funds.

The decrease in period-end commercial paper and the increase in average balances for the year ended December 31, 2022 compared to the respective prior year periods, was due to changes in net issuance levels primarily for short-term liquidity management.

Long-term funding and issuance

Long-term funding provides an additional source of stable funding and liquidity for the Firm. The Firm's long-term funding plan is driven primarily by expected client activity, liquidity considerations, and regulatory requirements, including TLAC. Long-term funding objectives include maintaining diversification, maximizing market access and optimizing funding costs. The Firm evaluates various funding markets, tenors and currencies in creating its optimal long-term funding plan.

The significant majority of the Firm's long-term unsecured funding is issued by the Parent Company to provide flexibility in support of the funding needs of both bank and non-bank subsidiaries. The Parent Company advances substantially all net funding proceeds to its subsidiary, the IHC. The IHC does not issue debt to external counterparties. The following table summarizes long-term unsecured issuance and maturities or redemptions for the years ended December 31, 2022 and 2021. Refer to Note 20 for additional information on the IHC and long-term debt.

Long-term unsecured funding

Year ended December 31, (Notional in millions)	2022	2021	2022	2021
	Parent Company		Subsidiaries	
Issuance				
Senior notes issued in the U.S. market	\$ 32,600	\$ 39,500	\$ —	\$ —
Senior notes issued in non-U.S. markets	2,752	5,581	—	—
Total senior notes	35,352	45,081	—	—
Subordinated debt	3,500	—	—	—
Structured notes ^(a)	2,535	4,113	35,577	32,714
Total long-term unsecured funding - issuance	\$ 41,387	\$ 49,194	\$ 35,577	\$ 32,714
Maturities/redemptions				
Senior notes	\$ 16,700	\$ 10,840	\$ 65	\$ 65
Subordinated debt	—	9	—	—
Structured notes	1,594	4,694	25,481	33,023
Total long-term unsecured funding - maturities/redemptions	\$ 18,294	\$ 15,543	\$ 25,546	\$ 33,088

(a) Includes certain TLAC-eligible long-term unsecured debt issued by the Parent Company.

The Firm can also raise secured long-term funding through securitization of consumer credit card loans and FHLB advances. The following table summarizes the securitization issuance and FHLB advances and their respective maturities or redemptions for the years ended December 31, 2022 and 2021.

Long-term secured funding

Year ended December 31, (in millions)	Issuance		Maturities/Redemptions	
	2022	2021	2022	2021
Credit card securitization	\$ 999	\$ —	\$ 1,400	\$ 2,550
FHLB advances	—	—	14	3,011
Other long-term secured funding ^(a)	476	525	268	741
Total long-term secured funding	\$ 1,475	\$ 525	\$ 1,682	\$ 6,302

(a) Includes long-term structured notes that are secured.

The Firm's wholesale businesses also securitize loans for client-driven transactions; those client-driven loan securitizations are not considered to be a source of funding for the Firm and are not included in the table above. Refer to Note 14 for a further description of client-driven loan securitizations.

Management's discussion and analysis

Credit ratings

The cost and availability of financing are influenced by credit ratings. Reductions in these ratings could have an adverse effect on the Firm's access to liquidity sources, increase the cost of funds, trigger additional collateral or funding requirements and decrease the number of investors and counterparties willing to lend to the Firm. The nature and magnitude of the impact of ratings downgrades depends on numerous contractual and behavioral factors, which the Firm believes are incorporated in its liquidity risk and stress testing metrics. The Firm believes that it

maintains sufficient liquidity to withstand a potential decrease in funding capacity due to ratings downgrades.

Additionally, the Firm's funding requirements for VIEs and other third-party commitments may be adversely affected by a decline in credit ratings. Refer to liquidity risk and credit-related contingent features in Note 5 for additional information on the impact of a credit ratings downgrade on the funding requirements for VIEs, and on derivatives and collateral agreements.

The credit ratings of the Parent Company and the Firm's principal bank and non-bank subsidiaries as of December 31, 2022, were as follows:

December 31, 2022	JPMorgan Chase & Co.			JPMorgan Chase Bank, N.A.			J.P. Morgan Securities LLC J.P. Morgan Securities plc J.P. Morgan SE ^(a)		
	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook
Moody's Investors Service	A1	P-1	Stable	Aa2	P-1	Stable	Aa3	P-1	Stable
Standard & Poor's	A-	A-2	Positive	A+	A-1	Positive	A+	A-1	Positive
Fitch Ratings	AA-	F1+	Stable	AA	F1+	Stable	AA	F1+	Stable

(a) In January 2022, the three rating agencies affirmed the credit ratings of J.P. Morgan SE, which are equivalent to the ratings previously assigned to J.P. Morgan SE's predecessors, J.P. Morgan Bank Luxembourg S.A. and J.P. Morgan AG.

On September 29, 2022, Moody's upgraded the Parent Company's long-term issuer rating to A1 (previously A2) and changed the long-term outlook to stable (previously positive). All other ratings and outlooks of the Parent Company and those of the Firm's principal bank and non-bank subsidiaries were affirmed by Moody's.

JPMorgan Chase's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings, or stock price.

Critical factors in maintaining high credit ratings include a stable and diverse earnings stream, strong capital and liquidity ratios, strong credit quality and risk management controls, and diverse funding sources. Rating agencies continue to evaluate economic and geopolitical trends, regulatory developments, future profitability, risk management practices, and litigation matters, as well as their broader ratings methodologies. Changes in any of these factors could lead to changes in the Firm's credit ratings.

REPUTATION RISK MANAGEMENT

Reputation risk is the risk that an action or inaction may negatively impact perception of the Firm's integrity and reduce confidence in the Firm's competence by various constituents, including clients, counterparties, customers, investors, regulators, employees, communities or the broader public.

Organization and management

Reputation Risk Management establishes the governance framework for managing reputation risk across the Firm's LOBs and Corporate. Reputation risk is inherently challenging to identify, manage, and quantify.

The Firm's reputation risk management function includes the following activities:

- Maintaining a Firmwide Reputation Risk Governance policy and a standard consistent with the reputation risk framework
- Overseeing the governance execution through processes and infrastructure that support consistent identification, escalation, management and monitoring of reputation risk issues Firmwide

The types of events that result in reputation risk are wide-ranging and may be introduced by the Firm's employees and the clients, customers and counterparties with which the Firm does business. These events could result in financial losses, litigation, regulatory enforcement actions, fines, penalties or other sanctions, as well as other harm to the Firm.

Governance and oversight

The Reputation Risk Governance policy establishes the principles for managing reputation risk for the Firm. It is the responsibility of employees in each LOB and Corporate to consider the reputation of the Firm when deciding whether to offer a new product, engage in a transaction or client relationship, enter a new jurisdiction, initiate a business process or consider any other activity.

Environmental impacts and social concerns are increasingly important considerations in assessing the Firm's reputation risk, and are a component of the Firm's reputation risk governance.

Reputation risk issues that are deemed to be material are escalated as appropriate.

CREDIT AND INVESTMENT RISK MANAGEMENT

Credit and investment risk is the risk associated with the default or change in credit profile of a client, counterparty or customer; or loss of principal or a reduction in expected returns on investments, including consumer credit risk, wholesale credit risk, and investment portfolio risk.

Credit risk management

Credit risk is the risk associated with the default or change in credit profile of a client, counterparty or customer. The Firm provides credit to a variety of clients and customers, ranging from large corporate and institutional clients to individual consumers and small businesses. In its consumer businesses, the Firm is exposed to credit risk primarily through its home lending, credit card, auto, and business banking businesses. In its wholesale businesses, the Firm is exposed to credit risk through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through its operating services activities (such as cash management and clearing activities), and securities financing activities. The Firm is also exposed to credit risk through its investment securities portfolio and cash placed with banks.

Credit Risk Management monitors, measures and manages credit risk throughout the Firm and defines credit risk policies and procedures. The Firm's credit risk management governance includes the following activities:

- Maintaining a credit risk policy framework
- Monitoring, measuring and managing credit risk across all portfolio segments, including transaction and exposure approval
- Setting industry and geographic concentration limits, as appropriate, and establishing underwriting guidelines
- Assigning and managing credit authorities in connection with the approval of credit exposure
- Managing criticized exposures and delinquent loans, and
- Estimating credit losses and supporting appropriate credit risk-based capital management

Risk identification and measurement

To measure credit risk, the Firm employs several methodologies for estimating the likelihood of obligor or counterparty default. Methodologies for measuring credit risk vary depending on several factors, including type of asset (e.g., consumer versus wholesale), risk measurement parameters (e.g., delinquency status and borrower's credit score versus wholesale risk-rating) and risk management and collection processes (e.g., retail collection center versus centrally managed workout groups). Credit risk measurement is based on the probability of default of an obligor or counterparty, the loss severity given a default event and the exposure at default.

Based on these factors and the methodology and estimates described in Note 13 and Note 10, the Firm estimates credit losses for its exposures. The allowance for loan losses reflects estimated credit losses related to the consumer and wholesale held-for-investment loan portfolios, the allowance for lending-related commitments reflects estimated credit losses related to the Firm's lending-related commitments and the allowance for investment securities reflects estimated credit losses related to the investment securities portfolio. Refer to Note 13, Note 10 and Critical Accounting Estimates used by the Firm on pages 149-152 for further information.

In addition, potential and unexpected credit losses are reflected in the allocation of credit risk capital and represent the potential volatility of actual losses relative to the established allowances for loan losses and lending-related commitments. The analyses for these losses include stress testing that considers alternative economic scenarios as described below.

Stress testing

Stress testing is important in measuring and managing credit risk in the Firm's credit portfolio. The stress testing process assesses the potential impact of alternative economic and business scenarios on estimated credit losses for the Firm. Economic scenarios and the underlying parameters are defined centrally, articulated in terms of macroeconomic factors and applied across the businesses. The stress test results may indicate credit migration, changes in delinquency trends and potential losses in the credit portfolio. In addition to the periodic stress testing processes, management also considers additional stresses outside these scenarios, including industry and country-specific stress scenarios, as necessary. The Firm uses stress testing to inform decisions on setting risk appetite both at a Firm and LOB level, as well as to assess the impact of stress on individual counterparties.

Risk monitoring and management

The Firm has developed policies and practices that are designed to preserve the independence and integrity of the approval and decision-making process for extending credit so that credit risks are assessed accurately, approved properly, monitored regularly and managed actively at both the transaction and portfolio levels. The policy framework establishes credit approval authorities, concentration limits, risk-rating methodologies, portfolio review parameters and guidelines for management of distressed exposures. In addition, certain models, assumptions and inputs used in evaluating and monitoring credit risk are independently validated by groups that are separate from the LOBs.

Consumer credit risk is monitored for delinquency and other trends, including any concentrations at the portfolio level, as certain of these trends can be addressed through changes in underwriting policies and portfolio guidelines. Consumer Risk Management evaluates delinquency and other trends against business expectations, current and forecasted economic conditions, and industry benchmarks. Historical and forecasted economic performance and trends are incorporated into the modeling of estimated consumer credit losses and are part of the monitoring of the credit risk profile of the portfolio.

Wholesale credit risk is monitored regularly at an aggregate portfolio, industry, and individual client and counterparty level with established concentration limits that are reviewed and revised periodically as deemed appropriate by management. Industry and counterparty limits, as measured in terms of exposure and economic risk appetite, are subject to stress-based loss constraints. Wrong-way risk is the risk that exposure to a counterparty is positively correlated with the impact of a default by the same counterparty, which could cause exposure to increase at the same time as the counterparty's capacity to meet its obligations is decreasing.

Management of the Firm's wholesale credit risk exposure is accomplished through a number of means, including:

- Loan underwriting and credit approval processes
- Loan syndications and participations
- Loan sales and securitizations
- Credit derivatives
- Master netting agreements, and
- Collateral and other risk-reduction techniques

In addition to Credit Risk Management, an independent Credit Review function is responsible for:

- Independently validating or changing the risk grades assigned to exposures in the Firm's wholesale credit portfolio, and assessing the timeliness of risk grade changes initiated by responsible business units; and
- Evaluating the effectiveness of the credit management processes of the LOBs and Corporate, including the adequacy of credit analyses and risk grading/loss given default ("LGD") rationales, proper monitoring and management of credit exposures, and compliance with applicable grading policies and underwriting guidelines.

Refer to Note 12 for further discussion of consumer and wholesale loans.

Risk reporting

To enable monitoring of credit risk and effective decision-making, aggregate credit exposure, credit quality forecasts, concentration levels and risk profile changes are reported regularly to senior members of Credit Risk Management. Detailed portfolio reporting of industry, clients, counterparties and customers, product and geography are prepared, and the appropriateness of the allowance for credit losses is reviewed by senior management at least on a quarterly basis. Through the risk reporting and governance structure, credit risk trends and limit exceptions are provided regularly to, and discussed with, risk committees, senior management and the Board of Directors.

CREDIT PORTFOLIO

Credit risk is the risk associated with the default or change in credit profile of a client, counterparty or customer.

In the following tables, total loans include loans retained (i.e., held-for-investment); loans held-for-sale; and certain loans accounted for at fair value. The following tables do not include loans which the Firm accounts for at fair value and classifies as trading assets; refer to Notes 2 and 3 for further information regarding these loans. Refer to Notes 12, 28, and 5 for additional information on the Firm's loans, lending-related commitments and derivative receivables, including the Firm's related accounting policies.

Refer to Note 10 for information regarding the credit risk inherent in the Firm's investment securities portfolio; and refer to Note 11 for information regarding credit risk inherent in the securities financing portfolio. Refer to Consumer Credit Portfolio on pages 110-115 and Note 12 for further discussions of the consumer credit environment and consumer loans. Refer to Wholesale Credit Portfolio on pages 116-126 and Note 12 for further discussions of the wholesale credit environment and wholesale loans.

Total credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming ^{(d)(e)}	
	2022	2021	2022	2021
Loans retained	\$ 1,089,598	\$ 1,010,206	\$ 5,837	\$ 6,932
Loans held-for-sale	3,970	8,688	54	48
Loans at fair value	42,079	58,820	829	815
Total loans	1,135,647	1,077,714	6,720	7,795
Derivative receivables	70,880	57,081	296	316
Receivables from customers ^(a)	49,257	59,645	—	—
Total credit-related assets	1,255,784	1,194,440	7,016	8,111
Assets acquired in loan satisfactions				
Real estate owned	NA	NA	203	213
Other	NA	NA	28	22
Total assets acquired in loan satisfactions	NA	NA	231	235
Lending-related commitments	1,326,782	1,262,313	455	764
Total credit portfolio	\$ 2,582,566	\$ 2,456,753	\$ 7,702	\$ 9,110
Credit derivatives and credit-related notes used in credit portfolio management activities ^(b)	\$ (19,330)	\$ (20,739) ^(c)	\$ —	\$ —
Liquid securities and other cash collateral held against derivatives	(23,014)	(10,102)	NA	NA

- (a) Receivables from customers reflect held-for-investment margin loans to brokerage clients in CIB, CCB and AWM; these are reported within accrued interest and accounts receivable on the Consolidated balance sheets.
- (b) Represents the net notional amount of protection purchased and sold through credit derivatives and credit-related notes used to manage credit exposures.
- (c) Prior-period amount has been revised to conform with the current presentation.
- (d) At December 31, 2022 and 2021, nonperforming assets excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of \$302 million and \$623 million, respectively. These amounts have been excluded based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.
- (e) At December 31, 2022, and 2021 nonaccrual loans excluded \$119 million and \$633 million, respectively, of PPP loans 90 or more days past due and guaranteed by the SBA.

The following table provides information on Firmwide nonaccrual loans to total loans.

December 31, (in millions, except ratios)	2022	2021
Total nonaccrual loans	\$ 6,720	\$ 7,795
Total loans	1,135,647	1,077,714
Firmwide nonaccrual loans to total loans outstanding	0.59 %	0.72 %

The following table provides information about the Firm's net charge-offs and recoveries.

Year ended December 31, (in millions, except ratios)	2022	2021
Net charge-offs	\$ 2,853	\$ 2,865
Average retained loans	1,044,765	965,271
Net charge-off rates	0.27 %	0.30 %

Customer and client assistance

The Firm provided various forms of assistance to customers and clients impacted by the COVID-19 pandemic, including payment deferrals and covenant modifications. Assistance provided in response to the COVID-19 pandemic could delay the recognition of delinquencies, nonaccrual status, and net charge-offs for those customers and clients who would have otherwise moved into past due or nonaccrual status. Refer to Notes 12 and 13 for further information on the Firm's accounting policies for loan modifications and the allowance for credit losses.

Paycheck Protection Program (“PPP”)

The PPP, implemented by the Small Business Administration (“SBA”), provided the Firm with delegated authority to process and originate PPP loans. When certain criteria are met, PPP loans are subject to forgiveness and the Firm will receive payment of the forgiveness amount from the SBA. The PPP ended for new applications on May 31, 2021.

At December 31, 2022 and 2021, the Firm had \$490 million and \$6.7 billion, respectively, of PPP loans, including \$350 million and \$5.4 billion, respectively, in consumer, and \$140 million and \$1.3 billion, respectively, in wholesale.

At December 31, 2022 and 2021, \$119 million and \$633 million, respectively, of PPP loans 90 or more days past due have been excluded from the Firm's nonaccrual loans as they are guaranteed by the SBA. Refer to Note 12 for additional information.

CONSUMER CREDIT PORTFOLIO

The Firm's retained consumer portfolio consists primarily of residential real estate loans, credit card loans, scored auto and business banking loans, as well as associated lending-related commitments. The Firm's focus is on serving primarily the prime segment of the consumer credit market. Originated mortgage loans are retained in the residential real estate portfolio, securitized or sold to U.S. government agencies and U.S. government-sponsored enterprises; other types of consumer loans are typically retained on the balance sheet. Refer to Note 12 for further information on the consumer loan portfolio. Refer to Note 28 for further information on lending-related commitments.

The following tables present consumer credit-related information with respect to the scored credit portfolio held in CCB, AWM, CIB and Corporate.

Consumer credit portfolio

December 31, (in millions)	Credit exposure		Nonaccrual loans ^{(j)(k)(l)}	
	2022	2021	2022	2021
Consumer, excluding credit card				
Residential real estate ^(a)	\$ 237,561	\$ 224,795	\$ 3,745	\$ 4,759
Auto and other ^{(b)(c)(d)}	63,192	70,761	129	119
Total loans - retained	300,753	295,556	3,874	4,878
Loans held-for-sale	618	1,287	28	—
Loans at fair value ^(e)	10,004	26,463	423	472
Total consumer, excluding credit card loans	311,375	323,306	4,325	5,350
Lending-related commitments ^(f)	33,518	45,334		
Total consumer exposure, excluding credit card	344,893	368,640		
Credit card				
Loans retained ^(g)	185,175	154,296	NA	NA
Total credit card loans	185,175	154,296		
Lending-related commitments ^{(f)(h)}	821,284	730,534		
Total credit card exposure^(h)	1,006,459	884,830		
Total consumer credit portfolio^(h)	\$ 1,351,352	\$ 1,253,470	\$ 4,325	\$ 5,350
Credit-related notes used in credit portfolio management activities ⁽ⁱ⁾	\$ (1,187)	\$ (2,028)		

(in millions, except ratios)	Year ended December 31,					
	Net charge-offs/(recoveries)		Average loans - retained		Net charge-off/(recovery) rate ^(m)	
	2022	2021	2022	2021	2022	2021
Consumer, excluding credit card						
Residential real estate	\$ (226)	\$ (275)	\$ 233,454	\$ 220,914	(0.10)%	(0.12)%
Auto and other	495	286	65,955	77,900	0.75	0.37
Total consumer, excluding credit card - retained	269	11	299,409	298,814	0.09	—
Credit card - retained	2,403	2,712	163,335	139,900	1.47	1.94
Total consumer - retained	\$ 2,672	\$ 2,723	\$ 462,744	\$ 438,714	0.58 %	0.62 %

- (a) Includes scored mortgage and home equity loans held in CCB and AWM, and scored mortgage loans held in Corporate.
- (b) At December 31, 2022 and 2021, excluded operating lease assets of \$12.0 billion and \$17.1 billion, respectively. These operating lease assets are included in other assets on the Firm's Consolidated balance sheets. Refer to Note 18 for further information.
- (c) Includes scored auto and business banking loans and overdrafts.
- (d) At December 31, 2022 and 2021, included \$350 million and \$5.4 billion of loans, respectively, in Business Banking under the PPP. The Firm does not expect to realize material credit losses on PPP loans because the loans are guaranteed by the SBA. Refer to Credit Portfolio on pages 108-109 for a further discussion of the PPP.
- (e) Includes scored mortgage loans held in CCB and CIB.
- (f) Credit card, home equity and certain business banking lending-related commitments represent the total available lines of credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit would be used at the same time. For credit card commitments, and if certain conditions are met, home equity commitments and certain business banking commitments, the Firm can reduce or cancel these lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. Refer to Note 28 for further information.
- (g) Includes billed interest and fees.
- (h) Also includes commercial card lending-related commitments primarily in CB and CIB.
- (i) Represents the notional amount of protection obtained through the issuance of credit-related notes that reference certain pools of residential real estate and auto loans in the retained consumer portfolio.
- (j) At December 31, 2022 and 2021, nonaccrual loans excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of \$302 million and \$623 million, respectively. These amounts have been excluded from nonaccrual loans based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status, as permitted by regulatory guidance.
- (k) Generally excludes loans under payment deferral programs offered in response to the COVID-19 pandemic.
- (l) At December 31, 2022 and 2021, nonaccrual loans excluded \$101 million and \$506 million, respectively, of PPP loans 90 or more days past due and guaranteed by the SBA.
- (m) Average consumer loans held-for-sale and loans at fair value were \$17.4 billion and \$29.1 billion for the years ended December 31, 2022 and 2021, respectively. These amounts were excluded when calculating net charge-off/(recovery) rates.

Management's discussion and analysis

Maturities and sensitivity to changes in interest rates

The table below sets forth loan maturities by scheduled repayments, by class of loan and the distribution between fixed and floating interest rates based on the stated terms of the loan agreements. Effective December 31, 2022, the Firm revised its methodology from contractual maturities to scheduled repayments. The Firm estimated the principal repayment amounts for both the residential real estate and auto and other loan classes by calculating the weighted-average loan balance and interest rates for loan pools based on remaining loan term.

December 31, 2022 (in millions)	Within 1 year ^(b)	1-5 years	5-15 years	After 15 years	Total
Consumer, excluding credit card					
Residential real estate	\$ 15,709	\$ 22,984	\$ 81,946	\$ 127,282	\$ 247,921
Auto and other	17,380 ^(c)	42,727	3,342	5	63,454
Total consumer, excluding credit card loans	\$ 33,089	\$ 65,711	\$ 85,288	\$ 127,287	\$ 311,375
Total credit card loans	\$ 184,681	\$ 494 ^(a)	\$ —	\$ —	\$ 185,175
Total consumer loans	\$ 217,770	\$ 66,205	\$ 85,288	\$ 127,287	\$ 496,550
Loans due after one year at fixed interest rates					
Residential real estate		\$ 17,266	\$ 50,589	\$ 77,189	
Auto and other		42,652	2,716	5	
Credit card		494	—	—	
Loans due after one year at variable interest rates^(a)					
Residential real estate		\$ 5,718	\$ 31,357	\$ 50,093	
Auto and other		75	626	—	
Total consumer loans	\$ 66,205	\$ 85,288	\$ 127,287		

(a) Credit card loans with maturities greater than one year represent TDRs and are at fixed interest rates. There are no credit card loans due after one year at variable interest rates.

(b) Includes loans held-for-sale and loans at fair value.

(c) Includes overdrafts.

Consumer, excluding credit card

Portfolio analysis

Loans decreased from December 31, 2021 driven by residential real estate loans at fair value and auto and other loans, largely offset by higher retained residential real estate loans.

The following discussions provide information concerning individual loan products. Refer to Note 12 for further information about this portfolio, including information about delinquencies, loan modifications and other credit quality indicators.

Residential real estate: The residential real estate portfolio, including loans held-for-sale and loans at fair value, predominantly consists of prime mortgage loans and home equity lines of credit.

Retained loans increased compared to December 31, 2021 reflecting originations, net of paydowns. Retained nonaccrual loans decreased from December 31, 2021 reflecting improved credit performance and loan sales. Net recoveries were lower for the year ended December 31, 2022 compared to the prior year driven by lower prepayments due to higher interest rates, partially offset by lower gross charge-offs.

Loans at fair value decreased from December 31, 2021, as warehouse loan sales in Home Lending outpaced originations due to higher interest rates and loan sales in CIB outpaced loan purchase activity. Nonaccrual loans at fair value decreased from December 31, 2021 driven by net portfolio activity in CIB.

The carrying value of home equity lines of credit outstanding was \$15.7 billion at December 31, 2022. This amount included \$5.1 billion of HELOCs that have recast from interest-only to fully amortizing payments or have been modified and \$5.0 billion of interest-only balloon HELOCs, which primarily mature after 2030. The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are exhibiting a material deterioration in their credit risk profile.

At December 31, 2022 and 2021, the carrying value of interest-only residential mortgage loans were \$36.3 billion and \$30.0 billion, respectively. These loans have an interest-only payment period generally followed by an adjustable-rate or fixed-rate fully amortizing payment period to maturity and are typically originated as higher-balance loans to higher-income borrowers, predominantly in AWM. The interest-only residential mortgage loan portfolio reflected net recoveries for the year ended December 31, 2022. The credit performance of this portfolio is comparable with the performance of the broader prime mortgage portfolio.

The following table provides a summary of the Firm's residential mortgage portfolio insured and/or guaranteed by U.S. government agencies, predominantly loans held-for-sale and loans at fair value. The Firm monitors its exposure to certain potential unrecoverable claim payments related to government-insured loans and considers this exposure in estimating the allowance for loan losses.

(in millions)	December 31, 2022	December 31, 2021
Current	\$ 659	\$ 689
30-89 days past due	136	135
90 or more days past due	302	623
Total government guaranteed loans	\$ 1,097	\$ 1,447

Geographic composition and current estimated loan-to-value ratio of residential real estate loans

At December 31, 2022, \$152.7 billion, or 64% of the total retained residential real estate loan portfolio, excluding mortgage loans insured by U.S. government agencies, were concentrated in California, New York, Florida, Texas and Illinois, compared with \$145.5 billion, or 65% at December 31, 2021.

Average current estimated loan-to-value ("LTV") ratios were relatively flat.

Refer to Note 12 for information on the geographic composition and current estimated LTVs of the Firm's residential real estate loans.

Modified residential real estate loans

The following table presents information relating to modified retained residential real estate loans for which concessions have been granted to borrowers experiencing financial difficulty, which include both TDRs and modified PCD loans not accounted for as TDRs. The following table does not include loans with short-term or other insignificant modifications that are not considered concessions and, therefore, are not TDRs. Refer to Note 12 for further information on modifications for the years ended December 31, 2022 and 2021.

(in millions)	December 31, 2022	December 31, 2021
Retained loans	\$ 11,579	\$ 13,251
Nonaccrual retained loans ^(a)	3,300	3,938

(a) At both December 31, 2022 and 2021, nonaccrual loans included \$2.7 billion of TDRs for which the borrowers were less than 90 days past due. Refer to Note 12 for additional information about loans modified in a TDR that are on nonaccrual status.

Management's discussion and analysis

Auto and other: The auto and other loan portfolio, including loans at fair value consists of prime-quality scored auto and business banking loans, as well as overdrafts. The portfolio decreased when compared with December 31, 2021 due to paydowns of scored Auto loans and PPP loan forgiveness in Business Banking predominantly offset by originations of scored Auto loans. Net charge-offs for the year ended December 31, 2022 increased compared to the prior year due to higher scored Auto and overdraft charge-offs, as the prior year benefited from government stimulus and payment assistance programs. The scored Auto net charge-off rates were 0.24% and 0.04% for the years ended December 31, 2022 and 2021, respectively.

Nonperforming assets

The following table presents information as of December 31, 2022 and 2021, about consumer, excluding credit card, nonperforming assets.

Nonperforming assets^(a)

December 31, (in millions)	2022	2021
Nonaccrual loans		
Residential real estate ^(b)	\$ 4,196	\$ 5,231
Auto and other ^(c)	129	119
Total nonaccrual loans	4,325	5,350
Assets acquired in loan satisfactions		
Real estate owned	129	112
Other	28	22
Total assets acquired in loan satisfactions	157	134
Total nonperforming assets	\$ 4,482	\$ 5,484

- (a) At December 31, 2022 and 2021, nonperforming assets excluded mortgage loans 90 or more days past due and insured by U.S. government agencies of \$302 million and \$623 million, respectively. These amounts have been excluded based upon the government guarantee.
- (b) Generally excludes loans under payment deferral programs offered in response to the COVID-19 pandemic.
- (c) At December 31, 2022 and 2021, nonaccrual loans excluded \$101 million and \$506 million, respectively, of PPP loans 90 or more days past due and guaranteed by the SBA.

Nonaccrual loans

The following table presents changes in consumer, excluding credit card, nonaccrual loans for the years ended December 31, 2022 and 2021.

Nonaccrual loan activity

Year ended December 31, (in millions)	2022	2021
Beginning balance	\$ 5,350	\$ 6,467
Additions:	2,196	2,956
Reductions:		
Principal payments and other ^(a)	1,393	2,018
Charge-offs	255	229
Returned to performing status	1,405	1,716
Foreclosures and other liquidations	168	110
Total reductions	3,221	4,073
Net changes	(1,025)	(1,117)
Ending balance	\$ 4,325	\$ 5,350

(a) Other reductions include loan sales.

Refer to Note 12 for further information about the consumer credit portfolio, including information about delinquencies, other credit quality indicators, loan modifications and loans that were in the process of active or suspended foreclosure.

Purchased credit deteriorated (“PCD”) loans

The following tables provide credit-related information for PCD loans which are reported in residential real estate.

Year ended December 31, (in millions, except ratios)	December 31, 2022	December 31, 2021
Loan delinquency^(a)		
Current	\$ 10,910	\$ 12,746
30-149 days past due	347	331
150 or more days past due	277	664
Total PCD loans	\$ 11,534	\$ 13,741
% of 30+ days past due to total retained PCD loans	5.41 %	7.24 %
Nonaccrual loans	\$ 1,200	\$ 1,616
Year ended December 31, (in millions, except ratios)		
Net charge-offs/(recoveries)	\$ (11)	\$ 15
Net charge-off/(recovery) rate	(0.09)%	0.10 %

- (a) At December 31, 2022 and 2021, loans under payment deferral programs offered in response to the COVID-19 pandemic which are still within their deferral period and performing according to their modified terms are generally not considered delinquent.

Credit card

Total credit card loans increased from December 31, 2021 driven by growth in balances on higher consumer spending and net new originations. The December 31, 2022 30+ and 90+ day delinquency rates of 1.45% and 0.68%, respectively, increased compared to the December 31, 2021 30+ and 90+ day delinquency rates of 1.04% and 0.50%, but remain below pre-pandemic levels. Net charge-offs decreased for the year ended December 31, 2022 compared to the prior year. Delinquency and net charge-off rates continue to benefit from the ongoing financial strength of U.S. consumers. However, median deposit balances declined in the second half of 2022, impacted by the growth in consumer spending.

Consistent with the Firm's policy, all credit card loans typically remain on accrual status until charged off. However, the Firm's allowance for loan losses includes the estimated uncollectible portion of accrued and billed interest and fee income.

Geographic and FICO composition of credit card loans

At December 31, 2022, \$85.4 billion, or 46% of the total retained credit card loan portfolio, was concentrated in California, Texas, New York, Florida and Illinois, compared with \$70.5 billion, or 46%, at December 31, 2021.

Modifications of credit card loans

At December 31, 2022, the Firm had \$796 million of credit card loans outstanding that have been modified in TDRs, compared to \$1.0 billion at December 31, 2021. These TDRs do not include loans with short-term or other insignificant modifications that are not considered TDRs.

Refer to Note 12 for further information about this portfolio, including information about delinquencies, geographic and FICO composition, and modifications.

WHOLESALE CREDIT PORTFOLIO

In its wholesale businesses, the Firm is exposed to credit risk primarily through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through various operating services (such as cash management and clearing activities), securities financing activities and cash placed with banks. A portion of the loans originated or acquired by the Firm's wholesale businesses is generally retained on the balance sheet. The Firm distributes a significant percentage of the loans that it originates into the market as part of its syndicated loan business and to manage portfolio concentrations and credit risk. The wholesale portfolio is actively managed, in part by conducting ongoing, in-depth reviews of client credit quality and transaction structure, inclusive of collateral where applicable, and of industry, product and client concentrations. Refer to the industry discussion on pages 118-121 for further information.

The Firm's wholesale credit portfolio includes exposure held in CIB, CB, AWM, and Corporate, as well as the risk-rated BWM and auto dealer exposure held in CCB, for which the wholesale methodology is applied when determining the allowance for loan losses.

In 2022, wholesale credit continued to perform well with charge-offs remaining low.

As of December 31, 2022, retained loans increased by \$43.3 billion driven by CIB and CB, including higher revolver utilization, partially offset by a decline in AWM. Lending-related commitments decreased \$14.5 billion, driven by net portfolio activity in CIB, including a decrease in held-for-sale positions in the bridge financing portfolio, largely offset by net portfolio activity in AWM and CB.

As of December 31, 2022, the investment-grade percentage of the portfolio remained relatively flat at 70%, while criticized exposure decreased by \$6.9 billion from \$38.2 billion to \$31.3 billion. As of December 31, 2022, nonperforming exposure decreased by \$406.0 million driven by a decline in lending-related commitments in CIB and loans in AWM as a result of client-specific upgrades, paydowns and cancelled commitments, largely offset by client-specific downgrades in CIB including downgrades to certain Russia and Russia-associated clients in the first quarter of 2022. Refer to Business Developments on page 50 and Country Risk on pages 139-140 for additional information. Refer to Wholesale credit exposure - industry exposures on pages 118-121 for additional information.

Wholesale credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming	
	2022	2021	2022	2021
Loans retained	\$ 603,670	\$ 560,354	\$ 1,963	\$ 2,054
Loans held-for-sale	3,352	7,401	26	48
Loans at fair value	32,075	32,357	406	343
Loans	639,097	600,112	2,395	2,445
Derivative receivables	70,880	57,081	296	316
Receivables from customers ^(a)	49,257	59,645	—	—
Total wholesale credit-related assets	759,234	716,838	2,691	2,761
Assets acquired in loan satisfactions				
Real estate owned	NA	NA	74	101
Other	NA	NA	—	—
Total assets acquired in loan satisfactions	NA	NA	74	101
Lending-related commitments	471,980	486,445	455	764
Total wholesale credit portfolio	\$1,231,214	\$1,203,283	\$ 3,220	\$ 3,626
Credit derivatives and credit-related notes used in credit portfolio management activities ^(b)	\$ (18,143)	\$ (18,711) ^(c)	\$ —	\$ —
Liquid securities and other cash collateral held against derivatives	(23,014)	(10,102)	NA	NA

(a) Receivables from customers reflect held-for-investment margin loans to brokerage clients in CIB, CCB and AWM; these are reported within accrued interest and accounts receivable on the Consolidated balance sheets.

(b) Represents the net notional amount of protection purchased and sold through credit derivatives and credit-related notes used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. Refer to Credit derivatives on page 126 and Note 5 for additional information.

(c) Prior-period amounts have been revised to conform with the current presentation.

Wholesale credit exposure – maturity and ratings profile

The following tables present the maturity and internal risk ratings profiles of the wholesale credit portfolio as of December 31, 2022 and 2021. The Firm generally considers internal ratings with qualitative characteristics equivalent to BBB-/Baa3 or higher as investment grade, and takes into consideration collateral and structural support when determining the internal risk rating for each credit facility. Refer to Note 12 for further information on internal risk ratings.

December 31, 2022 (in millions, except ratios)	Maturity profile ^(e)				Ratings profile				Total % of IG
	1 year or less	After 1 year through 5 years	After 5 years	Total	Investment- grade	Noninvestment- grade	Total		
Loans retained	\$ 204,761	\$ 253,896	\$ 145,013	\$ 603,670	\$ 425,412	\$ 178,258	\$ 603,670		70 %
Derivative receivables				70,880				70,880	
Less: Liquid securities and other cash collateral held against derivatives				(23,014)				(23,014)	
Total derivative receivables, net of collateral	13,508	14,880	19,478	47,866	36,231	11,635	47,866		76
Lending-related commitments	101,083	347,456	23,441	471,980	327,168	144,812	471,980		69
Subtotal	319,352	616,232	187,932	1,123,516	788,811	334,705	1,123,516		70
Loans held-for-sale and loans at fair value ^(a)				35,427				35,427	
Receivables from customers				49,257				49,257	
Total exposure - net of liquid securities and other cash collateral held against derivatives				\$ 1,208,200				\$ 1,208,200	
Credit derivatives and credit-related notes used in credit portfolio management activities ^{(b)(c)(d)}	\$ (2,817)	\$ (13,530)	\$ (1,796)	\$ (18,143)	\$ (15,115)	\$ (3,028)	\$ (18,143)		83 %

December 31, 2021 (in millions, except ratios)	Maturity profile ^(e)				Ratings profile				Total % of IG
	1 year or less	After 1 year through 5 years	After 5 years	Total	Investment- grade	Noninvestment- grade	Total		
Loans retained	\$ 214,064	\$ 218,176	\$ 128,114	\$ 560,354	\$ 410,011	\$ 150,343	\$ 560,354		73 %
Derivative receivables				57,081				57,081	
Less: Liquid securities and other cash collateral held against derivatives				(10,102)				(10,102)	
Total derivative receivables, net of collateral	13,648	12,814	20,517	46,979	31,934	15,045	46,979		68
Lending-related commitments	120,929	340,308	25,208	486,445	331,116	155,329	486,445		68
Subtotal	348,641	571,298	173,839	1,093,778	773,061	320,717	1,093,778		71
Loans held-for-sale and loans at fair value ^(a)				39,758				39,758	
Receivables from customers				59,645				59,645	
Total exposure - net of liquid securities and other cash collateral held against derivatives				\$ 1,193,181				\$ 1,193,181	
Credit derivatives and credit-related notes used in credit portfolio management activities ^{(b)(c)(d)}	\$ (7,472)	\$ (9,750)	\$ (1,489)	\$ (18,711)	\$ (15,012)	\$ (3,699)	\$ (18,711)		80 %

(a) Loans held-for-sale are primarily related to syndicated loans and loans transferred from the retained portfolio.

(b) These derivatives do not qualify for hedge accounting under U.S. GAAP.

(c) The notional amounts are presented on a net basis by underlying reference entity and the ratings profile shown is based on the ratings of the reference entity on which protection has been purchased. Predominantly all of the credit derivatives entered into by the Firm where it has purchased protection used in credit portfolio management activities are executed with investment-grade counterparties. In addition, the Firm obtains credit protection against certain loans in the retained loan portfolio through the issuance of credit-related notes.

(d) Prior-period amounts have been revised to conform with the current presentation.

(e) The maturity profile of retained loans, lending-related commitments and derivative receivables is generally based on remaining contractual maturity. Derivative contracts that are in a receivable position at December 31, 2022, may become payable prior to maturity based on their cash flow profile or changes in market conditions.

Management's discussion and analysis

Wholesale credit exposure – industry exposures

The Firm focuses on the management and diversification of its industry exposures, and pays particular attention to industries with actual or potential credit concerns.

Exposures that are deemed to be criticized align with the U.S. banking regulators' definition of criticized exposures, which consist of the special mention, substandard and doubtful categories. Total criticized exposure, excluding loans held-for-sale and loans at fair value, was \$31.3 billion at December 31, 2022 and \$38.2 billion at December 31, 2021, representing approximately 2.7% and 3.5% of total wholesale credit exposure, respectively. Criticized exposure decreased driven by net portfolio activity and client-specific upgrades concentrated in Consumer & Retail, Technology, Media & Telecommunications and Real Estate, largely offset by client-specific downgrades. Of the \$31.3 billion of criticized exposure at December 31, 2022, approximately half was undrawn and \$28.6 billion was performing.

The table below summarizes by industry the Firm's exposures as of December 31, 2022 and 2021. The industry of risk category is generally based on the client or counterparty's primary business activity. Refer to Note 4 for additional information on industry concentrations.

Wholesale credit exposure – industries^(a)

As of or for the year ended December 31, 2022 (in millions)	Credit exposure ^{(f)(g)}	Investment- grade	Noninvestment-grade			30 days or more past due and accruing loans ^(h)	Net charge- offs/ (recoveries)	Credit derivative hedges and credit- related notes ⁽ⁱ⁾	Liquid securities and other cash collateral held against derivative receivables	Selected metrics	
			Noncriticized	Criticized performing	Criticized nonperforming					19	(113)
Real Estate	\$ 170,857	\$ 129,866	\$ 36,945	\$ 3,609	\$ 437	\$ 543	\$ 19	\$ (113)	\$ —	—	—
Individuals and Individual Entities ^(b)	130,815	112,006	18,104	360	345	1,038	1	—	—	—	—
Consumer & Retail	120,555	60,781	51,871	7,295	608	321	49	(1,157)	—	—	—
Asset Managers	95,656	78,925	16,665	61	5	15	(1)	—	(8,278)	—	—
Industrials	72,483	39,052	30,500	2,809	122	282	44	(1,258)	—	—	—
Technology, Media & Telecommunications	72,286	39,199	25,689	7,096	302	62	39	(1,766)	—	—	—
Healthcare	62,613	43,839	17,117	1,479	178	43	27	(1,055)	—	—	—
Banks & Finance Cos	51,816	27,811	22,994	961	50	36	—	(262)	(994)	—	—
Oil & Gas	38,668	20,547	17,616	474	31	57	(6)	(414)	—	—	—
Utilities	36,218	25,981	9,294	807	136	21	15	(607)	(1)	—	—
State & Municipal Govt ^(c)	33,847	33,191	529	126	1	36	—	(9)	(5)	—	—
Automotive ^(c)	33,287	23,908	8,839	416	124	198	(2)	(513)	—	—	—
Insurance	21,045	15,468	5,396	181	—	1	—	(273)	(7,296)	—	—
Chemicals & Plastics	20,030	12,134	7,103	744	49	10	3	(298)	—	—	—
Central Govt	19,095	18,698	362	35	—	—	10	(4,591)	(677)	—	—
Metals & Mining	15,915	8,825	6,863	222	5	7	(1)	(27)	(4)	—	—
Transportation	15,009	6,497	6,862	1,574	76	24	2	(339)	—	—	—
Securities Firms	8,066	4,235	3,716	115	—	—	(13)	(26)	(2,811)	—	—
Financial Markets Infrastructure	4,962	4,525	437	—	—	—	—	—	—	—	—
All other ^(d)	123,307	105,284	17,555	223	245	4	(5)	(5,435)	(2,948)	—	—
Subtotal	\$ 1,146,530	\$ 810,772	\$ 304,457	\$ 28,587	\$ 2,714	\$ 2,698	\$ 181	\$ (18,143)	\$ (23,014)	—	—
Loans held-for-sale and loans at fair value	35,427	—	—	—	—	—	—	—	—	—	—
Receivables from customers	49,257	—	—	—	—	—	—	—	—	—	—
Total^(e)	\$ 1,231,214	—	—	—	—	—	—	—	—	—	—

As of or for the year ended December 31, 2021 (in millions)											Selected metrics		
	Noninvestment-grade					30 days or more past due and accruing loans					Net charge-offs/ (recoveries)	Credit derivative hedges and credit-related notes ^(h)	Liquid securities and other cash collateral held against derivative receivables
	Credit exposure ^{(f)(g)}	Investment-grade	Noncriticized	Criticized performing	Criticized nonperforming								
Real Estate	\$ 155,069	\$ 120,174	\$ 29,642	\$ 4,636	\$ 617	\$ 394	\$ 6	\$ (185)	\$ (1)	\$ (10,711)	\$ (10,102)	\$ (1)	—
Individuals and Individual Entities ^(b)	141,973	122,606	18,797	99	471	1,450	32	—	—	—	—	—	(1)
Consumer & Retail	122,789	59,622	53,317	9,445	405	288	2	(352)	(1)	(352)	(1)	—	—
Asset Managers	81,228	68,593	12,630	—	5	8	—	—	—	—	—	(3,900)	—
Industrials	66,974	36,953	26,957	2,895	169	428	13	(586)	(1)	(586)	(1)	—	(1)
Technology, Media & Telecommunications	84,070	49,610	25,540	8,595	325	58	(1)	(900)	(1)	(900)	(1)	(12)	—
Healthcare	59,014	42,133	15,136	1,686	59	204	(4)	(490)	(4)	(490)	(4)	(174)	—
Banks & Finance Cos	54,684	29,732	23,809	1,138	5	9	9	(503)	(1)	(503)	(1)	(810)	—
Oil & Gas	42,606	20,698	20,222	1,558	128	4	60	(564)	(1)	(564)	(1)	—	—
Utilities	33,203	25,069	7,011	914	209	11	6	(367)	(1)	(367)	(1)	(4)	—
State & Municipal Govt ^(c)	33,216	32,522	586	101	7	74	—	—	—	—	—	(14)	—
Automotive	34,573	24,606	9,446	399	122	95	(3)	(463)	(1)	(463)	(1)	—	—
Insurance	13,926	9,943	3,887	96	—	—	—	(25)	(1)	(25)	(1)	(2,366)	—
Chemicals & Plastics	17,660	11,319	5,817	518	6	7	—	(89)	—	(89)	—	—	—
Central Govt	11,317	11,067	250	—	—	—	—	(6,961)	(1)	(6,961)	(1)	(72)	—
Metals & Mining	16,696	7,848	8,491	294	63	27	7	(15)	(1)	(15)	(1)	(4)	—
Transportation	14,635	6,010	5,983	2,470	172	21	20	(100)	(1)	(100)	(1)	(24)	—
Securities Firms	4,180	2,599	1,578	—	3	—	—	(47)	(1)	(47)	(1)	(217)	—
Financial Markets Infrastructure	4,377	3,987	390	—	—	—	—	—	—	—	—	—	—
All other ^(d)	111,690	97,537	13,580	205	368	242	(5)	(7,064)	(1)	(7,064)	(1)	(2,503)	—
Subtotal	\$ 1,103,880	\$ 782,628	\$ 283,069	\$ 35,049	\$ 3,134	\$ 3,320	\$ 142	\$ (18,711)	\$ (10,102)				
Loans held-for-sale and loans at fair value	39,758												
Receivables from customers	59,645												
Total^(e)	\$ 1,203,283												

- (a) The industry rankings presented in the table as of December 31, 2021, are based on the industry rankings of the corresponding exposures at December 31, 2022, not actual rankings of such exposures at December 31, 2021.
- (b) Individuals and Individual Entities predominantly consists of Global Private Bank clients within AWM and J.P. Morgan Wealth Management within CCB, and includes exposure to personal investment companies and personal and testamentary trusts.
- (c) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2022 and 2021, noted above, the Firm held: \$6.6 billion and \$7.1 billion, respectively, of trading assets; \$6.8 billion and \$15.9 billion, respectively, of AFS securities; and \$19.7 billion and \$14.0 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. Refer to Note 2 and Note 10 for further information.
- (d) All other includes: SPEs and Private education and civic organizations, representing approximately 95% and 5%, respectively, at December 31, 2022 and 94% and 6%, respectively, at December 31, 2021.
- (e) Excludes cash placed with banks of \$556.6 billion and \$729.6 billion, at December 31, 2022 and 2021, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.
- (f) Credit exposure is net of risk participations and excludes the benefit of credit derivatives and credit-related notes used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.
- (g) Credit exposure includes held-for-sale and fair value option elected lending-related commitments.
- (h) Represents the net notional amounts of protection purchased and sold through credit derivatives and credit-related notes used to manage the credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. The All other category includes purchased credit protection on certain credit indices.
- (i) Prior-period amounts have been revised to conform with the current presentation.

Management's discussion and analysis

Presented below is additional detail on certain of the Firm's industry exposures.

Real Estate

Real Estate exposure was \$170.9 billion as of December 31, 2022. Criticized exposure decreased by \$1.2 billion from \$5.3 billion at December 31, 2021 to \$4.0 billion at December 31, 2022, driven by client-specific upgrades and net portfolio activity largely offset by client-specific downgrades.

(in millions, except ratios)	December 31, 2022					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)	
Multifamily ^(a)	\$ 99,555	\$ 17	\$ 99,572	82 %	87 %	
Industrial	15,928	1	15,929	72	71	
Office	14,917	25	14,942	74	73	
Services and Non Income Producing	13,968	10	13,978	65	48	
Other Income Producing Properties ^(b)	12,701	150	12,851	70	62	
Retail	10,192	8	10,200	75	68	
Lodging	3,347	38	3,385	6	37	
Total Real Estate Exposure^(c)	\$ 170,608	\$ 249	\$ 170,857	76 %	77 %	

(in millions, except ratios)	December 31, 2021					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)	
Multifamily ^(a)	\$ 89,032	\$ 122	\$ 89,154	84 %	89 %	
Industrial	11,546	66	11,612	75	64	
Office	16,409	234	16,643	75	71	
Services and Non Income Producing	11,512	24	11,536	63	50	
Other Income Producing Properties ^(b)	13,018	498	13,516	77	55	
Retail	9,580	106	9,686	61	69	
Lodging	2,859	63	2,922	5	33	
Total Real Estate Exposure	\$ 153,956	\$ 1,113	\$ 155,069	77 %	77 %	

(a) Multifamily exposure is largely in California.

(b) Other Income Producing Properties consists of clients with diversified property types or other property types outside of categories listed in the table above.

(c) Real Estate exposure is approximately 79% secured; unsecured exposure is approximately 77% investment-grade.

(d) Represents drawn exposure as a percentage of credit exposure.

Consumer & Retail

Consumer & Retail exposure was \$120.6 billion as of December 31, 2022. Criticized exposure decreased by \$1.9 billion from \$9.9 billion at December 31, 2021 to \$7.9 billion at December 31, 2022, driven by net portfolio activity and client-specific upgrades largely offset by client-specific downgrades.

(in millions, except ratios)	December 31, 2022					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)	
Retail ^(a)	\$ 33,891	\$ 309	\$ 34,200	50 %	33 %	
Food and Beverage	31,706	736	32,442	59	39	
Business and Consumer Services	31,256	384	31,640	50	40	
Consumer Hard Goods	13,879	172	14,051	51	39	
Leisure ^(b)	8,173	49	8,222	21	45	
Total Consumer & Retail^(c)	\$ 118,905	\$ 1,650	\$ 120,555	50 %	38 %	

(in millions, except ratios)	December 31, 2021					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(d)	
Retail ^(a)	\$ 32,872	\$ 1,152	\$ 34,024	50 %	31 %	
Food and Beverage	30,434	957	31,391	59	33	
Business and Consumer Services	32,159	347	32,506	46	33	
Consumer Hard Goods	17,035	111	17,146	46	30	
Leisure ^(b)	7,620	102	7,722	17	34	
Total Consumer & Retail	\$ 120,120	\$ 2,669	\$ 122,789	49 %	32 %	

(a) Retail consists of Home Improvement & Specialty Retailers, Restaurants, Supermarkets, Discount & Drug Stores, Specialty Apparel and Department Stores.

(b) Leisure consists of Gaming, Arts & Culture, Travel Services and Sports & Recreation. As of December 31, 2022, approximately 90% of the noninvestment-grade Leisure portfolio is secured.

(c) Consumer & Retail exposure is approximately 58% secured; unsecured exposure is approximately 80% investment-grade.

(d) Represents drawn exposure as a percent of credit exposure.

Oil & Gas

Oil & Gas exposure was \$38.7 billion as of December 31, 2022. Criticized exposure decreased by \$1.2 billion from \$1.7 billion at December 31, 2021 to \$505 million at December 31, 2022, driven by net portfolio activity and client-specific upgrades partially offset by client-specific downgrades.

(in millions, except ratios)	December 31, 2022					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(c)	
Exploration & Production ("E&P") and Oil field Services	\$ 17,729	\$ 4,666	\$ 22,395	50 %	25 %	
Other Oil & Gas ^(a)	15,818	455	16,273	57	25	
Total Oil & Gas^(b)	\$ 33,547	\$ 5,121	\$ 38,668	53 %	25 %	

(in millions, except ratios)	December 31, 2021					
	Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn ^(c)	
Exploration & Production ("E&P") and Oil field Services	\$ 17,631	\$ 5,452	\$ 23,083	39 %	26 %	
Other Oil & Gas ^(a)	18,941	582	19,523	60	26	
Total Oil & Gas	\$ 36,572	\$ 6,034	\$ 42,606	49 %	26 %	

(a) Other Oil & Gas includes Integrated Oil & Gas companies, Midstream/Oil Pipeline companies and refineries.

(b) Oil & Gas exposure is approximately 41% secured, over half of which is reserve-based lending to the Exploration & Production sub-sector; unsecured exposure is approximately 61% investment-grade.

(c) Represents drawn exposure as a percent of credit exposure.

Management's discussion and analysis

Loans

In its wholesale businesses, the Firm provides loans to a variety of clients, ranging from large corporate and institutional clients to high-net-worth individuals. Refer to Note 12 for a further discussion on loans, including information about delinquencies, loan modifications and other credit quality indicators.

The following table presents the change in the nonaccrual loan portfolio for the years ended December 31, 2022 and 2021. Since December 31, 2021, nonaccrual loan exposure decreased by \$50 million driven by Individuals and Individual Entities and Transportation due to client-specific upgrades and net portfolio activity, largely offset by Consumer & Retail due to client-specific downgrades.

Wholesale nonaccrual loan activity

Year ended December 31, (in millions)	2022	2021
Beginning balance	\$ 2,445	\$ 4,106
Additions	2,119	2,909
Reductions:		
Paydowns and other	1,329	2,676
Gross charge-offs	213	268
Returned to performing status	594	1,106
Sales	33	520
Total reductions	2,169	4,570
Net changes	(50)	(1,661)
Ending balance	\$ 2,395	\$ 2,445

The following table presents net charge-offs/recoveries, which are defined as gross charge-offs less recoveries, for the years ended December 31, 2022 and 2021. The amounts in the table below do not include gains or losses from sales of nonaccrual loans recognized in noninterest revenue.

Wholesale net charge-offs/(recoveries)

Year ended December 31, (in millions, except ratios)	2022	2021
Loans		
Average loans retained	\$ 582,021	\$ 526,557
Gross charge-offs	322	283
Gross recoveries collected	(141)	(141)
Net charge-offs/(recoveries)	181	142
Net charge-off/(recovery) rate	0.03 %	0.03 %

Maturities and sensitivity to changes in interest rates

The table below sets forth wholesale loan maturities and the distribution between fixed and floating interest rates based on the stated terms of the loan agreements by loan class. Effective December 31, 2022, the Firm revised its methodology from contractual maturities to scheduled repayments. Refer to Note 12 for further information on loan classes.

December 31, 2022 (in millions, except ratios)	1 year or less ^(a)	After 1 year	After 5 years through 15 years	After 15 years	Total
		through 5 years	15 years	years	
Wholesale loans:					
Secured by real estate	\$ 9,275	\$ 43,060	\$ 41,234	\$ 41,277	\$ 134,846
Commercial and industrial	54,408	115,823	8,493	193	178,917
Other	166,967	122,062	32,291	4,014	325,334
Total wholesale loans	\$ 230,650	\$ 280,945	\$ 82,018	\$ 45,484	\$ 639,097
Loans due after one year at fixed interest rates					
Secured by real estate		\$ 6,087	\$ 6,387	\$ 724	
Commercial and industrial		5,432	1,107	4	
Other		23,303	14,792	2,786	
Loans due after one year at variable interest rates					
Secured by real estate		\$ 36,972	\$ 34,847	\$ 40,553	
Commercial and industrial		110,391	7,387	189	
Other		98,760	17,498	1,228	
Total wholesale loans		\$ 280,945	\$ 82,018	\$ 45,484	

(a) Includes loans held-for-sale, demand loans and overdrafts.

The following table presents net charge-offs/recoveries, average retained loans and net charge-off/recovery rate by loan class for the year ended December 31, 2022 and 2021.

(in millions, except ratios)	Year ended December 31,								
	Secured by real estate		Commercial and industrial		Other		Total		
	2022	2021	2022	2021	2022	2021	2022	2021	2022
Net charge-offs/(recoveries)	\$ 6	\$ 13	\$ 145	\$ 105	\$ 30	\$ 24	\$ 181	\$ 142	
Average retained loans	122,904	118,417	160,611	138,015	298,506	270,125	582,021	526,557	
Net charge-off/(recovery) rate	— %	0.01 %	0.09 %	0.08 %	0.01 %	0.01 %	0.03 %	0.03 %	

Management's discussion and analysis

Lending-related commitments

The Firm uses lending-related financial instruments, such as commitments (including revolving credit facilities) and guarantees, to address the financing needs of its clients. The contractual amounts of these financial instruments represent the maximum possible credit risk should the clients draw down on these commitments or when the Firm fulfills its obligations under these guarantees, and the clients subsequently fail to perform according to the terms of these contracts. Most of these commitments and guarantees have historically been refinanced, extended, cancelled, or expired without being drawn upon or a default occurring. As a result, the Firm does not believe that the total contractual amount of these wholesale lending-related commitments is representative of the Firm's expected future credit exposure or funding requirements. Refer to Note 28 for further information on wholesale lending-related commitments.

Receivables from customers

Receivables from customers reflect held-for-investment margin loans to brokerage clients in CIB, CCB and AWM that are collateralized by assets maintained in the clients' brokerage accounts (e.g., cash on deposit, and liquid and readily marketable debt or equity securities). Because of this collateralization, no allowance for credit losses is generally held against these receivables. To manage its credit risk, the Firm establishes margin requirements and monitors the required margin levels on an ongoing basis, and requires clients to deposit additional cash or other collateral, or to reduce positions, when appropriate. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

Derivative contracts

Derivatives enable clients and counterparties to manage risk, including credit risk and risks arising from fluctuations in interest rates, foreign exchange and equities and commodities prices. The Firm makes markets in derivatives in order to meet these needs and uses derivatives to manage certain risks associated with net open risk positions from its market-making activities, including the counterparty credit risk arising from derivative receivables. The Firm also uses derivative instruments to manage its own credit risk and other market risk exposure. The nature of the counterparty and the settlement mechanism of the derivative affect the credit risk to which the Firm is exposed. For OTC derivatives, the Firm is exposed to the credit risk of the derivative counterparty. For exchange-traded derivatives ("ETD"), such as futures and options, and cleared over-the-counter ("OTC-cleared") derivatives, the Firm can also be exposed to the credit risk of the relevant CCP. Where possible, the Firm seeks to mitigate its credit risk exposures arising from derivative contracts through the use of legally enforceable master netting arrangements and collateral agreements. The percentage of the Firm's OTC derivative transactions subject to collateral agreements – excluding foreign exchange spot trades, which are not typically covered by collateral agreements due to their short

maturity and centrally cleared trades that are settled daily – was approximately 87% and 88% at December 31, 2022 and 2021, respectively. Refer to Note 5 for additional information on the Firm's use of collateral agreements and further discussion of derivative contracts, counterparties and settlement types.

The fair value of derivative receivables reported on the Consolidated balance sheets were \$70.9 billion and \$57.1 billion at December 31, 2022 and 2021, respectively. The increase was primarily driven by higher foreign exchange as a result of market movements. Derivative receivables represent the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and the related cash collateral held by the Firm.

In addition, the Firm held liquid securities and other cash collateral that may be used as security when the fair value of the client's exposure is in the Firm's favor. For these purposes, the definition of liquid securities is consistent with the definition of high quality liquid assets as defined in the LCR rule.

In management's view, the appropriate measure of current credit risk should also take into consideration other collateral, which generally represents securities that do not qualify as high quality liquid assets under the LCR rule. The benefits of these additional collateral amounts for each counterparty are subject to a legally enforceable master netting agreement and limited to the net amount of the derivative receivables for each counterparty.

The Firm also holds additional collateral (primarily cash, G7 government securities, other liquid government agency and guaranteed securities, and corporate debt and equity securities) delivered by clients at the initiation of transactions, as well as collateral related to contracts that have a non-daily call frequency and collateral that the Firm has agreed to return but has not yet settled as of the reporting date. Although this collateral does not reduce the balances and is not included in the tables below, it is available as security against potential exposure that could arise should the fair value of the client's derivative contracts move in the Firm's favor. Refer to Note 5 for additional information on the Firm's use of collateral agreements.

The following tables summarize the net derivative receivables and the internal ratings profile for the periods presented.

Derivative receivables

December 31, (in millions)	2022	2021
Total, net of cash collateral	\$ 70,880	\$ 57,081
Liquid securities and other cash collateral held against derivative receivables	(23,014)	(10,102)
Total, net of liquid securities and other cash collateral	\$ 47,866	\$ 46,979
Other collateral held against derivative receivables	(1,261)	(1,544)
Total, net of collateral	\$ 46,605	\$ 45,435

Ratings profile of derivative receivables

December 31, (in millions, except ratios)	2022		2021	
	Exposure net of collateral	% of exposure net of collateral	Exposure net of collateral	% of exposure net of collateral
Investment-grade	\$ 35,097	75 %	\$ 30,278	67 %
Noninvestment-grade	11,508	25	15,157	33
Total	\$ 46,605	100 %	\$ 45,435	100 %

While useful as a current view of credit exposure, the net fair value of the derivative receivables does not capture the potential future variability of that credit exposure. To capture the potential future variability of credit exposure, the Firm calculates, on a client-by-client basis, three measures of potential derivatives-related credit loss: Peak, Derivative Risk Equivalent (“DRE”), and Average exposure (“AVG”). These measures all incorporate netting and collateral benefits, where applicable.

Peak represents a conservative measure of potential derivative exposure, including the benefit of collateral, to a counterparty calculated in a manner that is broadly equivalent to a 97.5% confidence level over the life of the transaction. Peak is the primary measure used by the Firm for setting credit limits for derivative contracts, senior management reporting and derivatives exposure management.

DRE exposure is a measure that expresses the risk of derivative exposure, including the benefit of collateral, on a basis intended to be equivalent to the risk of loan exposures. DRE is a less extreme measure of potential credit loss than Peak and is used as an input for aggregating derivative credit risk exposures with loans and other credit risk.

Finally, AVG is a measure of the expected fair value of the Firm’s derivative exposure, including the benefit of collateral, at future time periods. AVG over the total life of the derivative contract is used as the primary metric for pricing purposes and is used to calculate credit risk capital and CVA, as further described below.

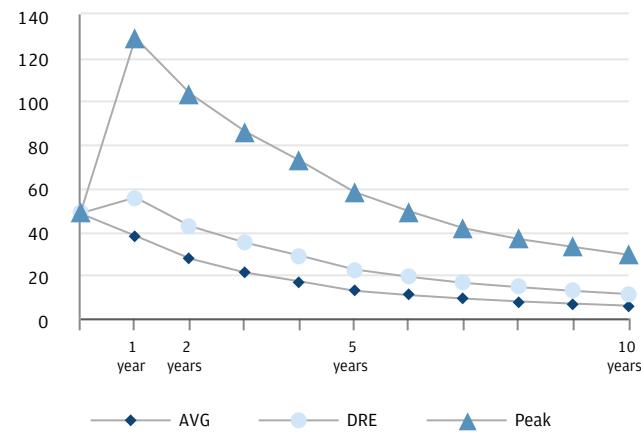
The fair value of the Firm’s derivative receivables incorporates CVA to reflect the credit quality of counterparties. CVA is based on the Firm’s AVG to a counterparty and the counterparty’s credit spread in the credit derivatives market. The Firm believes that active risk management is essential to controlling the dynamic credit risk in the derivatives portfolio. In addition, the Firm’s risk

management process for derivatives exposures takes into consideration the potential impact of wrong-way risk, which is broadly defined as the risk that exposure to a counterparty is positively correlated with the impact of a default by the same counterparty, which could cause exposure to increase at the same time as the counterparty’s capacity to meet its obligations is decreasing. Many factors may influence the nature and magnitude of these correlations over time. To the extent that these correlations are identified, the Firm may adjust the CVA associated with a particular counterparty’s AVG. The Firm risk manages exposure to changes in CVA by entering into credit derivative contracts, as well as interest rate, foreign exchange, equity and commodity derivative contracts.

The below graph shows exposure profiles to the Firm’s current derivatives portfolio over the next 10 years as calculated by the Peak, DRE and AVG metrics. The three measures generally show that exposure will decline after the first year, if no new trades are added to the portfolio.

Exposure profile of derivatives measures

December 31, 2022
(in billions)



Management's discussion and analysis

Credit derivatives

The Firm uses credit derivatives for two primary purposes: first, in its capacity as a market-maker, and second, as an end-user to manage the Firm's own credit risk associated with various exposures.

Credit portfolio management activities

Included in the Firm's end-user activities are credit derivatives used to mitigate the credit risk associated with traditional lending activities (loans and lending-related commitments) and derivatives counterparty exposure in the Firm's wholesale businesses (collectively, "credit portfolio management activities"). Information on credit portfolio management activities is provided in the table below.

The Firm also uses credit derivatives as an end-user to manage other exposures, including credit risk arising from certain securities held in the Firm's market-making businesses. These credit derivatives are not included in credit portfolio management activities.

Credit derivatives and credit-related notes used in credit portfolio management activities

	Notional amount of protection purchased and sold ^(a)	
December 31, (in millions)	2022	2021
Credit derivatives and credit-related notes used to manage:		
Loans and lending-related commitments	\$ 6,422	\$ 4,138
Derivative receivables	11,721	14,573 (b)
Credit derivatives and credit-related notes used in credit portfolio management activities	\$ 18,143	\$ 18,711

(a) Amounts are presented net, considering the Firm's net protection purchased or sold with respect to each underlying reference entity or index.

(b) Prior-period amount has been revised to conform with the current presentation

The credit derivatives used in credit portfolio management activities do not qualify for hedge accounting under U.S. GAAP; these derivatives are reported at fair value, with gains and losses recognized in principal transactions revenue. In contrast, the loans and lending-related commitments being risk-managed are accounted for on an accrual basis. This asymmetry in accounting treatment, between loans and lending-related commitments and the credit derivatives used in credit portfolio management activities, causes earnings volatility that is not representative, in the Firm's view, of the true changes in value of the Firm's overall credit exposure.

The effectiveness of credit default swaps ("CDS") as a hedge against the Firm's exposures may vary depending on a number of factors, including the named reference entity (i.e., the Firm may experience losses on specific exposures that are different than the named reference entities in the purchased CDS); the contractual terms of the CDS (which may have a defined credit event that does not align with an actual loss realized by the Firm); and the maturity of the Firm's CDS protection (which in some cases may be shorter than the Firm's exposures). However, the Firm generally seeks to purchase credit protection with a maturity date that is the same or similar to the maturity date of the exposure for which the protection was purchased, and remaining differences in maturity are actively monitored and managed by the Firm. Refer to Credit derivatives in Note 5 for further information on credit derivatives and derivatives used in credit portfolio management activities.

ALLOWANCE FOR CREDIT LOSSES

The Firm's allowance for credit losses represents management's estimate of expected credit losses over the remaining expected life of the Firm's financial assets measured at amortized cost and certain off-balance sheet lending-related commitments. The Firm's allowance for credit losses comprises:

- the allowance for loan losses, which covers the Firm's retained loan portfolios (scored and risk-rated) and is presented separately on the Consolidated balance sheets,
- the allowance for lending-related commitments, which is reflected in accounts payable and other liabilities on the Consolidated balance sheets, and
- the allowance for credit losses on investment securities, which is reflected in investment securities on the Consolidated balance sheets.

Discussion of changes in the allowance

The allowance for credit losses as of December 31, 2022 was \$22.2 billion, reflecting a net addition of \$3.5 billion from December 31, 2021, consisting of:

- \$2.3 billion in wholesale, driven by deterioration in the Firm's macroeconomic outlook and loan growth, predominantly in CB and CIB, and
- \$1.2 billion in consumer, predominantly driven by Card Services, reflecting higher outstanding balances and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede.

Deterioration in the Firm's macroeconomic outlook included both updates to the central scenario in the fourth quarter of 2022, which now reflects a mild recession, as well as the impact of the increased weight placed on the adverse scenarios beginning in the first quarter of 2022 due to the effects associated with higher inflation, changes in monetary policy, and geopolitical risks, including the war in Ukraine.

The Firm's allowance for credit losses is estimated using a weighted average of five internally developed macroeconomic scenarios. The adverse scenarios incorporate more punitive macroeconomic factors than the central case assumptions provided in the table below, resulting in a weighted average U.S. unemployment rate peaking at 5.6% in the second quarter of 2024, and a 1.2% lower U.S. real GDP exiting the second quarter of 2024.

The Firm's central case assumptions reflected U.S. unemployment rates and U.S. real GDP as follows:

	Assumptions at December 31, 2022		
	2Q23	4Q23	2Q24
U.S. unemployment rate ^(a)	3.8 %	4.3 %	5.0 %
YoY growth in U.S. real GDP ^(b)	1.5 %	0.4 %	– %

	Assumptions at December 31, 2021		
	2Q22	4Q22	2Q23
U.S. unemployment rate ^(a)	4.2 %	4.0 %	3.9 %
YoY growth in U.S. real GDP ^(b)	3.1 %	2.8 %	2.1 %

(a) Reflects quarterly average of forecasted U.S. unemployment rate.

(b) The year over year growth in U.S. real GDP in the forecast horizon of the central scenario is calculated as the percentage change in U.S. real GDP levels from the prior year.

Subsequent changes to this forecast and related estimates will be reflected in the provision for credit losses in future periods.

Refer to Critical Accounting Estimates Used by the Firm on pages 149-152 for further information on the allowance for credit losses and related management judgments.

Refer to Consumer Credit Portfolio on pages 110-115, Wholesale Credit Portfolio on pages 116-126 for additional information on the consumer and wholesale credit portfolios.

Management's discussion and analysis

Allowance for credit losses and related information

Year ended December 31, (in millions, except ratios)	2022			2021				
	Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses								
Beginning balance at January 1,	\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386	\$ 3,636	\$ 17,800	\$ 6,892	\$ 28,328
Gross charge-offs	812	3,192	322	4,326	630	3,651	283	4,564
Gross recoveries collected	(543)	(789)	(141)	(1,473)	(619)	(939)	(141)	(1,699)
Net charge-offs	269	2,403	181	2,853	11	2,712	142	2,865
Provision for loan losses	543	3,353	2,293	6,189	(1,858)	(4,838)	(2,375)	(9,071)
Other	1	—	3	4	(2)	—	(4)	(6)
Ending balance at December 31,	\$ 2,040	\$ 11,200	\$ 6,486	\$ 19,726	\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386
Allowance for lending-related commitments								
Beginning balance at January 1,	\$ 113	\$ —	\$ 2,148	\$ 2,261	\$ 187	\$ —	\$ 2,222	\$ 2,409
Provision for lending-related commitments	(37)	—	157	120	(75)	—	(74)	(149)
Other	—	—	1	1	1	—	—	1
Ending balance at December 31,	\$ 76	\$ —	\$ 2,306	\$ 2,382	\$ 113	\$ —	\$ 2,148	\$ 2,261
Impairment methodology								
Asset-specific ^(a)	\$ (624)	\$ 223	\$ 467	\$ 66	\$ (665)	\$ 313	\$ 263	\$ (89)
Portfolio-based	2,664	10,977	6,019	19,660	2,430	9,937	4,108	16,475
Total allowance for loan losses	\$ 2,040	\$ 11,200	\$ 6,486	\$ 19,726	\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386
Impairment methodology								
Asset-specific	\$ —	\$ —	\$ 90	\$ 90	\$ —	\$ —	\$ 167	\$ 167
Portfolio-based	76	—	2,216	2,292	113	—	1,981	2,094
Total allowance for lending-related commitments	\$ 76	\$ —	\$ 2,306	\$ 2,382	\$ 113	\$ —	\$ 2,148	\$ 2,261
Total allowance for investment securities	NA	NA	NA	\$ 96	NA	NA	NA	\$ 42
Total allowance for credit losses^(b)	\$ 2,116	\$ 11,200	\$ 8,792	\$ 22,204	\$ 1,878	\$ 10,250	\$ 6,519	\$ 18,689
Memo:								
Retained loans, end of period	\$ 300,753	\$ 185,175	\$ 603,670	\$ 1,089,598	\$ 295,556	\$ 154,296	\$ 560,354	\$ 1,010,206
Retained loans, average	299,409	163,335	582,021	1,044,765	298,814	139,900	526,557	965,271
Credit ratios								
Allowance for loan losses to retained loans	0.68 %	6.05 %	1.07 %	1.81 %	0.60 %	6.64 %	0.78 %	1.62 %
Allowance for loan losses to retained nonaccrual loans ^(c)	53	NM	330	338	36	NM	213	236
Allowance for loan losses to retained nonaccrual loans excluding credit card	53	NM	330	146	36	NM	213	89
Net charge-off rates	0.09	1.47	0.03	0.27	—	1.94	0.03	0.30

(a) Includes collateral dependent loans, including those considered TDRs and those for which foreclosure is deemed probable, modified PCD loans, and non-collateral dependent loans that have been modified or are reasonably expected to be modified in a TDR. Also includes risk-rated loans that have been placed on nonaccrual status for the wholesale portfolio segment. The asset-specific credit card allowance for loan losses modified or reasonably expected to be modified in a TDR is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(b) At December 31, 2022, excludes an allowance for credit losses associated with certain accounts receivable in CIB of \$21 million.

(c) The Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.

Allocation of allowance for loan losses

The table below presents a breakdown of the allowance for loan losses by loan class. Refer to Note 12 for further information on loan classes.

December 31, (in millions, except ratios)	2022		2021	
	Allowance for loan losses	Percent of retained loans to total retained loans	Allowance for loan losses	Percent of retained loans to total retained loans
Residential real estate	\$ 1,070	22 %	\$ 817	22 %
Auto and other	970	6	948	7
Consumer, excluding credit card	2,040	28	1,765	29
Credit card	11,200	17	10,250	15
Total consumer	13,240	45	12,015	45
Secured by real estate	1,782	12	1,495	12
Commercial and industrial	3,507	15	1,881	14
Other	1,197	28	995	29
Total wholesale	6,486	55	4,371	55
Total	\$ 19,726	100 %	\$ 16,386	100 %

INVESTMENT PORTFOLIO RISK MANAGEMENT

Investment portfolio risk is the risk associated with the loss of principal or a reduction in expected returns on investments arising from the investment securities portfolio or from principal investments. The investment securities portfolio is predominantly held by Treasury and CIO in connection with the Firm's balance sheet and asset-liability management objectives. Principal investments are predominantly privately-held financial instruments and are managed in the LOBs and Corporate. Investments are typically intended to be held over extended periods and, accordingly, the Firm has no expectation for short-term realized gains with respect to these investments.

Investment securities risk

Investment securities risk includes the exposure associated with a default in the payment of principal and interest. This risk is mitigated given that the investment securities portfolio held by Treasury and CIO predominantly consists of high-quality securities. At December 31, 2022, the Treasury and CIO investment securities portfolio, net of the allowance for credit losses, was \$629.3 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available, and where not available, based primarily upon internal risk ratings). Refer to Corporate segment results on pages 79-80 and Note 10 for further information on the investment securities portfolio and internal risk ratings. Refer to Liquidity Risk Management on pages 97-104 for further information on related liquidity risk. Refer to Market Risk Management on pages 131-138 for further information on the market risk inherent in the portfolio.

Governance and oversight

Investment securities risks are governed by the Firm's Risk Appetite framework, and reviewed at the CTC Risk Committee with regular updates provided to the Board Risk Committee.

The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of investment securities in accordance with relevant policies. Approved levels for investment securities are established for each risk category, including capital and credit risks.

Principal investment risk

Principal investments are typically privately-held financial instruments representing ownership interests or other forms of junior capital. In general, principal investments include tax-oriented investments and investments made to enhance or accelerate the Firm's business strategies and exclude those that are consolidated on the Firm's balance sheets. These investments are made by dedicated investing businesses or as part of a broader business strategy. The Firm's principal investments are managed by the LOBs and Corporate and are reflected within their respective financial results. The Firm's investments will continue to evolve in line with its strategies, including the Firm's commitment to support underserved communities and minority-owned businesses.

The table below presents the aggregate carrying values of the principal investment portfolios as of December 31, 2022 and 2021.

(in billions)	December 31, 2022	December 31, 2021
Tax-oriented investments, primarily in alternative energy and affordable housing	\$ 26.2	\$ 23.2
Private equity, various debt and equity instruments, and real assets	10.8 ^(a)	7.3
Total carrying value	\$ 37.0	\$ 30.5

(a) Includes the Firm's 40% ownership in C6 Bank and 49% ownership in Viva Wallet.

Governance and oversight

The Firm's approach to managing principal risk is consistent with the Firm's risk governance structure. The Firm has established a Firmwide risk policy framework for all principal investing activities that includes approval by executives who are independent from the investing businesses, as appropriate.

The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of investments in accordance with relevant policies. As part of the risk governance structure, approved levels for investments are established and monitored for each relevant business or segment in order to manage the overall size of the portfolios. The Firm also conducts stress testing on these portfolios using specific scenarios that estimate losses based on significant market moves and/or other risk events.

MARKET RISK MANAGEMENT

Market risk is the risk associated with the effect of changes in market factors such as interest and foreign exchange rates, equity and commodity prices, credit spreads or implied volatilities, on the value of assets and liabilities held for both the short and long term.

Market Risk Management

Market Risk Management monitors market risks throughout the Firm and defines market risk policies and procedures.

Market Risk Management seeks to manage risk, facilitate efficient risk/return decisions, reduce volatility in operating performance and provide transparency into the Firm's market risk profile for senior management, the Board of Directors and regulators. Market Risk Management is responsible for the following functions:

- Maintaining a market risk policy framework
- Independently measuring, monitoring and controlling LOB, Corporate, and Firmwide market risk
- Defining, approving and monitoring of limits
- Performing stress testing and qualitative risk assessments

Risk measurement

Measures used to capture market risk

There is no single measure to capture market risk and therefore Market Risk Management uses various metrics, both statistical and nonstatistical, to assess risk including:

- Value-at-risk (VaR)
- Stress testing
- Profit and loss drawdowns
- Earnings-at-risk
- Other sensitivity-based measures

Risk monitoring and control

Market risk exposure is managed primarily through a series of limits set in the context of the market environment and business strategy. In setting limits, Market Risk Management takes into consideration factors such as market volatility, product liquidity, accommodation of client business, and management judgment. Market Risk Management maintains different levels of limits. Firm level limits include VaR and stress limits. Similarly, LOB and Corporate limits include VaR and stress limits and may be supplemented by certain nonstatistical risk measures such as profit and loss drawdowns. Limits may also be set within the LOBs and Corporate, as well as at the legal entity level.

Market Risk Management sets limits and regularly reviews and updates them as appropriate. Senior management is responsible for reviewing and approving certain of these risk limits on an ongoing basis. Limits that have not been reviewed within specified time periods by Market Risk Management are reported to senior management. The LOBs and Corporate are responsible for adhering to established limits against which exposures are monitored and reported.

Limit breaches are required to be reported in a timely manner to limit approvers, which include Market Risk Management and senior management. In the event of a breach, Market Risk Management consults with senior members of appropriate groups within the Firm to determine the suitable course of action required to return the applicable positions to compliance, which may include a reduction in risk in order to remedy the breach or granting a temporary increase in limits to accommodate an expected increase in client activity and/or market volatility. Certain Firm, Corporate or LOB-level limit breaches are escalated as appropriate.

Models used to measure market risk are inherently imprecise and are limited in their ability to measure certain risks or to predict losses. This imprecision may be heightened when sudden or severe shifts in market conditions occur. For additional discussion on model uncertainty refer to Estimations and Model Risk Management on page 148.

Market Risk Management periodically reviews the Firm's existing market risk measures to identify opportunities for enhancement, and to the extent appropriate, will calibrate those measures accordingly over time.

Management's discussion and analysis

The following table summarizes the predominant business activities and related market risks, as well as positions which give rise to market risk and certain measures used to capture those risks, for each LOB and Corporate.

In addition to the predominant business activities, each LOB and Corporate may engage in principal investing activities. To the extent principal investments are deemed market risk sensitive, they are reflected in relevant risk measures and captured in the table below. Refer to Investment Portfolio Risk Management on page 130 for additional discussion on principal investments.

LOBs and Corporate	Predominant business activities	Related market risks	Positions included in Risk Management VaR	Positions included in earnings-at-risk	Positions included in other sensitivity-based measures
CCB	<ul style="list-style-type: none"> Originates and services mortgage loans Originates loans and takes deposits 	<ul style="list-style-type: none"> Risk from changes in the probability of newly originated mortgage commitments closing Interest rate risk and prepayment risk 	<ul style="list-style-type: none"> Mortgage commitments, classified as derivatives Warehouse loans that are fair value option elected, classified as loans - debt instruments MSRs Hedges of mortgage commitments, warehouse loans and MSRs, classified as derivatives Interest-only and mortgage-backed securities, classified as trading assets debt instruments, and related hedges, classified as derivatives Fair value option elected liabilities^(a) 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	<ul style="list-style-type: none"> Fair value option elected liabilities DVA^(a)
CIB	<ul style="list-style-type: none"> Makes markets and services clients across fixed income, foreign exchange, equities and commodities Originates loans and takes deposits 	<ul style="list-style-type: none"> Risk of loss from adverse movements in market prices and implied volatilities across interest rate, foreign exchange, credit, commodity and equity instruments Basis and correlation risk from changes in the way asset values move relative to one another Interest rate risk and prepayment risk 	<ul style="list-style-type: none"> Trading assets/liabilities - debt and marketable equity instruments, and derivatives, including hedges of the retained loan portfolio Certain securities purchased, loaned or sold under resale agreements and securities borrowed Fair value option elected liabilities^(a) Certain fair value option elected loans Derivative CVA and associated hedges Marketable equity investments 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	<ul style="list-style-type: none"> Privately held equity and other investments measured at fair value; and certain real estate-related fair value option elected loans Derivatives FVA and fair value option elected liabilities DVA(a) Credit risk component of CVA and associated hedges for counterparties with credit spreads that have widened to elevated levels
CB	Originates loans and takes deposits	Interest rate risk and prepayment risk	Marketable equity investments ^(b)	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	
AWM	<ul style="list-style-type: none"> Provides initial capital investments in products such as mutual funds and capital invested alongside third-party investors Originates loans and takes deposits 	<ul style="list-style-type: none"> Risk from adverse movements in market factors (e.g., market prices, rates and credit spreads) Interest rate risk and prepayment risk 	<ul style="list-style-type: none"> Debt securities held in advance of distribution to clients, classified as trading assets - debt instruments^(b) 	<ul style="list-style-type: none"> Retained loan portfolio Deposits 	<ul style="list-style-type: none"> Initial seed capital investments and related hedges, classified as derivatives Certain deferred compensation and related hedges, classified as derivatives Capital invested alongside third-party investors, typically in privately distributed collective vehicles managed by AWM (i.e., co-investments)
Corporate	Manages the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks	<ul style="list-style-type: none"> Structural interest rate risk from the Firm's traditional banking activities Structural non-USD foreign exchange risks 	<ul style="list-style-type: none"> Derivative positions measured through noninterest revenue in earnings Marketable equity investments 	<ul style="list-style-type: none"> Deposits with banks Investment securities portfolio and related interest rate hedges Long-term debt and related interest rate hedges Deposits 	<ul style="list-style-type: none"> Privately held equity and other investments measured at fair value Foreign exchange exposure related to Firm-issued non-USD long-term debt ("LTD") and related hedges

(a) Reflects structured notes in Risk Management VaR and the DVA on structured notes in other sensitivity-based measures.

(b) The AWM and CB contributions to Firmwide average VaR were not material for the years ended December 31, 2022 and 2021.

Value-at-risk

JPMorgan Chase utilizes value-at-risk (“VaR”), a statistical risk measure, to estimate the potential loss from adverse market moves in the current market environment. The Firm has a single VaR framework used as a basis for calculating Risk Management VaR and Regulatory VaR.

The framework is employed across the Firm using historical simulation based on data for the previous 12 months. The framework’s approach assumes that historical changes in market values are representative of the distribution of potential outcomes in the immediate future. The Firm believes the use of Risk Management VaR provides a daily measure of risk that is closely aligned to risk management decisions made by the LOBs and Corporate and, along with other market risk measures, provides the appropriate information needed to respond to risk events.

The Firm’s Risk Management VaR is calculated assuming a one-day holding period and an expected tail-loss methodology which approximates a 95% confidence level. Risk Management VaR provides a consistent framework to measure risk profiles and levels of diversification across product types and is used for aggregating risks and monitoring limits across businesses. VaR results are reported to senior management, the Board of Directors and regulators.

Underlying the overall VaR model framework are individual VaR models that simulate historical market returns for individual risk factors and/or product types. To capture material market risks as part of the Firm’s risk management framework, comprehensive VaR model calculations are performed daily for businesses whose activities give rise to market risk. These VaR models are granular and incorporate numerous risk factors and inputs to simulate daily changes in market values over the historical period; inputs are selected based on the risk profile of each portfolio, as sensitivities and historical time series used to generate daily market values may be different across product types or risk management systems. The VaR model results across all portfolios are aggregated at the Firm level.

As VaR is based on historical data, it is an imperfect measure of market risk exposure and potential future losses. In addition, based on their reliance on available historical data, limited time horizons, and other factors, VaR measures are inherently limited in their ability to measure certain risks and to predict losses, particularly those associated with market illiquidity and sudden or severe shifts in market conditions.

For certain products, specific risk parameters are not captured in VaR due to the lack of liquidity and availability of appropriate historical data. The Firm uses proxies to estimate the VaR for these and other products when daily time series are not available. It is likely that using an actual price-based time series for these products, if available, would affect the VaR results presented. The Firm therefore considers other nonstatistical measures such as stress

testing, in addition to VaR, to capture and manage its market risk positions.

The daily market data used in VaR models may be different than the independent third-party data collected for VCG price testing in its monthly valuation process. For example, in cases where market prices are not observable, or where proxies are used in VaR historical time series, the data sources may differ. Refer to Valuation process in Note 2 for further information on the Firm’s valuation process. As VaR model calculations require daily data and a consistent source for valuation, it may not be practical to use the data collected in the VCG monthly valuation process for VaR model calculations.

The Firm’s VaR model calculations are periodically evaluated and enhanced in response to changes in the composition of the Firm’s portfolios, changes in market conditions, improvements in the Firm’s modeling techniques and measurements, and other factors. Such changes may affect historical comparisons of VaR results. Refer to Estimations and Model Risk Management on page 148 for information regarding model reviews and approvals.

The Firm calculates separately a daily aggregated VaR in accordance with regulatory rules (“Regulatory VaR”), which is used to derive the Firm’s regulatory VaR-based capital requirements under Basel III capital rules. This Regulatory VaR model framework currently assumes a ten business-day holding period and an expected tail loss methodology which approximates a 99% confidence level. Regulatory VaR is applied to “covered” positions as defined by Basel III capital rules, which may be different than the positions included in the Firm’s Risk Management VaR. For example, credit derivative hedges of accrual loans are included in the Firm’s Risk Management VaR, while Regulatory VaR excludes these credit derivative hedges. In addition, in contrast to the Firm’s Risk Management VaR, Regulatory VaR currently excludes the diversification benefit for certain VaR models.

Refer to JPMorgan Chase’s Basel III Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm’s website, for additional information on Regulatory VaR and the other components of market risk regulatory capital for the Firm (e.g., VaR-based measure, stressed VaR-based measure and the respective backtesting).

Management's discussion and analysis

The table below shows the results of the Firm's Risk Management VaR measure using a 95% confidence level. VaR can vary significantly as positions change, market volatility fluctuates, and diversification benefits change.

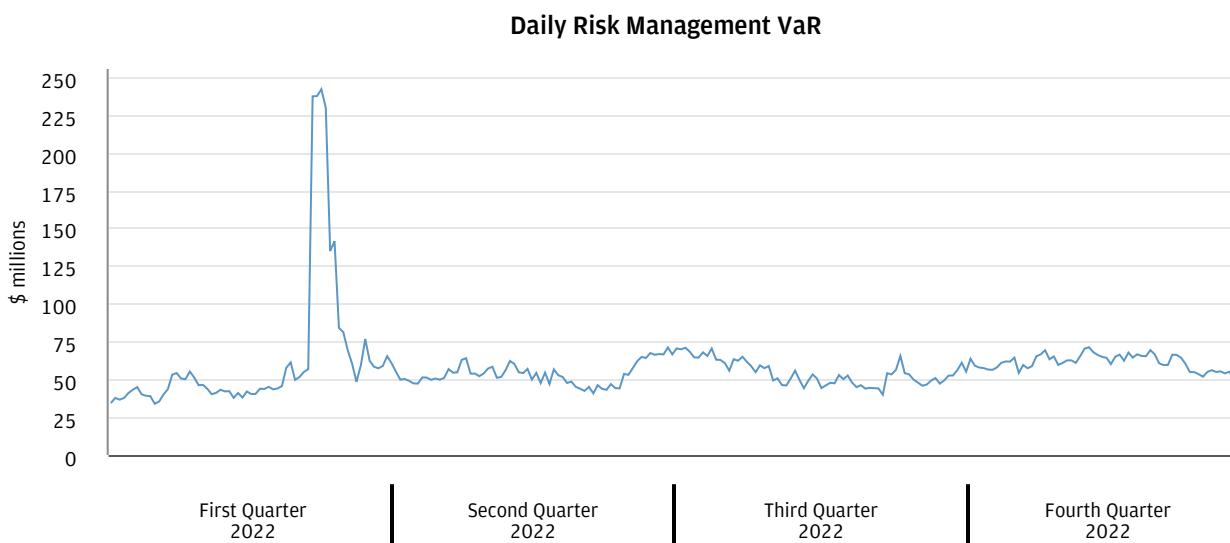
Total VaR

As of or for the year ended December 31, (in millions)	2022			2021		
	Avg.	Min	Max	Avg.	Min	Max
CIB trading VaR by risk type						
Fixed income	\$ 59	\$ 33	\$ 82	\$ 60	\$ 30	\$ 153
Foreign exchange	8	3	15	6	2	27
Equities	12	7	20	16	8	38
Commodities and other	15	10	28	19	9	43
Diversification benefit to CIB trading VaR	(43) ^(a)	NM ^(e)	NM ^(e)	(49) ^(a)	NM ^(e)	NM ^(e)
CIB trading VaR	51	34	69	52	22	134
Credit Portfolio VaR	16 ^{(b)(c)}	4 ^(b)	235 ^{(b)(c)}	6	4	12
Diversification benefit to CIB VaR	(10) ^(a)	NM ^(e)	NM ^(e)	(6) ^(a)	NM ^(e)	NM ^(e)
CIB VaR	57	35	240	52	22	133
CCB VaR	6	2	20	5	3	11
Corporate and other LOB VaR	12 ^(d)	9	16 ^(d)	24 ^(d)	14	94 ^(d)
Diversification benefit to other VaR	(4) ^(a)	NM ^(e)	NM ^(e)	(4) ^(a)	NM ^(e)	NM ^(e)
Other VaR	14	10	24	25	14	94
Diversification benefit to CIB and other VaR	(13) ^(a)	NM ^(e)	NM ^(e)	(22) ^(a)	NM ^(e)	NM ^(e)
Total VaR	\$ 58	\$ 34	\$ 242	\$ 55	\$ 24	\$ 153

- (a) Diversification benefit represents the difference between the portfolio VaR and the sum of its individual components. This reflects the non-additive nature of VaR due to imperfect correlation across LOBs, Corporate, and risk types.
- (b) In the first quarter of 2022, in line with the Firm's internal model governance, the credit risk component of CVA related to certain counterparties was removed from Credit Portfolio VaR due to the widening of the credit spreads for those counterparties to elevated levels. The related hedges were also removed to maintain consistency. This exposure is now reflected in other sensitivity-based measures.
- (c) In March 2022, the effects of nickel price increases and the associated volatility in the nickel market resulted in elevated average and maximum Credit Portfolio VaR.
- (d) The decrease in Corporate and other LOB VaR was driven by lower market values for a legacy private equity position in Corporate which is publicly traded.
- (e) The maximum and minimum VaR for each portfolio may have occurred on different trading days than the components, and consequently, diversification benefit is not meaningful.

Average Total VaR increased by \$3 million for the year ended December 31, 2022 when compared with the prior year. The increase was driven by the effects of nickel price increases and the associated volatility in the nickel market observed in March 2022 impacting Credit Portfolio VaR, predominantly offset by a decrease in Corporate and other LOB VaR.

The following graph presents daily Risk Management VaR for the four trailing quarters. The movement in VaR in March 2022 was driven by changes in nickel-related counterparty exposure in the Firm's Credit Portfolio.



VaR backtesting

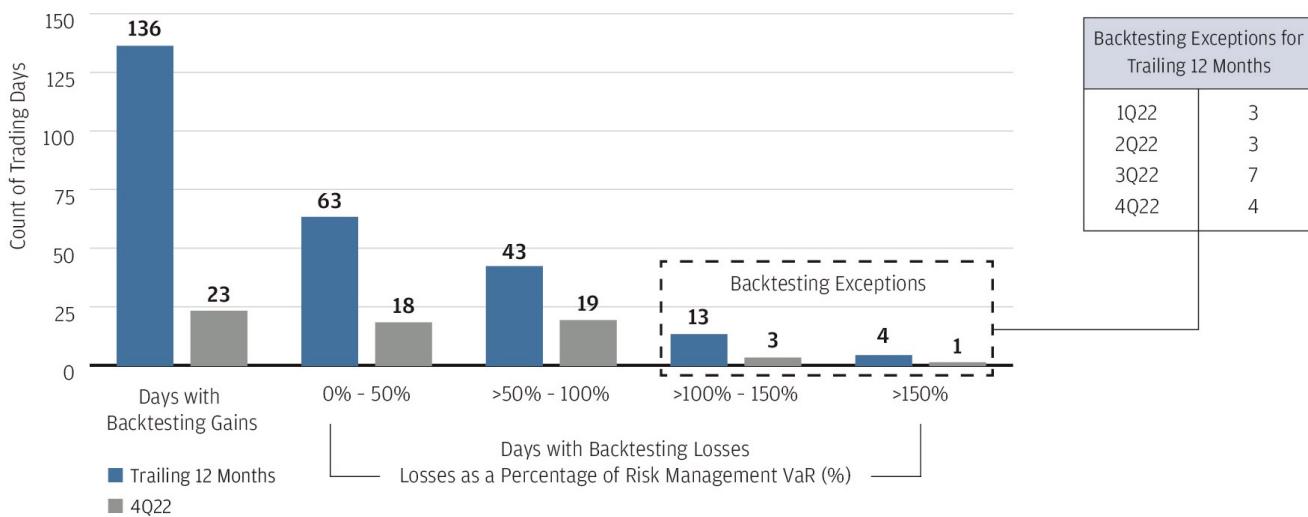
The Firm performs daily VaR model backtesting, which compares the daily Risk Management VaR results with the daily gains and losses that are utilized for VaR backtesting purposes. The gains and losses depicted in the chart below do not reflect the Firm's reported revenue as they exclude certain components of total net revenue, such as those associated with the execution of new transactions (i.e., intraday client-driven trading and intraday risk management activities), fees, commissions, other valuation adjustments and net interest income. These excluded components of total net revenue may more than offset the backtesting gain or loss on a particular day. The definition of backtesting gains and losses above is consistent with the requirements for backtesting under Basel III capital rules.

A backtesting exception occurs when the daily backtesting loss exceeds the daily Risk Management VaR for the prior day. Under the Firm's Risk Management VaR methodology, assuming current changes in market values are consistent with the historical changes used in the simulation, the Firm would expect to incur VaR backtesting exceptions five times every 100 trading days on average. The number of VaR backtesting exceptions observed can differ from the statistically expected number of backtesting exceptions if the current level of market volatility is materially different from the level of market volatility during the 12 months of historical data used in the VaR calculation.

For the 12 months ended December 31, 2022, the Firm posted backtesting gains on 136 of the 259 days, and observed 17 VaR backtesting exceptions. Firmwide backtesting loss days can differ from the loss days for which Fixed Income Markets and Equity Markets posted losses, as disclosed in CIB Markets revenue, as the population of positions which compose each metric are different and due to the exclusion of certain components of total net revenue in backtesting gains and losses as described above. For more information on CIB Markets revenue, refer to pages 70-71.

The following chart presents the distribution of Firmwide daily backtesting gains and losses for the trailing 12 months and three months ended December 31, 2022. The daily backtesting losses are displayed as a percentage of the corresponding daily Risk Management VaR. The count of days with backtesting losses are shown in aggregate, in fifty percentage point intervals. Backtesting exceptions are displayed within the intervals that are greater than one hundred percent. The results in the chart below differ from the results of backtesting disclosed in the Market Risk section of the Firm's Basel III Pillar 3 Regulatory Capital Disclosures reports, which are based on Regulatory VaR applied to the Firm's covered positions.

Distribution of Daily Backtesting Gains and Losses



Other risk measures

Stress testing

Along with VaR, stress testing is an important tool used to assess risk. While VaR reflects the risk of loss due to adverse changes in markets using recent historical market behavior, stress testing reflects the risk of loss from hypothetical changes in the value of market risk sensitive positions applied simultaneously. Stress testing measures the Firm's vulnerability to losses under a range of stressed but possible economic and market scenarios. The results are used to understand the exposures responsible for those potential losses and are measured against limits.

The Firm's stress framework covers market risk sensitive positions in the LOBs and Corporate. The framework is used to calculate multiple magnitudes of potential stress for both market rallies and market sell-offs, assuming significant changes in market factors such as credit spreads, equity prices, interest rates, currency rates and commodity prices, and combines them in multiple ways to capture an array of hypothetical economic and market scenarios.

The Firm generates a number of scenarios that focus on tail events in specific asset classes and geographies, including how the event may impact multiple market factors simultaneously. Scenarios also incorporate specific idiosyncratic risks and stress basis risk between different products. The flexibility in the stress framework allows the Firm to construct new scenarios that can test the outcomes against possible future stress events. Stress testing results are reported periodically to senior management of the Firm, as appropriate.

Stress scenarios are governed by the overall stress framework, under the oversight of Market Risk Management, and the models to calculate the stress results are subject to the Firm's Estimations and Model Risk Management Policy. The Firmwide Market Risk Stress Methodology Committee reviews and approves changes to stress testing methodology and scenarios across the Firm. Significant changes to the framework are escalated to senior management, as appropriate.

The Firm's stress testing framework is utilized in calculating the Firm's CCAR and other stress test results, which are reported periodically to the Board of Directors. In addition, stress testing results are incorporated into the Firm's Risk Appetite framework, and are reported periodically to the Board Risk Committee.

Profit and loss drawdowns

Profit and loss drawdowns are used to highlight trading losses above certain levels of risk tolerance. A profit and loss drawdown is a decline in revenue from its year-to-date peak level.

Earnings-at-risk

The effect of interest rate exposure on the Firm's reported net income is important as interest rate risk represents one of the Firm's significant market risks. Interest rate risk arises not only from trading activities but also from the

Firm's traditional banking activities, which include extension of loans and credit facilities, taking deposits, issuing debt and the investment securities portfolio. Refer to the table on page 132 for a summary by LOB and Corporate, identifying positions included in earnings-at-risk.

The CTC Risk Committee establishes the Firm's structural interest rate risk policy and related limits, which are subject to approval by the Board Risk Committee. Treasury and CIO, working in partnership with the LOBs, calculates the Firm's structural interest rate risk profile and reviews it with senior management, including the CTC Risk Committee. In addition, oversight of structural interest rate risk is managed through a dedicated risk function reporting to the CTC CRO. This risk function is responsible for providing independent oversight and governance around assumptions and establishing and monitoring limits for structural interest rate risk. The Firm manages structural interest rate risk generally through its investment securities portfolio and interest rate derivatives.

Structural interest rate risk can arise due to a variety of factors, including:

- Differences in timing among the maturity or repricing of assets, liabilities and off-balance sheet instruments
- Differences in the amounts of assets, liabilities and off-balance sheet instruments that are maturing or repricing at the same time
- Differences in the amounts by which short-term and long-term market interest rates change (for example, changes in the slope of the yield curve)
- The impact of changes in the maturity of various assets, liabilities or off-balance sheet instruments as interest rates change

The Firm manages interest rate exposure related to its assets and liabilities on a consolidated, Firmwide basis. Business units transfer their interest rate risk to Treasury and CIO through funds transfer pricing, which takes into account the elements of interest rate exposure that can be risk-managed in financial markets. These elements include asset and liability balances and contractual rates of interest, contractual principal payment schedules, expected prepayment experience, interest rate reset dates and maturities, rate indices used for repricing, and any interest rate ceilings or floors for adjustable rate products.

One way that the Firm evaluates its structural interest rate risk is through earnings-at-risk. Earnings-at-risk estimates the Firm's interest rate exposure for a given interest rate scenario. It is presented as a sensitivity to a baseline, which includes net interest income and certain interest rate sensitive fees. The baseline uses market interest rates and, in the case of deposits, pricing assumptions. The Firm conducts simulations of changes to this baseline for interest rate-sensitive assets and liabilities denominated in U.S. dollars and other currencies ("non-U.S. dollar" currencies). These simulations primarily include retained loans,

deposits, deposits with banks, investment securities, long-term debt and any related interest rate hedges, and funds transfer pricing of other positions in risk management VaR and other sensitivity-based measures as described on page 132.

Earnings-at-risk scenarios estimate the potential change to a net interest income baseline over the following 12 months utilizing multiple assumptions. These scenarios include a parallel shift involving changes to both short-term and long-term rates by an equal amount; a steeper yield curve involving holding short-term rates constant and increasing long-term rates; and a flatter yield curve involving increasing short-term rates and holding long-term rates constant or holding short-term rates constant and decreasing long-term rates. These scenarios consider many different factors, including:

- The impact on exposures as a result of instantaneous changes in interest rates from baseline rates.
- Forecasted balance sheet, as well as modeled prepayment and reinvestment behavior, but excluding assumptions about actions that could be taken by the Firm or its clients and customers in response to instantaneous rate changes. Mortgage prepayment assumptions are based on the interest rates used in the scenarios compared with underlying contractual rates, the time since origination, and other factors which are updated periodically based on historical experience. Deposit forecasts are a key assumption in the Firm's earnings-at-risk. The baseline reflects certain assumptions relating to the reversal of Quantitative Easing that are highly uncertain and require management judgment. Therefore, the actual amount of deposits held by the Firm, at any particular time, could be impacted by actions the Federal Reserve may take as part of monetary policy, including through the use of the Reverse Repurchase Facility. In addition, there are other factors that impact the amount of deposits held at the Firm such as the level of loans across the industry and competition for deposits.
- The pricing sensitivity of deposits, known as deposit betas, represent the amount by which deposit rates paid could change upon a given change in market interest rates. The deposit rates paid in these scenarios differ from actual deposit rates paid, due to repricing lags and other factors.

The Firm's earnings-at-risk scenarios are periodically evaluated and enhanced in response to changes in the composition of the Firm's balance sheet, changes in market conditions, improvements in the Firm's simulation and other factors. The Firm is currently evaluating the modeling of repricing lags for deposits in its earnings-at-risk scenarios. Incorporating repricing lags, in the current environment, would significantly affect the U.S. dollar interest rate scenarios, with higher interest rate scenarios expected to result in a positive impact, and lower interest rate scenarios expected to result in a negative impact, on the Firm's earnings-at-risk. While a relevant measure of the

Firm's interest rate exposure, the earnings-at-risk analysis does not represent a forecast of the Firm's net interest income (Refer to Outlook on page 49 for additional information).

The Firm's U.S. dollar sensitivities are presented in the table below.

December 31, (in billions)	2022	2021
Parallel shift:		
+100 bps shift in rates	\$ (2.0)	\$ 5.0
-100 bps shift in rates	2.4	NM ^(a)
Steeper yield curve:		
+100 bps shift in long-term rates	0.8	1.8
-100 bps shift in short-term rates	3.2	NM ^(a)
Flatter yield curve:		
+100 bps shift in short-term rates	(2.8)	3.2
-100 bps shift in long-term rates	(0.9)	NM ^(a)

(a) Given the level of market interest rates, these scenarios were not considered to be meaningful as of December 31, 2021.

The change in the Firm's U.S. dollar sensitivities as of December 31, 2022 compared to December 31, 2021 reflected updates to the Firm's baseline for higher interest rates and higher corresponding modeled deposit betas, as well as the impact of changes in the Firm's balance sheet.

As of December 31, 2022, the Firm's sensitivity to the +/-100 basis points parallel and short-term shift in rates is primarily the result of a greater impact from liabilities repricing compared to the impact of assets repricing, while a +/-100 basis points shift in long-term rates is primarily the result of a greater impact from assets repricing compared to the impact of liabilities repricing.

The Firm's non-U.S. dollar sensitivities are presented in the table below.

December 31, (in billions)	2022	2021
Parallel shift:		
+100 bps shift in rates	\$ 0.7	\$ 0.8
-100 bps shift in rates	\$ (0.6)	NM ^(a)
Steeper yield curve:		
-100 bps shift in short-term rates	\$ (0.6)	NM ^(a)
Flatter yield curve:		
+100 bps shift in short-term rates	0.6	0.8

(a) Given the level of market interest rates, these scenarios were not considered to be meaningful as of December 31, 2021.

The results of the non-U.S. dollar interest rate scenario involving a steeper/flatter yield curve with long-term rates increasing/decreasing by 100 basis points and short-term rates staying at current levels were not material to the Firm's earnings-at-risk at December 31, 2022 and 2021.

Management's discussion and analysis

Non-U.S. dollar foreign exchange risk

Non-U.S. dollar FX risk is the risk that changes in foreign exchange rates affect the value of the Firm's assets or liabilities or future results. The Firm has structural non-U.S. dollar FX exposures arising from capital investments, forecasted expense and revenue, the investment securities portfolio and non-U.S. dollar-denominated debt issuance. Treasury and CIO, working in partnership with the LOBs, primarily manage these risks on behalf of the Firm. Treasury and CIO may hedge certain of these risks using derivatives. Refer to Business Segment Results on page 62 for additional information.

Other sensitivity-based measures

The Firm quantifies the market risk of certain debt and equity and credit and funding-related exposures by assessing the potential impact on net revenue, other comprehensive income ("OCI") and noninterest expense due to changes in relevant market variables. Refer to the predominant business activities that give rise to market risk on page 132 for additional information on the positions captured in other sensitivity-based measures.

The table below represents the potential impact to net revenue, OCI or noninterest expense for market risk sensitive instruments that are not included in VaR or earnings-at-risk. Where appropriate, instruments used for hedging purposes are reported net of the positions being hedged. The sensitivities disclosed in the table below may not be representative of the actual gain or loss that would have been realized at December 31, 2022 and 2021, as the movement in market parameters across maturities may vary and are not intended to imply management's expectation of future changes in these sensitivities.

Gain/(loss) (in millions)		Sensitivity measure	December 31,	December 31,
Activity	Description		2022	2021
Debt and equity^(a)				
Asset Management activities	Consists of seed capital and related hedges; fund co-investments ^(c) ; and certain deferred compensation and related hedges ^(d)	10% decline in market value	\$ (56)	\$ (69)
Other debt and equity	Consists of certain real estate-related fair value option elected loans, privately held equity and other investments held at fair value ^(c)	10% decline in market value	(1,046)	(971)
Credit- and funding-related exposures				
Non-USD LTD cross-currency basis	Represents the basis risk on derivatives used to hedge the foreign exchange risk on the non-USD LTD ^(e)	1 basis point parallel tightening of cross currency basis	(12)	(16)
Non-USD LTD hedges foreign currency ("FX") exposure	Primarily represents the foreign exchange revaluation on the fair value of the derivative hedges ^(e)	10% depreciation of currency	3	15
Derivatives - funding spread risk	Impact of changes in the spread related to derivatives FVA ^(c)	1 basis point parallel increase in spread	(4)	(7)
CVA - counterparty credit risk ^(b)	Credit risk component of CVA and associated hedges	10% credit spread widening	(1)	N/A
Fair value option elected liabilities - funding spread risk	Impact of changes in the spread related to fair value option elected liabilities DVA ^(e)	1 basis point parallel increase in spread	43	41
Fair value option elected liabilities - interest rate sensitivity	Interest rate sensitivity on fair value option elected liabilities resulting from a change in the Firm's own credit spread ^(e)	1 basis point parallel increase in spread	–	(3)
	Interest rate sensitivity related to risk management of changes in the Firm's own credit spread on the fair value option elected liabilities noted above ^(c)	1 basis point parallel increase in spread	–	3

(a) Excludes equity securities without readily determinable fair values that are measured under the measurement alternative. Refer to Note 2 for additional information.

(b) In the first quarter of 2022, in line with the Firm's internal model governance, the credit risk component of CVA related to certain counterparties was removed from Credit Portfolio VaR due to the widening of the credit spreads for those counterparties to elevated levels. The related hedges were also removed to maintain consistency. This exposure is now reflected in other sensitivity-based measures.

(c) Impact recognized through net revenue.

(d) Impact recognized through noninterest expense.

(e) Impact recognized through OCI.

COUNTRY RISK MANAGEMENT

The Firm, through its LOBs and Corporate, may be exposed to country risk resulting from financial, economic, political or other significant developments which adversely affect the value of the Firm's exposures related to a particular country or set of countries. The Country Risk Management group actively monitors the various portfolios which may be impacted by these developments and measures the extent to which the Firm's exposures are diversified given the Firm's strategy and risk tolerance relative to a country.

Organization and management

Country Risk Management is an independent risk management function that assesses, manages and monitors exposure to country risk across the Firm.

The Firm's country risk management function includes the following activities:

- Maintaining policies, procedures and standards consistent with a comprehensive country risk framework
- Assigning sovereign ratings, assessing country risks and establishing risk tolerance relative to a country
- Measuring and monitoring country risk exposure and stress across the Firm
- Managing and approving country limits and reporting trends and limit breaches to senior management
- Developing surveillance tools, such as signaling models and ratings indicators, for early identification of potential country risk concerns
- Providing country risk scenario analysis

Sources and measurement

The Firm is exposed to country risk through its lending and deposits, investing, and market-making activities, whether cross-border or locally funded. Country exposure includes activity with both government and private-sector entities in a country.

Under the Firm's internal country risk management approach, attribution of exposure to an individual country is based on the country where the largest proportion of the assets of the counterparty, issuer, obligor or guarantor are located or where the largest proportion of its revenue is derived, which may be different than the domicile (i.e. legal residence) or country of incorporation.

Individual country exposures reflect an aggregation of the Firm's risk to an immediate default, with zero recovery, of the counterparties, issuers, obligors or guarantors attributed to that country. Activities which result in contingent or indirect exposure to a country are not included in the country exposure measure (for example, providing clearing services or secondary exposure to collateral on securities financing receivables).

Assumptions are sometimes required in determining the measurement and allocation of country exposure, particularly in the case of certain non-linear or index products, or where the nature of the counterparty, issuer, obligor or guarantor is not suitable for attribution to an

individual country. The use of different measurement approaches or assumptions could affect the amount of reported country exposure.

Under the Firm's internal country risk measurement framework:

- Deposits with banks are measured as the cash balances placed with central banks, commercial banks, and other financial institutions
- Lending exposures are measured at the total committed amount (funded and unfunded), net of the allowance for credit losses and eligible cash and marketable securities collateral received
- Securities financing exposures are measured at their receivable balance, net of eligible collateral received
- Debt and equity securities are measured at the fair value of all positions, including both long and short positions
- Counterparty exposure on derivative receivables is measured at the derivative's fair value, net of the fair value of the eligible collateral received
- Credit derivatives exposure is measured at the net notional amount of protection purchased or sold for the same underlying reference entity, inclusive of the fair value of the derivative receivable or payable, reflecting the manner in which the Firm manages these exposures

The Firm's internal country risk reporting differs from the reporting provided under the FFIEC bank regulatory requirements.

Management's discussion and analysis

Stress testing

Stress testing is an important component of the Firm's country risk management framework, which aims to estimate and limit losses arising from a country crisis by measuring the impact of adverse asset price movements to a country based on market shocks combined with counterparty specific assumptions. Country Risk

Management periodically designs and runs tailored stress scenarios to test vulnerabilities to individual countries or sets of countries in response to specific or potential market events, sector performance concerns, sovereign actions and geopolitical risks. These tailored stress results are used to inform potential risk reduction across the Firm, as necessary.

Risk reporting

Country exposure and stress are measured and reported regularly, and used by Country Risk Management to identify trends and monitor high usages and breaches against limits.

For country risk management purposes, the Firm may report exposure to jurisdictions that are not fully autonomous, including Special Administrative Regions ("SAR") and dependent territories, separately from the independent sovereign states with which they are associated.

The following table presents the Firm's top 20 exposures by country (excluding the U.S.) as of December 31, 2022, and their comparative exposures as of December 31, 2021. The selection of countries represents the Firm's largest total exposures by individual country, based on the Firm's internal country risk management approach, and does not represent the Firm's view of any existing or potentially adverse credit conditions. Country exposures may fluctuate from period to period due to client activity and market flows.

The increase in exposure to Germany and the decrease in exposure to the U.K. were primarily due to changes in cash placements with the central banks of those countries driven by balance sheet and liquidity management activities.

The decrease in exposure to Australia was driven by reductions in cash placed with the central bank of Australia and government debt securities, due to client-driven market-making activities and lower client cash deposits resulting from higher interest rates.

As of December 31, 2022, exposure to Russia was approximately \$500 million. This amount excludes certain deposits placed on behalf of clients, largely at the Russian National Settlement Depository. In accordance with requirements of the Bank of Russia, these deposits were transferred to the Depository Insurance Agency of Russia on February 3, 2023.

Top 20 country exposures (excluding the U.S.)^(a)

	December 31, (in billions)		2022			2021 ^(f)	
	Deposits with banks ^(b)	Lending ^(c)	Trading and investing ^(d)	Other ^(e)	Total exposure	Total exposure	
Germany	\$ 79.5	\$ 11.3	\$ 1.9	\$ 0.5	\$ 93.2	\$ 61.7	
United Kingdom	30.8	23.0	14.5	1.8	70.1	96.4	
Japan	48.2	3.1	4.2	0.3	55.8	45.5	
Australia	15.9	6.2	3.6	—	25.7	39.1	
France	0.4	11.4	2.6	3.7	18.1	14.0	
Brazil	4.2	4.9	8.7	—	17.8	12.0	
Switzerland	8.8	3.3	1.6	1.6	15.3	20.9	
Canada	2.6	10.2	1.5	0.1	14.4	16.9	
China	2.5	5.7	5.5	—	13.7	18.6	
South Korea	1.4	3.5	4.9	0.2	10.0	8.7	
Singapore	1.2	4.6	3.7	0.4	9.9	12.3	
Belgium	6.3	1.7	1.2	—	9.2	6.8	
India	1.3	4.0	2.8	0.9	9.0	14.7	
Saudi Arabia	0.7	5.6	1.6	—	7.9	9.1	
Netherlands	0.2	7.2	(0.8)	0.5	7.1	6.8	
Spain	0.4	4.9	0.5	—	5.8	10.1	
Mexico	0.5	4.4	0.5	—	5.4	4.9	
Luxembourg	0.9	2.9	1.5	—	5.3	11.5	
Hong Kong SAR	2.8	0.9	0.7	0.1	4.5	5.9	
Sweden	1.1	3.1	0.2	—	4.4	4.4	

(a) Country exposures presented in the table reflect 87% and 88% of total Firmwide non-U.S. exposure, where exposure is attributed to an individual country, at December 31, 2022 and 2021, respectively.

(b) Predominantly represents cash placed with central banks.

(c) Includes loans and accrued interest receivable, lending-related commitments (net of eligible collateral and the allowance for credit losses). Excludes intra-day and operating exposures, such as those from settlement and clearing activities.

(d) Includes market-making inventory, investment securities, and counterparty exposure on derivative and securities financings net of eligible collateral and hedging. Includes exposure from single reference entity ("single-name"), index and other multiple reference entity transactions for which one or more of the underlying reference entities is in a country listed in the above table.

(e) Includes physical commodities inventory and clearing house guarantee funds.

(f) The country rankings presented in the table as of December 31, 2021, are based on the country rankings of the corresponding exposures at December 31, 2022, not actual rankings of such exposures at December 31, 2021.

CLIMATE RISK MANAGEMENT

Climate risk is the risk associated with the impacts of climate change on the Firm's clients, customers, operations and business strategy. Climate change is viewed as a driver of risk that may impact existing types of risks managed by the Firm. Climate risk is categorized into physical risk and transition risk.

Physical risk refers to economic costs and financial loss associated with a changing climate. Acute physical risk drivers include the increased frequency or severity of climate and weather events, such as floods, wildfires and tropical storms. Chronic physical risk drivers include more gradual shifts in the climate, such as rising sea levels, persistent changes in precipitation levels and increases in average ambient temperatures.

Transition risk refers to the financial and economic implications associated with a societal adjustment to a low-carbon economy. Transition risk drivers include possible changes in public policy, adoption of new technologies and shifts in consumer preferences. Transition risks may also be influenced by changes in the physical climate.

Organization and management

The Firm has a Climate Risk Management function that is responsible for establishing the Firmwide framework and strategy for managing climate risk. The Climate Risk Management function engages across the Firm to help integrate climate risk considerations into existing risk management frameworks, as appropriate.

Other responsibilities of Climate Risk Management include:

- Setting policies, standards, procedures and processes to support identification, escalation, monitoring and management of climate risk across the Firm
- Developing metrics, scenarios, and stress testing mechanisms designed to assess the range of potential climate-related financial and economic impacts to the Firm
- Establishing a Firmwide climate risk data strategy and the supporting climate risk technology infrastructure

The LOBs and Corporate are responsible for the identification, assessment and management of climate risks present in their business activities and for adherence to applicable climate-related laws, rules and regulations.

Governance and oversight

The Firm's approach to managing climate risk is consistent with the Firm's risk governance structure. The LOBs and Corporate are responsible for integrating climate risk management into existing governance frameworks, or creating new governance frameworks, as appropriate.

The LOBs, Corporate and Climate Risk Management are responsible for providing the Board Risk Committee with information on significant climate risks and climate-related initiatives, as appropriate.

OPERATIONAL RISK MANAGEMENT

Operational risk is the risk of an adverse outcome resulting from inadequate or failed internal processes or systems; human factors; or external events impacting the Firm's processes or systems. Operational Risk includes compliance, conduct, legal, and estimations and model risk. Operational risk is inherent in the Firm's activities and can manifest itself in various ways, including fraudulent acts, business disruptions (including those caused by extraordinary events beyond the Firm's control), cyber attacks, inappropriate employee behavior, failure to comply with applicable laws, rules and regulations or failure of vendors or other third party providers to perform in accordance with their agreements. Operational Risk Management attempts to manage operational risk at appropriate levels in light of the Firm's financial position, the characteristics of its businesses, and the markets and regulatory environments in which it operates.

Operational Risk Management Framework

The Firm's Compliance, Conduct, and Operational Risk ("CCOR") Management Framework is designed to enable the Firm to govern, identify, measure, monitor and test, manage and report on the Firm's operational risk.

Operational Risk Governance

The LOBs and Corporate are responsible for the management of operational risk. The Control Management Organization, which consists of control managers within each LOB and Corporate, is responsible for the day-to-day execution of the CCOR Framework.

The Firm's Global Chief Compliance Officer ("CCO") and FRE for Operational Risk and Qualitative Risk Appetite is responsible for defining the CCOR Management Framework and establishing the minimum standards for its execution. The LOB and Corporate aligned CCOR Lead Officers report to the Global CCO and FRE for Operational Risk and Qualitative Risk Appetite and are independent of the respective businesses or functions they oversee. The CCOR Management Framework is included in the Risk Governance and Oversight Policy that is reviewed and approved by the Board Risk Committee periodically.

Operational Risk Identification

The Firm utilizes a structured risk and control self-assessment process that is executed by the LOBs and Corporate. As part of this process, the LOBs and Corporate evaluate the effectiveness of their respective control environment to assess where controls have failed, and to determine where remediation efforts may be required. The Firm's Operational Risk and Compliance organization ("Operational Risk and Compliance") provides oversight of and challenge to these evaluations and may also perform independent assessments of significant operational risk events and areas of concentrated or emerging risk.

Operational Risk Measurement

Operational Risk and Compliance performs an independent assessment of the operational risks inherent within the LOBs and Corporate, which includes evaluating the effectiveness of the control environments and reporting the results to senior management.

In addition, Operational Risk and Compliance assesses operational risks through quantitative means, including operational risk-based capital and estimation of operational risk losses under both baseline and stressed conditions.

The primary component of the operational risk capital estimate is the Loss Distribution Approach ("LDA") statistical model, which simulates the frequency and severity of future operational risk loss projections based on historical data. The LDA model is used to estimate an aggregate operational risk loss over a one-year time horizon, at a 99.9% confidence level. The LDA model incorporates actual internal operational risk losses in the quarter following the period in which those losses were realized, and the calculation generally continues to reflect such losses even after the issues or business activities giving rise to the losses have been remediated or reduced.

As required under the Basel III capital framework, the Firm's operational risk-based capital methodology, which uses the Advanced Measurement Approach ("AMA"), incorporates internal and external losses as well as management's view of tail risk captured through operational risk scenario analysis, and evaluation of key business environment and internal control metrics. The Firm does not reflect the impact of insurance in its AMA estimate of operational risk capital.

The Firm considers the impact of stressed economic conditions on operational risk losses and develops a forward looking view of material operational risk events that may occur in a stressed environment. The Firm's operational risk stress testing framework is utilized in calculating results for the Firm's CCAR and other stress testing processes.

Refer to Capital Risk Management on pages 86-96 for information related to operational risk RWA, and CCAR.

Operational Risk Monitoring and testing

The results of risk assessments performed by Operational Risk and Compliance are used in connection with their independent monitoring and testing compliance of the LOBs and Corporate with laws, rules and regulations. Through monitoring and testing, Operational Risk and Compliance independently identify areas of heightened operational risk and tests the effectiveness of controls within the LOBs and Corporate.

Management of Operational Risk

The operational risk areas or issues identified through monitoring and testing are escalated to the LOBs and Corporate to be remediated through action plans, as needed, to mitigate operational risk. Operational Risk and Compliance may advise the LOBs and Corporate in the development and implementation of action plans.

Operational Risk Reporting

All employees of the Firm are expected to escalate risks appropriately. Risks identified by Operational Risk and Compliance are escalated to the appropriate LOB and Corporate Control Committees, as needed. Operational Risk and Compliance has established standards designed to ensure that consistent operational risk reporting and operational risk reports are produced on a Firmwide basis as well as by the LOBs and Corporate. Reporting includes the evaluation of key risk and performance indicators against established thresholds as well as the assessment of different types of operational risk against stated risk appetite. The standards reinforce escalation protocols to senior management and to the Board of Directors.

Subcategories and examples of operational risks

Operational risk can manifest itself in various ways. Operational risk subcategories include Compliance risk, Conduct risk, Legal risk, and Estimations and Model risk. Refer to pages 145, 146, 147 and 148, respectively for more information on Compliance, Conduct, Legal, and Estimations and Model risk. Details on other select examples of operational risks such as cybersecurity, business and technology resiliency, payment fraud and third-party outsourcing are provided below.

War in Ukraine and Sanctions

In response to the war in Ukraine, numerous financial and economic sanctions have been imposed on Russia and Russia-associated entities and individuals by various governments around the world, including the authorities in the U.S., U.K. and EU. These sanctions are complex and continue to evolve. The Firm continues to face increased operational risk associated with addressing these complex compliance-related matters. To manage this increased risk, the Firm has implemented controls reasonably designed to mitigate the risk of non-compliance and to prevent dealing with sanctioned persons or in property subject to sanctions, as well as to block or restrict payments as required by the applicable regulations.

Cybersecurity risk

Cybersecurity risk is the risk of the Firm's exposure to harm or loss resulting from misuse or abuse of technology by malicious actors. Cybersecurity risk is an important and continuously evolving focus for the Firm. Significant resources are devoted to protecting and enhancing the security of computer systems, software, networks, storage devices, and other technology assets. The Firm's security efforts are designed to protect against, among other things, cybersecurity attacks by unauthorized parties attempting to obtain access to confidential information, destroy data,

disrupt or degrade service, sabotage systems or cause other damage.

The Firm has experienced, and expects that it will continue to experience, a higher volume and complexity of cyber attacks against the backdrop of heightened geopolitical tensions. The Firm has implemented precautionary measures and controls reasonably designed to address this increased risk, such as enhanced threat monitoring. There can be no assurance that the measures taken by the Firm will be successful in defending against cyber attacks.

Ongoing business expansions may expose the Firm to potential new threats as well as expanded regulatory scrutiny including the introduction of new cybersecurity requirements. The Firm continues to make significant investments in enhancing its cyber defense capabilities and to strengthen its partnerships with the appropriate government and law enforcement agencies and other businesses in order to understand the full spectrum of cybersecurity risks in the operating environment, enhance defenses and improve resiliency against cybersecurity threats. The Firm actively participates in discussions and simulations of cybersecurity risks both internally and with law enforcement, government officials, peer and industry groups, and has significantly increased efforts to educate employees and certain clients on the topic of cybersecurity risks.

Third parties with which the Firm does business or that facilitate the Firm's business activities (e.g., vendors, supply chain, exchanges, clearing houses, central depositories, and financial intermediaries) are also sources of cybersecurity risk to the Firm. Third party cybersecurity incidents such as system breakdowns or failures, misconduct by the employees of such parties, or cyber attacks, including ransomware and supply-chain compromises, could affect their ability to deliver a product or service to the Firm or result in lost or compromised information of the Firm or its clients. Clients are also sources of cybersecurity risk to the Firm and its information assets, particularly when their activities and systems are beyond the Firm's own security and control systems. As a result, the Firm engages in regular and ongoing discussions with certain vendors and clients regarding cybersecurity risks and opportunities to improve security. However, where cybersecurity incidents occur as a result of client failures to maintain the security of their own systems and processes, clients are responsible for losses incurred.

To help safeguard the confidentiality, integrity and availability of the Firm's infrastructure, resources and information, the Firm maintains a Information Security Program designed to prevent, detect, and respond to cyberattacks. The Board of Directors is periodically provided with updates on the Firm's Information Security Program, recommended changes, cybersecurity policies and practices, ongoing efforts to improve security, as well as the Firm's efforts regarding significant cybersecurity events. In addition, the Firm has a cybersecurity incident response

Management's discussion and analysis

plan (“IRP”) designed to enable the Firm to respond to attempted cybersecurity incidents, coordinate such responses with law enforcement and other government agencies, and notify clients and customers, as applicable. Among other key focus areas, the IRP is designed to mitigate the risk of insider trading connected to a cybersecurity incident, and includes various escalation points.

The Global Cybersecurity and Technology Controls organization, working with each of the Firm’s LOBs and Corporate, is responsible for identifying technology and cybersecurity risks and is responsible for the controls to manage threats. The organization consists of business aligned information security personnel that are supported within the organization by the following products and services that execute the Information Security Program for the Firm:

- Cyber Operations
- Identity & Access Management
- Governance, Risk & Controls
- Global Technology Product Security

The Global Cybersecurity and Technology Controls governance structure is designed to identify, escalate, and mitigate information security risks. This structure uses key governance forums to disseminate information and monitor technology efforts. These forums are established at multiple levels throughout the Firm. The forums are used to escalate information security risks or other matters as appropriate.

The IRM function provides oversight of the activities designed to identify, assess, measure, and mitigate cybersecurity risk.

The Firm’s Security Awareness Program includes training that reinforces the Firm’s Information Technology Risk and Security Management policies, standards and practices, as well as the expectation that employees comply with these policies. The Security Awareness Program engages personnel through training on how to identify potential cybersecurity risks and protect the Firm’s resources and information. This training is mandatory for all employees globally on a periodic basis, and it is supplemented by Firmwide testing initiatives, including periodic phishing tests. The Firm provides specialized security training for certain employee roles such as application developers. Finally, the Firm’s Global Privacy Program requires all employees to take periodic awareness training on data privacy. This privacy-focused training includes information about confidentiality and security, as well as responding to unauthorized access to or use of information.

Business and technology resiliency risk

Disruptions can occur due to forces beyond the Firm’s control such as the spread of infectious diseases or pandemics, severe weather, power or telecommunications loss, failure of a third party to provide expected services, cyberattacks and terrorism. The Firmwide Business Resiliency Program is designed to enable the Firm to prepare for, adapt to, withstand and recover from business disruptions including occurrence of an extraordinary event beyond its control that may impact critical business functions and supporting assets (i.e., staff, technology, facilities and third parties). The program includes governance, awareness training, planning and testing of recovery strategies, as well as strategic and tactical initiatives to identify, assess, and manage business interruption and public safety risks.

Payment fraud risk

Payment fraud risk is the risk of external and internal parties unlawfully obtaining personal monetary benefit through misdirected or otherwise improper payment. The Firm employs various controls for managing payment fraud risk as well as providing employee and client education and awareness trainings.

Third-party outsourcing risk

The Firm’s Third-Party Oversight (“TPO”) and Inter-affiliates Oversight (“IAO”) frameworks assist the LOBs and Corporate in selecting, documenting, onboarding, monitoring and managing their supplier relationships including services provided by affiliates. The objectives of the TPO framework are to hold suppliers and other third parties to a high level of operational performance and to mitigate key risks, including data loss and business disruptions. The Corporate Third-Party Oversight group is responsible for Firmwide training, monitoring, reporting and standards.

Insurance

One of the ways in which operational risk may be mitigated is through insurance maintained by the Firm. The Firm purchases insurance from commercial insurers and maintains a wholly-owned captive insurer, Park Assurance Company. Insurance may also be required by third parties with whom the Firm does business.

COMPLIANCE RISK MANAGEMENT

Compliance risk, a subcategory of operational risk, is the risk of failing to comply with laws, rules, regulations or codes of conduct and standards of self-regulatory organizations.

Overview

Each of the LOBs and Corporate hold primary ownership of and accountability for managing their compliance risk. The Firm's Operational Risk and Compliance Organization ("Operational Risk and Compliance"), which is independent of the LOBs and Corporate, provides independent review, monitoring and oversight of business operations with a focus on compliance with the laws, rules, and regulations applicable to the delivery of the Firm's products and services to clients and customers.

These compliance risks relate to a wide variety of laws, rules and regulations varying across the LOBs and Corporate, and jurisdictions, and include risks related to financial products and services, relationships and interactions with clients and customers, and employee activities. For example, compliance risks include those associated with anti-money laundering compliance, trading activities, market conduct, and complying with the laws, rules, and regulations related to the offering of products and services across jurisdictional borders. Compliance risk is also inherent in the Firm's fiduciary activities, including the failure to exercise the applicable standard of care to act in the best interest of fiduciary clients and customers or to treat fiduciary clients and customers fairly.

Other functions provide oversight of significant regulatory obligations that are specific to their respective areas of responsibility.

Operational Risk and Compliance implements policies and standards designed to govern, identify, measure, monitor and test, manage, and report on compliance risk.

Governance and oversight

Operational Risk and Compliance is led by the Firm's Global CCO and FRE for Operational Risk and Qualitative Risk Appetite.

The Firm maintains oversight and coordination of its compliance risk through the implementation of the CCOR Management Framework. The Firm's Global CCO and FRE for Operational Risk and Qualitative Risk Appetite also provides regular updates to the Board Risk Committee and the Audit Committee on significant compliance risk issues, as appropriate.

Code of Conduct

The Firm has a Code of Conduct (the "Code") that sets forth the Firm's expectation that employees will conduct themselves with integrity at all times and provides the principles that govern employee conduct with clients, customers, shareholders and one another, as well as with the markets and communities in which the Firm does business. The Code requires employees to promptly report any potential or actual violation of the Code, any Firm policy, or any law or regulation applicable to the Firm's business. It also requires employees to report any illegal conduct, or conduct that violates the underlying principles of the Code, by any of the Firm's employees, clients, customers, suppliers, contract workers, business partners, or agents. Training is assigned to newly hired employees upon joining the Firm, and to current employees periodically on an ongoing basis. Employees are required to affirm their compliance with the Code annually.

Employees can report any potential or actual violations of the Code through the Firm's Conduct Hotline by phone or the internet. The Hotline is anonymous, except in certain non-U.S. jurisdictions where laws prohibit anonymous reporting, and is available at all times globally, with translation services. It is administered by an outside service provider. The Code prohibits retaliation against anyone who raises an issue or concern in good faith. Periodically, the Audit Committee receives reports on the Code of Conduct program.

CONDUCT RISK MANAGEMENT

Conduct risk, a subcategory of operational risk, is the risk that any action or misconduct by an employee could lead to unfair client or customer outcomes, impact the integrity of the markets in which the Firm operates, harm employees or the Firm, or compromise the Firm's reputation.

Overview

Each LOB and Corporate is accountable for identifying and managing its conduct risk to provide appropriate engagement, ownership and sustainability of a culture consistent with the Firm's How We Do Business Principles (the "Principles"). The Principles serve as a guide for how employees are expected to conduct themselves. With the Principles serving as a guide, the Firm's Code sets out the Firm's expectations for each employee and provides information and resources to help employees conduct business ethically and in compliance with applicable laws, rules and regulations everywhere the Firm operates. Refer to Compliance Risk Management on page 145 for further discussion of the Code.

Governance and oversight

The Conduct Risk Program is governed by the CCOR Management policy, which establishes the framework for governance, identification, measurement, monitoring and testing, management and reporting conduct risk in the Firm.

The Firm has a senior forum that provides oversight of the Firm's conduct initiatives to develop a more holistic view of conduct risks and to connect key programs across the Firm in order to identify opportunities and emerging areas of focus. This forum is responsible for setting overall program direction for strategic enhancements to the Firm's employee conduct framework and reviewing the consolidated Firmwide Conduct Risk Appetite Assessment.

Conduct risk management encompasses various aspects of people management practices throughout the employee life cycle, including recruiting, onboarding, training and development, performance management, promotion and compensation processes. Each LOB, Treasury and CIO, and each designated corporate function completes an assessment of conduct risk periodically, reviews metrics and issues which may involve conduct risk, and provides conduct education as appropriate.

LEGAL RISK MANAGEMENT

Legal risk, a subcategory of operational risk, is the risk of loss primarily caused by the actual or alleged failure to meet legal obligations that arise from the rule of law in jurisdictions in which the Firm operates, agreements with clients and customers, and products and services offered by the Firm.

Overview

The global Legal function (“Legal”) provides legal services and advice to the Firm. Legal is responsible for managing the Firm’s exposure to legal risk by:

- managing actual and potential litigation and enforcement matters, including internal reviews and investigations related to such matters
- advising on products and services, including contract negotiation and documentation
- advising on offering and marketing documents and new business initiatives
- managing dispute resolution
- interpreting existing laws, rules and regulations, and advising on changes to them
- advising on advocacy in connection with contemplated and proposed laws, rules and regulations, and
- providing legal advice to the LOBs, Corporate and the Board.

Legal selects, engages and manages outside counsel for the Firm on all matters in which outside counsel is engaged. In addition, Legal advises the Firm’s Conflicts Office which reviews the Firm’s wholesale transactions that may have the potential to create conflicts of interest for the Firm.

Governance and oversight

The Firm’s General Counsel reports to the CEO and is a member of the Operating Committee, the Firmwide Risk Committee and the Firmwide Control Committee. The Firm’s General Counsel and other members of Legal report on significant legal matters to the Firm’s Board of Directors and to the Audit Committee.

Legal serves on and advises various committees and advises the Firm’s LOBs and Corporate on potential reputation risk issues.

ESTIMATIONS AND MODEL RISK MANAGEMENT

Estimations and Model risk, a subcategory of operational risk, is the potential for adverse consequences from decisions based on incorrect or misused estimation outputs.

The Firm uses models and other analytical and judgment-based estimations across various businesses and functions. The estimation methods are of varying levels of sophistication and are used for many purposes, such as the valuation of positions and measurement of risk, assessing regulatory capital requirements, conducting stress testing, evaluating the allowance for credit losses and making business decisions. A dedicated independent function, Model Risk Governance and Review (“MRGR”), defines and governs the Firm’s policies relating to the management of model risk and risks associated with certain analytical and judgment-based estimations, such as those used in risk management, budget forecasting and capital planning and analysis.

The governance of analytical and judgment-based estimations within MRGR’s scope follows a consistent approach which is used for models, as described in detail below.

Model risks are owned by the users of the models within the Firm based on the specific purposes of such models. Users and developers of models are responsible for developing, implementing and testing their models, as well as referring models to MRGR for review and approval. Once models have been approved, model users and developers are responsible for maintaining a robust operating environment, and must monitor and evaluate the performance of the models on an ongoing basis. Model users and developers may seek to enhance models in response to changes in the portfolios and in product and market developments, as well as to capture improvements in available modeling techniques and systems capabilities.

Models are tiered based on an internal standard according to their complexity, the exposure associated with the model and the Firm’s reliance on the model. This tiering is subject to the approval of MRGR. In its review of a model, MRGR considers whether the model is suitable for the specific purposes for which it will be used. When reviewing a model, MRGR analyzes and challenges the model methodology and the reasonableness of model assumptions, and may perform or require additional testing, including back-testing of model outcomes. Model reviews are approved by the appropriate level of management within MRGR based on the relevant model tier.

Under the Firm’s Estimations and Model Risk Management Policy, MRGR reviews and approves new models, as well as material changes to existing models, prior to their use. In certain circumstances, exceptions may be granted to the Firm’s policy to allow a model to be used prior to review or approval. MRGR may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

While models are inherently imprecise, the degree of imprecision or uncertainty can be heightened by the market or economic environment. This is particularly true when the current and forecasted environments are significantly different from the historical environments upon which the models were developed, as the Firm experienced during the early stages of the COVID-19 pandemic. This increased uncertainty may necessitate a greater degree of judgment and analytics to inform any adjustments that the Firm may make to model outputs than would otherwise be the case.

Refer to Critical Accounting Estimates Used by the Firm on pages 149-152 and Note 2 for a summary of model-based valuations and other valuation techniques.

CRITICAL ACCOUNTING ESTIMATES USED BY THE FIRM

JPMorgan Chase's accounting policies and use of estimates are integral to understanding its reported results. The Firm's most complex accounting estimates require management's judgment to ascertain the appropriate carrying value of assets and liabilities. The Firm has established policies and control procedures intended to ensure that estimation methods, including any judgments made as part of such methods, are well-controlled, independently reviewed and applied consistently from period to period. The methods used and judgments made reflect, among other factors, the nature of the assets or liabilities and the related business and risk management strategies, which may vary across the Firm's businesses and portfolios. In addition, the policies and procedures are intended to ensure that the process for changing methodologies occurs in an appropriate manner. The Firm believes its estimates for determining the carrying value of its assets and liabilities are appropriate. The following is a brief description of the Firm's critical accounting estimates involving significant judgments.

Allowance for credit losses

The Firm's allowance for credit losses represents management's estimate of expected credit losses over the remaining expected life of the Firm's financial assets measured at amortized cost and certain off-balance sheet lending-related commitments. The allowance for credit losses comprises:

- The allowance for loan losses, which covers the Firm's retained loan portfolios (scored and risk-rated),
- The allowance for lending-related commitments, and
- The allowance for credit losses on investment securities.

The allowance for credit losses involves significant judgment on a number of matters including development and weighting of macroeconomic forecasts, incorporation of historical loss experience, assessment of risk characteristics, assignment of risk ratings, valuation of collateral, and the determination of remaining expected life. Refer to Note 10 and Note 13 for further information on these judgments as well as the Firm's policies and methodologies used to determine the Firm's allowance for credit losses.

One of the most significant judgments involved in estimating the Firm's allowance for credit losses relates to the macroeconomic forecasts used to estimate credit losses over the eight-quarter forecast period within the Firm's methodology. The eight-quarter forecast incorporates hundreds of macroeconomic variables ("MEVs") that are relevant for exposures across the Firm, with modeled credit losses being driven primarily by a subset of less than twenty variables. The specific variables that have the greatest effect on the modeled losses of each portfolio vary by portfolio and geography.

- Key MEVs for the consumer portfolio include regional U.S. unemployment rates, HPI and U.S. real GDP.

- Key MEVs for the wholesale portfolio include U.S. real GDP, U.S. unemployment, U.S. equity prices, U.S. interest rates, corporate credit spreads, oil prices, commercial real estate prices and HPI.

Changes in the Firm's assumptions and forecasts of economic conditions could significantly affect its estimate of expected credit losses in the portfolio at the balance sheet date or lead to significant changes in the estimate from one reporting period to the next.

It is difficult to estimate how potential changes in any one factor or input might affect the overall allowance for credit losses because management considers a wide variety of factors and inputs in estimating the allowance for credit losses. Changes in the factors and inputs considered may not occur at the same rate and may not be consistent across all geographies or product types, and changes in factors and inputs may be directionally inconsistent, such that improvement in one factor or input may offset deterioration in others.

To consider the impact of a hypothetical alternate macroeconomic forecast, the Firm compared the modeled credit losses determined using its central and relative adverse macroeconomic scenarios, which are two of the five scenarios considered in estimating the allowances for loan losses and lending-related commitments. The central and relative adverse scenarios each included a full suite of MEVs, but differed in the levels, paths and peaks/troughs of those variables over the eight-quarter forecast period.

For example, compared to the Firm's central scenario shown on page 127 and in Note 13, the Firm's relative adverse scenario assumes an elevated U.S. unemployment rate, averaging approximately 1.9% higher over the eight-quarter forecast, with a peak difference of approximately 2.8% in the fourth quarter of 2023; lower U.S. real GDP with a slower recovery, remaining nearly 3.1% lower at the end of the eight-quarter forecast, with a peak difference of approximately 3.9% in the fourth quarter of 2023; and lower national HPI with a peak difference of approximately 8.4% in the third quarter of 2024.

This analysis is not intended to estimate expected future changes in the allowance for credit losses, for a number of reasons, including:

- The allowance as of December 31, 2022, reflects credit losses beyond those estimated under the central scenario due to the weight placed on the adverse scenarios.
- The impacts of changes in many MEVs are both interrelated and nonlinear, so the results of this analysis cannot be simply extrapolated for more severe changes in macroeconomic variables.
- Expectations of future changes in portfolio composition and borrower behavior can significantly affect the allowance for credit losses.

To demonstrate the sensitivity of credit loss estimates to macroeconomic forecasts as of December 31, 2022, the

Management's discussion and analysis

Firm compared the modeled estimates under its relative adverse scenario to its central scenario. Without considering offsetting or correlated effects in other qualitative components of the Firm's allowance for credit losses, the comparison between these two scenarios for the exposures below reflect the following differences:

- An increase of approximately \$500 million for residential real estate loans and lending-related commitments
- An increase of approximately \$2.2 billion for credit card loans
- An increase of approximately \$3.9 billion for wholesale loans and lending-related commitments

This analysis relates only to the modeled credit loss estimates and is not intended to estimate changes in the overall allowance for credit losses as it does not reflect any potential changes in other adjustments to the quantitative calculation, which would also be influenced by the judgment management applies to the modeled lifetime loss estimates to reflect the uncertainty and imprecision of these modeled lifetime loss estimates based on then-current circumstances and conditions.

Recognizing that forecasts of macroeconomic conditions are inherently uncertain, particularly in light of the recent economic conditions, the Firm believes that its process to consider the available information and associated risks and uncertainties is appropriately governed and that its estimates of expected credit losses were reasonable and appropriate for the period ended December 31, 2022.

Fair value

JPMorgan Chase carries a portion of its assets and liabilities at fair value. The majority of such assets and liabilities are measured at fair value on a recurring basis, including derivatives, structured note products and certain securities financing agreements. Certain assets and liabilities are measured at fair value on a nonrecurring basis, including certain mortgage, home equity and other loans, where the carrying value is based on the fair value of the underlying collateral.

Assets measured at fair value

The following table includes the Firm's assets measured at fair value and the portion of such assets that are classified within level 3 of the fair value hierarchy. Refer to Note 2 for further information.

December 31, 2022 (in millions, except ratios)	Total assets at fair value	Total level 3 assets
Federal funds sold and securities purchased under resale agreements	\$ 311,883	\$ —
Securities borrowed	70,041	—
Trading assets:		
Trading-debt and equity instruments	382,876	2,909
Derivative receivables ^(a)	70,880	10,682
Total trading assets	453,756	13,591
AFS securities	205,857	239
Loans	42,079	1,418
MSRs	7,973	7,973
Other	14,014	405
Total assets measured at fair value on a recurring basis	1,105,603	23,626
Total assets measured at fair value on a nonrecurring basis	2,658	1,979
Total assets measured at fair value	\$ 1,108,261	\$ 25,605
Total Firm assets	\$ 3,665,743	
Level 3 assets at fair value as a percentage of total Firm assets ^(a)		0.7%
Level 3 assets at fair value as a percentage of total Firm assets at fair value ^(a)		2.3%

(a) For purposes of the table above, the derivative receivables total reflects the impact of netting adjustments; however, the \$10.7 billion of derivative receivables classified as level 3 does not reflect the netting adjustment as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.

Valuation

Details of the Firm's processes for determining fair value are set out in Note 2. Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed valuation models and other valuation techniques that use significant unobservable inputs and are therefore classified within level 3 of the fair value hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate valuation model or other valuation technique to use. Second, the lack of observability of certain significant inputs requires management to assess relevant empirical data in deriving valuation inputs including, for example, transaction details, yield curves, interest rates, prepayment speed, default rates, volatilities, correlations, prices (such as commodity, equity or debt prices), valuations of comparable instruments, foreign exchange rates and credit curves. Refer to Note 2 for a further discussion of the valuation of level 3 instruments, including unobservable inputs used.

For instruments classified in levels 2 and 3, management judgment must be applied to assess the appropriate level of valuation adjustments to reflect counterparty credit quality, the Firm's creditworthiness, market funding rates, liquidity considerations, unobservable parameters, and for portfolios that meet specified criteria, the size of the net open risk position. The judgments made are typically affected by the type of product and its specific contractual terms, and the level of liquidity for the product or within the market as a whole. In periods of heightened market volatility and uncertainty judgments are further affected by the wider variation of reasonable valuation estimates, particularly for positions that are less liquid. Refer to Note 2 for a further discussion of valuation adjustments applied by the Firm.

Imprecision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of methodologies or assumptions different than those used by the Firm could result in a different estimate of fair value at the reporting date. Refer to Note 2 for a detailed discussion of the Firm's valuation process and hierarchy, and its determination of fair value for individual financial instruments.

Goodwill impairment

Under U.S. GAAP, goodwill must be allocated to reporting units and tested for impairment at least annually. The Firm's process and methodology used to conduct goodwill impairment testing is described in Note 15.

Management applies significant judgment when testing goodwill for impairment. The goodwill associated with each business combination is allocated to the related reporting units for goodwill impairment testing.

For the year ended December 31, 2022, the Firm reviewed current economic conditions, estimated market cost of equity, as well as actual business results and projections of business performance. Based on such reviews, the Firm has concluded that goodwill was not impaired as of December 31, 2022. For each of the reporting units, fair value exceeded carrying value by at least 10% and there was no indication of a significant risk of goodwill impairment based on current projections and valuations.

The projections for the Firm's reporting units are consistent with management's current business outlook assumptions in the short term, and the Firm's best estimates of long-term growth and return on equity in the longer term. Where possible, the Firm uses third-party and peer data to benchmark its assumptions and estimates.

Refer to Note 15 for additional information on goodwill, including the goodwill impairment assessment as of December 31, 2022.

Credit card rewards liability

JPMorgan Chase offers credit cards with various rewards programs which allow cardholders to earn rewards points based on their account activity and the terms and conditions of the rewards program. Generally, there are no limits on the points that an eligible cardholder can earn, nor do the points expire, and the points can be redeemed for a variety of rewards, including cash (predominantly in the form of account credits), gift cards and travel. The Firm maintains a rewards liability which represents the estimated cost of rewards points earned and expected to be redeemed by cardholders. The liability is accrued as the cardholder earns the benefit and is reduced when the cardholder redeems points. This liability was \$11.3 billion and \$9.8 billion at December 31, 2022 and 2021, respectively, and is recorded in accounts payable and other liabilities on the Consolidated balance sheets. The increase in the liability was driven by continued growth in rewards points earned on increased cardholder spending and promotional offers outpacing redemptions throughout 2022.

The rewards liability is sensitive to redemption rate ("RR") and cost per point ("CPP") assumptions. The RR assumption is used to estimate the number of points earned by customers that will be redeemed over the life of the account. The CPP assumption is used to estimate the cost of future point redemptions. These assumptions are evaluated periodically considering historical actuals, cardholder redemption behavior and management judgment. Updates

Management's discussion and analysis

to these assumptions will impact the rewards liability. As of December 31, 2022, a combined increase of 25 basis points in RR and 1 basis point in CPP would increase the rewards liability by approximately \$315 million.

Income taxes

JPMorgan Chase is subject to the income tax laws of the various jurisdictions in which it operates, including U.S. federal, state and local, and non-U.S. jurisdictions. These laws are often complex and may be subject to different interpretations. To determine the financial statement impact of accounting for income taxes, including the provision for income tax expense and unrecognized tax benefits, JPMorgan Chase must make assumptions and judgments about how to interpret and apply these complex tax laws to numerous transactions and business events, as well as make judgments regarding the timing of when certain items may affect taxable income in the U.S. and non-U.S. tax jurisdictions.

JPMorgan Chase's interpretations of tax laws around the world are subject to review and examination by the various taxing authorities in the jurisdictions where the Firm operates, and disputes may occur regarding its view on a tax position. These disputes over interpretations with the various taxing authorities may be settled by audit, administrative appeals or adjudication in the court systems of the tax jurisdictions in which the Firm operates.

JPMorgan Chase regularly reviews whether it may be assessed additional income taxes as a result of the resolution of these matters, and the Firm records additional unrecognized tax benefits, as appropriate. In addition, the Firm may revise its estimate of income taxes due to changes in income tax laws, legal interpretations, and business strategies. It is possible that revisions in the Firm's estimate of income taxes may materially affect the Firm's results of operations in any reporting period.

Deferred taxes arise from differences between assets and liabilities measured for financial reporting versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. Deferred taxes are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred taxes of a change in tax rates is recognized within the provision for income taxes in the period enacted.

The Firm has also recognized deferred tax assets in connection with certain tax attributes, including net operating loss ("NOL") carryforwards and foreign tax credit ("FTC") carryforwards. The Firm performs regular reviews to ascertain whether its deferred tax assets are realizable. These reviews include management's estimates and assumptions regarding future taxable income, including foreign source income, and may incorporate various tax planning strategies, including strategies that may be available to utilize NOLs and FTCs before they expire. In connection with these reviews, if it is determined that a deferred tax asset is not realizable, a valuation allowance is

established. The valuation allowance may be reversed in a subsequent reporting period if the Firm determines that, based on revised estimates of future taxable income or changes in tax planning strategies, it is more likely than not that all or part of the deferred tax asset will become realizable. As of December 31, 2022, management has determined it is more likely than not that the Firm will realize its deferred tax assets, net of the existing valuation allowance.

The Firm adjusts its unrecognized tax benefits as necessary when new information becomes available, including changes in tax law and regulations, and interactions with taxing authorities. Uncertain tax positions that meet the more-likely-than-not recognition threshold are measured to determine the amount of benefit to recognize. An uncertain tax position is measured at the largest amount of benefit that management believes is more likely than not to be realized upon settlement. It is possible that the reassessment of JPMorgan Chase's unrecognized tax benefits may have a material impact on its effective income tax rate in the period in which the reassessment occurs. Although the Firm believes that its estimates are reasonable, the final tax amount could be different from the amounts reflected in the Firm's income tax provisions and accruals. To the extent that the final outcome of these amounts is different than the amounts recorded, such differences will generally impact the Firm's provision for income taxes in the period in which such a determination is made.

The Firm's provision for income taxes is composed of current and deferred taxes. The current and deferred tax provisions are calculated based on estimates and assumptions that could differ from the actual results reflected in income tax returns filed during the subsequent year. Adjustments based on filed returns are generally recorded in the period when the tax returns are filed and the global tax implications are known, which could impact the Firm's effective tax rate.

Refer to Note 25 for additional information on income taxes.

Litigation reserves

Refer to Note 30 for a description of the significant estimates and judgments associated with establishing litigation reserves.

ACCOUNTING AND REPORTING DEVELOPMENTS

Financial Accounting Standards Board (“FASB”) Standards Adopted since January 1, 2021

Standard	Summary of guidance	Effects on financial statements
Reference Rate Reform <i>Issued March 2020 and updated January 2021 and December 2022</i>	<ul style="list-style-type: none"> Provides optional expedients and exceptions to current accounting guidance when financial instruments, hedge accounting relationships, and other transactions are amended due to reference rate reform. Provides an election to account for certain contract amendments related to reference rate reform as modifications rather than extinguishments without the requirement to assess the significance of the amendments. Allows for changes in critical terms of a hedge accounting relationship without automatic termination of that relationship. Provides various practical expedients and elections designed to allow hedge accounting to continue uninterrupted during the transition period. Provides a one-time election to transfer securities out of the held-to-maturity classification if certain criteria are met. The January 2021 update provides an election to account for derivatives modified to change the rate used for discounting, margining, or contract price alignment (collectively “discounting transition”) as modifications. The December 2022 update extends the termination date of the optional expedients and exceptions to current accounting guidance to December 31, 2024. 	<ul style="list-style-type: none"> Issued and effective March 12, 2020. The January 7, 2021 and December 21, 2022 updates were effective when issued. The Firm elected to apply certain of the practical expedients related to contract modifications and hedge accounting relationships, and discounting transition beginning in the third quarter of 2020. The discounting transition election was applied retrospectively. The main purpose of the practical expedients is to ease the administrative burden of accounting for contracts impacted by reference rate reform. These elections did not have a material impact on the Consolidated Financial Statements.

FASB Standards Issued but Not Adopted as of December 31, 2022

Standard	Summary of guidance	Effects on financial statements
Derivatives and Hedging: Fair Value Hedging – Portfolio Layer Method <i>Issued March 2022</i>	<ul style="list-style-type: none"> Expands the current ability to hedge a portfolio of prepayable assets to allow more of the portfolio to be hedged. Non-prepayable assets can also be included in the same portfolio, thus increasing the size of the portfolio and the amount available to be hedged. Clarifies the types of derivatives that can be used as hedges, and the balance sheet presentation and disclosure requirements for the hedge accounting adjustments. Allows a one-time reclassification from HTM to AFS upon adoption. 	<ul style="list-style-type: none"> Adopted prospectively on January 1, 2023 and, as permitted by the guidance, in January 2023 the Firm transferred and designated approximately \$7.0 billion of HTM securities into a closed AFS securities portfolio hedged under the portfolio layer method.
Financial Instruments – Credit Losses: Troubled Debt Restructurings and Vintage Disclosures <i>Issued March 2022</i>	<ul style="list-style-type: none"> Eliminates existing accounting and disclosure requirements for Troubled Debt Restructurings, including the requirement to measure the allowance using a discounted cash flow methodology. Requires disclosure of loan modifications for borrowers experiencing financial difficulty involving principal forgiveness, interest rate reduction, other-than-insignificant payment delay, term extension or a combination of these modifications. Requires disclosure of current period loan charge-off information by origination year. May be adopted prospectively, or by using a modified retrospective method wherein the effect of adoption is reflected as an adjustment to retained earnings at the effective date. 	<ul style="list-style-type: none"> Adopted January 1, 2023. This guidance was adopted using a modified retrospective method which resulted in a net decrease to the allowance for credit losses of approximately \$600 million and an increase to retained earnings of approximately \$450 million after-tax, predominantly driven by residential real estate and credit card. Refer to Note 1 for further information.

FORWARD-LOOKING STATEMENTS

From time to time, the Firm has made and will make forward-looking statements. These statements can be identified by the fact that they do not relate strictly to historical or current facts. Forward-looking statements often use words such as "anticipate," "target," "expect," "estimate," "intend," "plan," "goal," "believe," or other words of similar meaning. Forward-looking statements provide JPMorgan Chase's current expectations or forecasts of future events, circumstances, results or aspirations. JPMorgan Chase's disclosures in this 2022 Form 10-K contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. The Firm also may make forward-looking statements in its other documents filed or furnished with the SEC. In addition, the Firm's senior management may make forward-looking statements orally to investors, analysts, representatives of the media and others.

All forward-looking statements are, by their nature, subject to risks and uncertainties, many of which are beyond the Firm's control. JPMorgan Chase's actual future results may differ materially from those set forth in its forward-looking statements. While there is no assurance that any list of risks and uncertainties or risk factors is complete, below are certain factors which could cause actual results to differ from those in the forward-looking statements:

- Local, regional and global business, economic and political conditions and geopolitical events, including the war in Ukraine;
- Changes in laws, rules, and regulatory requirements, including capital and liquidity requirements affecting the Firm's businesses, and the ability of the Firm to address those requirements;
- Heightened regulatory and governmental oversight and scrutiny of JPMorgan Chase's business practices, including dealings with retail customers;
- Changes in trade, monetary and fiscal policies and laws;
- Changes in the level of inflation;
- Changes in income tax laws, rules, and regulations;
- Securities and capital markets behavior, including changes in market liquidity and volatility;
- Changes in investor sentiment or consumer spending or savings behavior;
- Ability of the Firm to manage effectively its capital and liquidity;
- Changes in credit ratings assigned to the Firm or its subsidiaries;
- Damage to the Firm's reputation;
- Ability of the Firm to appropriately address social, environmental and sustainability concerns that may arise, including from its business activities;
- Ability of the Firm to deal effectively with an economic slowdown or other economic or market disruption, including, but not limited to, in the interest rate environment;

- Technology changes instituted by the Firm, its counterparties or competitors;
- The effectiveness of the Firm's control agenda;
- Ability of the Firm to develop or discontinue products and services, and the extent to which products or services previously sold by the Firm require the Firm to incur liabilities or absorb losses not contemplated at their initiation or origination;
- Acceptance of the Firm's new and existing products and services by the marketplace and the ability of the Firm to innovate and to increase market share;
- Ability of the Firm to attract and retain qualified and diverse employees;
- Ability of the Firm to control expenses;
- Competitive pressures;
- Changes in the credit quality of the Firm's clients, customers and counterparties;
- Adequacy of the Firm's risk management framework, disclosure controls and procedures and internal control over financial reporting;
- Adverse judicial or regulatory proceedings;
- Changes in applicable accounting policies, including the introduction of new accounting standards;
- Ability of the Firm to determine accurate values of certain assets and liabilities;
- Occurrence of natural or man-made disasters or calamities, including health emergencies, the spread of infectious diseases, epidemics or pandemics, an outbreak or escalation of hostilities or other geopolitical instabilities, the effects of climate change or extraordinary events beyond the Firm's control, and the Firm's ability to deal effectively with disruptions caused by the foregoing;
- Ability of the Firm to maintain the security of its financial, accounting, technology, data processing and other operational systems and facilities;
- Ability of the Firm to withstand disruptions that may be caused by any failure of its operational systems or those of third parties;
- Ability of the Firm to effectively defend itself against cyber attacks and other attempts by unauthorized parties to access information of the Firm or its customers or to disrupt the Firm's systems; and
- The other risks and uncertainties detailed in Part I, Item 1A: Risk Factors in JPMorgan Chase's 2022 Form 10-K.

Any forward-looking statements made by or on behalf of the Firm speak only as of the date they are made, and JPMorgan Chase does not undertake to update any forward-looking statements. The reader should, however, consult any further disclosures of a forward-looking nature the Firm may make in any subsequent Form 10-Ks, Quarterly Reports on Form 10-Qs, or Current Reports on Form 8-K.

Management's report on internal control over financial reporting

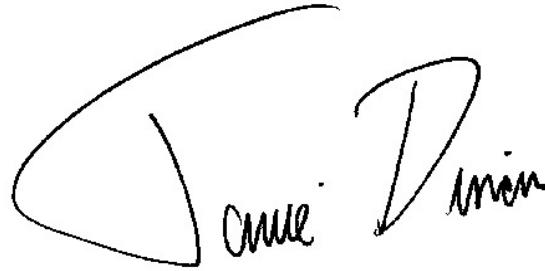
Management of JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm") is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the Firm's principal executive and principal financial officers, or persons performing similar functions, and effected by JPMorgan Chase's Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP").

JPMorgan Chase's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records, that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the Firm's assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. GAAP, and that receipts and expenditures of the Firm are being made only in accordance with authorizations of JPMorgan Chase's management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Firm's assets that could have a material effect on the financial statements.

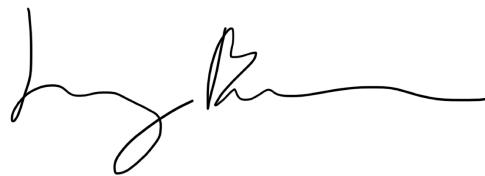
Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Management has completed an assessment of the effectiveness of the Firm's internal control over financial reporting as of December 31, 2022. In making the assessment, management used the "Internal Control – Integrated Framework" ("COSO 2013") promulgated by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

Based upon the assessment performed, management concluded that as of December 31, 2022, JPMorgan Chase's internal control over financial reporting was effective based upon the COSO 2013 framework. Additionally, based upon management's assessment, the Firm determined that there were no material weaknesses in its internal control over financial reporting as of December 31, 2022.

The effectiveness of the Firm's internal control over financial reporting as of December 31, 2022, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears herein.



James Dimon
Chairman and Chief Executive Officer



Jeremy Barnum
Executive Vice President and Chief Financial Officer

February 21, 2023



To the Board of Directors and Shareholders of JPMorgan Chase & Co.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of JPMorgan Chase & Co. and its subsidiaries (the “Firm”) as of December 31, 2022 and 2021, and the related consolidated statements of income, comprehensive income, changes in stockholders’ equity and cash flows for each of the three years in the period ended December 31, 2022, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Firm’s internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Firm as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Firm maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Firm changed the manner in which it accounts for credit losses on certain financial instruments in 2020.

Basis for Opinions

The Firm’s management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s report on internal control over financial reporting. Our responsibility is to express opinions on the Firm’s consolidated financial statements and on the Firm’s internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Firm in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Report of Independent Registered Public Accounting Firm

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Allowance for Loan Losses - Portfolio-based component of Wholesale Loan and Credit Card Loan Portfolios

As described in Note 13 to the consolidated financial statements, the allowance for loan losses for the portfolio-based component of the wholesale and credit card loan portfolios was \$17.0 billion on total portfolio-based retained loans of \$785.9 billion at December 31, 2022. The Firm's allowance for loan losses represents management's estimate of expected credit losses over the remaining expected life of the Firm's loan portfolios and considers expected future changes in macroeconomic conditions. The portfolio-based component of the Firm's allowance for loan losses for the wholesale and credit card retained loan portfolios begins with a quantitative calculation of expected credit losses over the expected life of the loan by applying credit loss factors to the estimated exposure at default. The credit loss factors applied are determined based on the weighted average of five internally developed macroeconomic scenarios that take into consideration the Firm's economic outlook as derived through forecast macroeconomic variables, the most significant of which are U.S. unemployment and U.S. real gross domestic product. This quantitative calculation is further adjusted to take into consideration model imprecision, emerging risk assessments, trends and other subjective factors that are not yet otherwise reflected in the credit loss estimate.

The principal considerations for our determination that performing procedures relating to the allowance for loan losses for the portfolio-based component of the wholesale and credit card loan portfolios is a critical audit matter are (i) the significant judgment and estimation by management in the forecast of macroeconomic variables, specifically U.S. unemployment and U.S. real gross domestic product, as the Firm's forecasts of economic conditions significantly affect its estimate of expected credit losses at the balance sheet date, (ii) the significant judgment and estimation by management in determining the quantitative calculation utilized in their credit loss estimates and the adjustments to take into consideration model imprecision, emerging risk assessments, trends and other subjective factors that are not yet otherwise reflected in the credit loss estimate, which both in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and in

evaluating audit evidence obtained relating to the credit loss estimates and the appropriateness of the adjustments to the credit loss estimates, and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the Firm's allowance for loan losses, including controls over model validation and generation of macroeconomic scenarios. These procedures also included, among others, testing management's process for estimating the allowance for loan losses, which involved (i) evaluating the appropriateness of the models and methodologies used in quantitative calculations; (ii) evaluating the reasonableness of forecasts of U.S. unemployment and U.S. real gross domestic product; (iii) testing the completeness and accuracy of data used in the estimate; and (iv) evaluating the reasonableness of management's adjustments to the quantitative output for the impacts of model imprecision, emerging risk assessments, trends and other subjective factors that are not yet otherwise reflected in the credit loss estimate. These procedures also included the use of professionals with specialized skill and knowledge to assist in evaluating the appropriateness of certain models, methodologies and macroeconomic variables.

Fair Value of Certain Level 3 Financial Instruments

As described in Notes 2 and 3 to the consolidated financial statements, the Firm carries \$1.1 trillion of its assets and \$453.7 billion of its liabilities at fair value on a recurring basis. Included in these balances are \$13.6 billion of trading assets and \$37.8 billion of liabilities measured at fair value on a recurring basis, collectively financial instruments, which are classified as level 3 as they contain one or more inputs to valuation which are unobservable and significant to their fair value measurement. The Firm utilized internally developed valuation models and unobservable inputs to estimate fair value of the level 3 financial instruments. The unobservable inputs used by management to estimate the fair value of certain of these financial instruments include volatility relating to interest rates, correlation relating to interest rates, equity prices, credit and foreign exchange rates, and Bermudan switch values.

The principal considerations for our determination that performing procedures relating to the fair value of certain level 3 financial instruments is a critical audit matter are (i) the significant judgment and estimation by management in determining the inputs to estimate fair value, which in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and in evaluating audit evidence obtained related to the fair value of these financial instruments, and (ii) the audit effort involved the use of professionals with specialized skill and knowledge.

Report of Independent Registered Public Accounting Firm

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the Firm's determination of the fair value, including controls over models, inputs, and data. These procedures also included, among others, the involvement of professionals with specialized skill and knowledge to assist in developing an independent estimate of fair value for a sample of these financial instruments and comparing management's estimate to the independently developed estimate of fair value. Developing the independent estimate involved testing the completeness and accuracy of data provided by management, developing independent inputs and, as appropriate, evaluating and utilizing management's aforementioned unobservable inputs.

PricewaterhouseCoopers LLP

February 21, 2023

We have served as the Firm's auditor since 1965.

JPMorgan Chase & Co.
Consolidated statements of income

Year ended December 31, (in millions, except per share data)	2022	2021	2020
Revenue			
Investment banking fees	\$ 6,686	\$ 13,216	\$ 9,486
Principal transactions	19,912	16,304	18,021
Lending- and deposit-related fees	7,098	7,032	6,511
Asset management, administration and commissions	20,677	21,029	18,177
Investment securities gains/(losses)	(2,380)	(345)	802
Mortgage fees and related income	1,250	2,170	3,091
Card income	4,420	5,102	4,435
Other income	4,322	4,830	4,865
Noninterest revenue	61,985	69,338	65,388
Interest income	92,807	57,864	64,523
Interest expense	26,097	5,553	9,960
Net interest income	66,710	52,311	54,563
Total net revenue	128,695	121,649	119,951
Provision for credit losses	6,389	(9,256)	17,480
Noninterest expense			
Compensation expense	41,636	38,567	34,988
Occupancy expense	4,696	4,516	4,449
Technology, communications and equipment expense	9,358	9,941	10,338
Professional and outside services	10,174	9,814	8,464
Marketing	3,911	3,036	2,476
Other expense	6,365	5,469	5,941
Total noninterest expense	76,140	71,343	66,656
Income before income tax expense	46,166	59,562	35,815
Income tax expense	8,490	11,228	6,684
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Net income applicable to common stockholders	\$ 35,892	\$ 46,503	\$ 27,410
Net income per common share data			
Basic earnings per share	\$ 12.10	\$ 15.39	\$ 8.89
Diluted earnings per share	12.09	15.36	8.88
Weighted-average basic shares	2,965.8	3,021.5	3,082.4
Weighted-average diluted shares	2,970.0	3,026.6	3,087.4

The Notes to Consolidated Financial Statements are an integral part of these statements.

JPMorgan Chase & Co.
Consolidated statements of comprehensive income

Year ended December 31, (in millions)	2022	2021	2020
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Other comprehensive income/(loss), after-tax			
Unrealized gains/(losses) on investment securities	(11,764)	(5,540)	4,123
Translation adjustments, net of hedges	(611)	(461)	234
Fair value hedges	98	(19)	19
Cash flow hedges	(5,360)	(2,679)	2,320
Defined benefit pension and OPEB plans	(1,241)	922	212
DVA on fair value option elected liabilities	1,621	(293)	(491)
Total other comprehensive income/(loss), after-tax	(17,257)	(8,070)	6,417
Comprehensive income	\$ 20,419	\$ 40,264	\$ 35,548

The Notes to Consolidated Financial Statements are an integral part of these statements.

JPMorgan Chase & Co.
Consolidated balance sheets

December 31, (in millions, except share data)	2022	2021
Assets		
Cash and due from banks	\$ 27,697	\$ 26,438
Deposits with banks	539,537	714,396
Federal funds sold and securities purchased under resale agreements (included \$311,883 and \$252,720 at fair value)	315,592	261,698
Securities borrowed (included \$70,041 and \$81,463 at fair value)	185,369	206,071
Trading assets (included assets pledged of \$93,687 and \$102,710)	453,799	433,575
Available-for-sale securities (amortized cost of \$216,188 and \$308,254; included assets pledged of \$9,158 and \$18,268)	205,857	308,525
Held-to-maturity securities	425,305	363,707
Investment securities, net of allowance for credit losses	631,162	672,232
Loans (included \$42,079 and \$58,820 at fair value)	1,135,647	1,077,714
Allowance for loan losses	(19,726)	(16,386)
Loans, net of allowance for loan losses	1,115,921	1,061,328
Accrued interest and accounts receivable	125,189	102,570
Premises and equipment	27,734	27,070
Goodwill, MSRs and other intangible assets	60,859	56,691
Other assets (included \$14,921 and \$14,753 at fair value and assets pledged of \$7,998 and \$5,298)	182,884	181,498
Total assets^(a)	\$ 3,665,743	\$ 3,743,567
Liabilities		
Deposits (included \$28,620 and \$11,333 at fair value)	\$ 2,340,179	\$ 2,462,303
Federal funds purchased and securities loaned or sold under repurchase agreements (included \$151,999 and \$126,435 at fair value)	202,613	194,340
Short-term borrowings (included \$15,792 and \$20,015 at fair value)	44,027	53,594
Trading liabilities	177,976	164,693
Accounts payable and other liabilities (included \$7,038 and \$5,651 at fair value)	300,141	262,755
Beneficial interests issued by consolidated VIEs (included \$5 and \$12 at fair value)	12,610	10,750
Long-term debt (included \$72,281 and \$74,934 at fair value)	295,865	301,005
Total liabilities^(a)	3,373,411	3,449,440
Commitments and contingencies (refer to Notes 28, 29 and 30)		
Stockholders' equity		
Preferred stock (\$1 par value; authorized 200,000,000 shares: issued 2,740,375 and 3,483,750 shares)	27,404	34,838
Common stock (\$1 par value; authorized 9,000,000,000 shares; issued 4,104,933,895 shares)	4,105	4,105
Additional paid-in capital	89,044	88,415
Retained earnings	296,456	272,268
Accumulated other comprehensive losses	(17,341)	(84)
Treasury stock, at cost (1,170,676,094 and 1,160,784,750 shares)	(107,336)	(105,415)
Total stockholders' equity	292,332	294,127
Total liabilities and stockholders' equity	\$ 3,665,743	\$ 3,743,567

(a) The following table presents information on assets and liabilities related to VIEs that are consolidated by the Firm at December 31, 2022 and 2021. The assets of the consolidated VIEs are used to settle the liabilities of those entities. The holders of the beneficial interests do not have recourse to the general credit of JPMorgan Chase. The assets and liabilities in the table below include third-party assets and liabilities of consolidated VIEs and exclude intercompany balances that eliminate in consolidation. Refer to Note 14 for a further discussion.

December 31, (in millions)	2022	2021
Assets		
Trading assets	\$ 2,151	\$ 2,010
Loans	34,411	33,024
All other assets	550	490
Total assets	\$ 37,112	\$ 35,524
Liabilities		
Beneficial interests issued by consolidated VIEs	\$ 12,610	\$ 10,750
All other liabilities	279	245
Total liabilities	\$ 12,889	\$ 10,995

The Notes to Consolidated Financial Statements are an integral part of these statements.

JPMorgan Chase & Co.
Consolidated statements of changes in stockholders' equity

Year ended December 31, (in millions, except per share data)	2022	2021	2020
Preferred stock			
Balance at January 1	\$ 34,838	\$ 30,063	\$ 26,993
Issuance	—	7,350	4,500
Redemption	(7,434)	(2,575)	(1,430)
Balance at December 31	27,404	34,838	30,063
Common stock			
Balance at January 1 and December 31	4,105	4,105	4,105
Additional paid-in capital			
Balance at January 1	88,415	88,394	88,522
Shares issued and commitments to issue common stock for employee share-based compensation awards, and related tax effects	629	152	(72)
Other	—	(131)	(56)
Balance at December 31	89,044	88,415	88,394
Retained earnings			
Balance at January 1	272,268	236,990	223,211
Cumulative effect of change in accounting principles	—	—	(2,650)
Net income	37,676	48,334	29,131
Dividends declared:			
Preferred stock	(1,595)	(1,600)	(1,583)
Common stock (\$4.00, \$3.80 and \$3.60 per share for 2022, 2021 and 2020, respectively)	(11,893)	(11,456)	(11,119)
Balance at December 31	296,456	272,268	236,990
Accumulated other comprehensive income/(loss)			
Balance at January 1	(84)	7,986	1,569
Other comprehensive income/(loss), after-tax	(17,257)	(8,070)	6,417
Balance at December 31	(17,341)	(84)	7,986
Shares held in restricted stock units ("RSU") Trust, at cost			
Balance at January 1	—	—	(21)
Liquidation of RSU Trust	—	—	21
Balance at December 31	—	—	—
Treasury stock, at cost			
Balance at January 1	(105,415)	(88,184)	(83,049)
Repurchase	(3,122)	(18,448)	(6,397)
Reissuance	1,201	1,217	1,262
Balance at December 31	(107,336)	(105,415)	(88,184)
Total stockholders' equity	\$ 292,332	\$ 294,127	\$ 279,354

Effective January 1, 2020, the Firm adopted the CECL accounting guidance. Refer to Note 1 for further information.

The Notes to Consolidated Financial Statements are an integral part of these statements.

JPMorgan Chase & Co.
Consolidated statements of cash flows

Year ended December 31, (in millions)	2022	2021	2020
Operating activities			
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Adjustments to reconcile net income to net cash provided by/(used in) operating activities:			
Provision for credit losses	6,389	(9,256)	17,480
Depreciation and amortization	7,051	7,932	8,614
Deferred tax (benefit)/expense	(2,738)	3,748	(3,573)
Other	5,174	3,274	1,649
Originations and purchases of loans held-for-sale	(149,167)	(347,864)	(166,504)
Proceeds from sales, securitizations and paydowns of loans held-for-sale	167,709	336,413	175,490
Net change in:			
Trading assets	(31,449)	85,710	(148,749)
Securities borrowed	20,203	(45,635)	(20,734)
Accrued interest and accounts receivable	(22,970)	(12,401)	(18,012)
Other assets	(2,882)	(11,745)	(42,430)
Trading liabilities	11,170	(23,190)	77,198
Accounts payable and other liabilities	58,614	43,162	7,415
Other operating adjustments	2,339	(398)	3,115
Net cash provided by/(used in) operating activities	107,119	78,084	(79,910)
Investing activities			
Net change in:			
Federal funds sold and securities purchased under resale agreements	(54,278)	34,473	(47,115)
Held-to-maturity securities:			
Proceeds from paydowns and maturities	48,626	50,897	21,360
Purchases	(33,676)	(111,756)	(12,400)
Available-for-sale securities:			
Proceeds from paydowns and maturities	39,159	50,075	57,675
Proceeds from sales	84,616	162,748	149,758
Purchases	(126,258)	(248,785)	(397,145)
Proceeds from sales and securitizations of loans held-for-investment	44,892	35,845	23,559
Other changes in loans, net	(128,968)	(91,797)	(50,263)
All other investing activities, net	(11,932)	(11,044)	(7,341)
Net cash (used in) investing activities	(137,819)	(129,344)	(261,912)
Financing activities			
Net change in:			
Deposits	(136,895)	293,764	602,765
Federal funds purchased and securities loaned or sold under repurchase agreements	8,455	(20,799)	31,528
Short-term borrowings	(8,984)	7,773	4,438
Beneficial interests issued by consolidated VIEs	2,205	(4,254)	1,347
Proceeds from long-term borrowings	78,442	82,409	78,686
Payments of long-term borrowings	(45,556)	(54,932)	(105,055)
Proceeds from issuance of preferred stock	–	7,350	4,500
Redemption of preferred stock	(7,434)	(2,575)	(1,430)
Treasury stock repurchased	(3,162)	(18,408)	(6,517)
Dividends paid	(13,562)	(12,858)	(12,690)
All other financing activities, net	234	(1,477)	(927)
Net cash provided by/(used in) financing activities	(126,257)	275,993	596,645
Effect of exchange rate changes on cash and due from banks and deposits with banks	(16,643)	(11,508)	9,155
Net increase/(decrease) in cash and due from banks and deposits with banks	(173,600)	213,225	263,978
Cash and due from banks and deposits with banks at the beginning of the period	740,834	527,609	263,631
Cash and due from banks and deposits with banks at the end of the period	\$ 567,234	\$ 740,834	\$ 527,609
Cash interest paid	\$ 23,143	\$ 5,142	\$ 13,077
Cash income taxes paid, net	4,355	18,737	8,140

The Notes to Consolidated Financial Statements are an integral part of these statements.

Note 1 – Basis of presentation

JPMorgan Chase & Co. (“JPMorgan Chase” or the “Firm”), a financial holding company incorporated under Delaware law in 1968, is a leading financial services firm based in the U.S., with operations worldwide. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Refer to Note 32 for a further discussion of the Firm’s business segments.

The accounting and financial reporting policies of JPMorgan Chase and its subsidiaries conform to U.S. GAAP.

Additionally, where applicable, the policies conform to the accounting and reporting guidelines prescribed by regulatory authorities.

Certain amounts reported in prior periods have been revised to conform with the current presentation.

Consolidation

The Consolidated Financial Statements include the accounts of JPMorgan Chase and other entities in which the Firm has a controlling financial interest. All material intercompany balances and transactions have been eliminated.

Assets held for clients in an agency or fiduciary capacity by the Firm are not assets of JPMorgan Chase and are not included on the Consolidated balance sheets.

The Firm determines whether it has a controlling financial interest in an entity by first evaluating whether the entity is a voting interest entity or a variable interest entity.

Voting interest entities

Voting interest entities are entities that have sufficient equity and provide the equity investors voting rights that enable them to make significant decisions relating to the entity’s operations. For these types of entities, the Firm’s determination of whether it has a controlling interest is primarily based on the amount of voting equity interests held. Entities in which the Firm has a controlling financial interest, through ownership of the majority of the entities’ voting equity interests, or through other contractual rights that give the Firm control, are consolidated by the Firm.

Investments in companies in which the Firm has significant influence over operating and financing decisions (but does not own a majority of the voting equity interests) are accounted for (i) in accordance with the equity method of accounting, or (ii) at fair value if the fair value option was elected. These investments are generally included in other assets, with income or loss included in noninterest revenue.

Certain Firm-sponsored asset management funds are structured as limited partnerships or limited liability companies. For many of these entities, the Firm is the general partner or managing member, but the non-affiliated partners or members have the ability to remove the Firm as the general partner or managing member without cause (i.e., kick-out rights), based on a simple majority vote, or the non-affiliated partners or members

have rights to participate in important decisions.

Accordingly, the Firm does not consolidate these voting interest entities. However, in the limited cases where the non-managing partners or members do not have substantive kick-out or participating rights, the Firm evaluates the funds as VIEs and consolidates the funds if the Firm is the general partner or managing member and has both power and a potentially significant interest.

The Firm’s investment companies and asset management funds have investments in both publicly-held and privately-held entities, including investments in buyouts, growth equity and venture opportunities. These investments are accounted for under investment company guidelines and, accordingly, irrespective of the percentage of equity ownership interests held, are carried on the Consolidated balance sheets at fair value, and are recorded in other assets, with income or loss included in noninterest revenue. If consolidated, the Firm retains the accounting under such specialized investment company guidelines.

Variable interest entities

VIEs are entities that, by design, either (1) lack sufficient equity to permit the entity to finance its activities without additional subordinated financial support from other parties, or (2) have equity investors that do not have the ability to make significant decisions relating to the entity’s operations through voting rights, or do not have the obligation to absorb the expected losses, or do not have the right to receive the residual returns of the entity.

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors. The legal documents that govern the transaction specify how the cash earned on the assets must be allocated to the SPE’s investors and other parties that have rights to those cash flows. SPEs are generally structured to insulate investors from claims on the SPE’s assets by creditors of other entities, including the creditors of the seller of the assets.

The primary beneficiary of a VIE (i.e., the party that has a controlling financial interest) is required to consolidate the assets and liabilities of the VIE. The primary beneficiary is the party that has both (1) the power to direct the activities of the VIE that most significantly impact the VIE’s economic performance; and (2) through its interests in the VIE, the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE.

To assess whether the Firm has the power to direct the activities of a VIE that most significantly impact the VIE’s economic performance, the Firm considers all the facts and circumstances, including its role in establishing the VIE and its ongoing rights and responsibilities. This assessment

includes, first, identifying the activities that most significantly impact the VIE's economic performance; and second, identifying which party, if any, has power over those activities. In general, the parties that make the most significant decisions affecting the VIE (such as asset managers, collateral managers, servicers, or owners of call options or liquidation rights over the VIE's assets) or have the right to unilaterally remove those decision-makers are deemed to have the power to direct the activities of a VIE.

To assess whether the Firm has the obligation to absorb losses of the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE, the Firm considers all of its economic interests, including debt and equity investments, servicing fees, and derivatives or other arrangements deemed to be variable interests in the VIE. This assessment requires that the Firm apply judgment in determining whether these interests, in the aggregate, are considered potentially significant to the VIE. Factors considered in assessing significance include: the design of the VIE, including its capitalization structure; subordination of interests; payment priority; relative share of interests held across various classes within the VIE's capital structure; and the reasons why the interests are held by the Firm.

The Firm performs on-going reassessments of: (1) whether entities previously evaluated under the majority voting-interest framework have become VIEs, based on certain events, and are therefore subject to the VIE consolidation framework; and (2) whether changes in the facts and circumstances regarding the Firm's involvement with a VIE cause the Firm's consolidation conclusion to change.

Refer to Note 14 for further discussion of the Firm's VIEs.

Revenue recognition

Interest income

The Firm recognizes interest income on loans, debt securities, and other debt instruments, generally on a level-yield basis, based on the underlying contractual rate. Refer to Note 7 for further information.

Revenue from contracts with customers

JPMorgan Chase recognizes noninterest revenue from certain contracts with customers, in investment banking fees, deposit-related fees, asset management administration and commissions, and components of card income, when the Firm's related performance obligations are satisfied. Refer to Note 6 for further discussion of the Firm's revenue from contracts with customers.

Principal transactions revenue

JPMorgan Chase carries a portion of its assets and liabilities at fair value. Changes in fair value are reported primarily in principal transactions revenue. Refer to Notes 2 and 3 for further discussion of fair value measurement. Refer to Note 6 for further discussion of principal transactions revenue.

Use of estimates in the preparation of consolidated financial statements

The preparation of the Consolidated Financial Statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenue and expense, and disclosures of contingent assets and liabilities. Actual results could be different from these estimates.

Foreign currency translation

JPMorgan Chase revalues assets, liabilities, revenue and expense denominated in non-U.S. currencies into U.S. dollars using applicable exchange rates.

Gains and losses relating to translating functional currency financial statements for U.S. reporting are included in the Consolidated statements of comprehensive income. Gains and losses relating to nonfunctional currency transactions, including non-U.S. operations where the functional currency is the U.S. dollar, are reported in the Consolidated statements of income.

Offsetting assets and liabilities

U.S. GAAP permits entities to present derivative receivables and derivative payables with the same counterparty and the related cash collateral receivables and payables on a net basis on the Consolidated balance sheets when a legally enforceable master netting agreement exists. U.S. GAAP also permits securities sold and purchased under repurchase agreements and securities borrowed or loaned under securities loan agreements to be presented net when specified conditions are met, including the existence of a legally enforceable master netting agreement. The Firm has elected to net such balances where it has determined that the specified conditions are met.

The Firm uses master netting agreements to mitigate counterparty credit risk in certain transactions, including derivative contracts, resale, repurchase, securities borrowed and securities loaned agreements. A master netting agreement is a single agreement with a counterparty that permits multiple transactions governed by that agreement to be terminated or accelerated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due). Upon the exercise of derivatives termination rights by the non-defaulting party (i) all transactions are terminated, (ii) all transactions are valued and the positive values of "in the money" transactions are netted against the negative values of "out of the money" transactions and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount. Upon exercise of default rights under repurchase agreements and securities loan agreements in general (i) all transactions are terminated and accelerated, (ii) all values of securities or cash held or to be delivered are calculated, and all such sums are netted against each other and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount.

Notes to consolidated financial statements

Typical master netting agreements for these types of transactions also often contain a collateral/margin agreement that provides for a security interest in, or title transfer of, securities or cash collateral/margin to the party that has the right to demand margin (the “demanding party”). The collateral/margin agreement typically requires a party to transfer collateral/margin to the demanding party with a value equal to the amount of the margin deficit on a net basis across all transactions governed by the master netting agreement, less any threshold. The collateral/margin agreement grants to the demanding party, upon default by the counterparty, the right to set-off any amounts payable by the counterparty against any posted collateral or the cash equivalent of any posted collateral/margin. It also grants to the demanding party the right to liquidate collateral/margin and to apply the proceeds to an amount payable by the counterparty.

Refer to Note 5 for further discussion of the Firm’s derivative instruments. Refer to Note 11 for further discussion of the Firm’s securities financing agreements.

Statements of cash flows

For JPMorgan Chase’s Consolidated statements of cash flows, cash is defined as those amounts included in cash and due from banks and deposits with banks on the Consolidated balance sheets.

Accounting standard adopted January 1, 2023

Financial Instruments - Credit Losses: Troubled Debt Restructurings (“TDRs”)

The adoption of this guidance eliminates the accounting and disclosure requirements for TDRs, including the requirement to measure the allowance using a discounted cash flow (“DCF”) methodology, and allows the option of a non-DCF portfolio-based approach for modified loans to troubled borrowers. If a DCF methodology is still applied for these modified loans, the discount rate must be the post-modification effective interest rate, instead of the pre-modification effective interest rate.

The Firm elected to apply its non-DCF, portfolio-based allowance approach for modified loans to troubled borrowers for all portfolios except modified nonaccrual risk-rated loans which the Firm elected to continue applying a DCF methodology. See Note 13 for a description of the portfolio-based allowance approach and the asset-specific allowance approach.

This guidance was adopted on January 1, 2023 under the modified retrospective method which resulted in a net decrease to the allowance for credit losses of approximately \$600 million and an increase to retained earnings of approximately \$450 million, after-tax predominantly driven by residential real estate and credit card.

Accounting standard adopted January 1, 2020

Financial Instruments - Credit Losses (“CECL”)

The adoption of this guidance established a single allowance framework for all financial assets measured at amortized cost and certain off-balance sheet credit exposures. This framework requires that management’s estimate reflects credit losses over the instrument’s remaining expected life and considers expected future changes in macroeconomic conditions. Prior to the adoption of the CECL accounting guidance, the Firm’s allowance for credit losses represented management’s estimate of probable credit losses inherent in the Firm’s retained loan portfolios and certain lending-related commitments.

Significant accounting policies

The following table identifies JPMorgan Chase’s other significant accounting policies and the Note and page where a detailed description of each policy can be found.

Fair value measurement	Note 2	page 167
Fair value option	Note 3	page 188
Derivative instruments	Note 5	page 194
Noninterest revenue and noninterest expense	Note 6	page 208
Interest income and Interest expense	Note 7	page 211
Pension and other postretirement employee benefit plans	Note 8	page 212
Employee share-based incentives	Note 9	page 215
Investment securities	Note 10	page 217
Securities financing activities	Note 11	page 222
Loans	Note 12	page 225
Allowance for credit losses	Note 13	page 242
Variable interest entities	Note 14	page 247
Goodwill and Mortgage servicing rights	Note 15	page 255
Premises and equipment	Note 16	page 259
Leases	Note 18	page 260
Long-term debt	Note 20	page 263
Earnings per share	Note 23	page 268
Income taxes	Note 25	page 270
Off-balance sheet lending-related financial instruments, guarantees and other commitments	Note 28	page 276
Litigation	Note 30	page 283

Note 2 – Fair value measurement

JPMorgan Chase carries a portion of its assets and liabilities at fair value. These assets and liabilities are predominantly carried at fair value on a recurring basis (i.e., assets and liabilities that are measured and reported at fair value on the Firm's Consolidated balance sheets). Certain assets, liabilities and unfunded lending-related commitments are measured at fair value on a nonrecurring basis; that is, they are not measured at fair value on an ongoing basis but are subject to fair value adjustments only in certain circumstances (for example, when there is evidence of impairment).

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair value is based on quoted market prices or inputs, where available. If prices or quotes are not available, fair value is based on valuation models and other valuation techniques that consider relevant transaction characteristics (such as maturity) and use, as inputs, observable or unobservable market parameters, including yield curves, interest rates, volatilities, prices (such as commodity, equity or debt prices), correlations, foreign exchange rates and credit curves. Valuation adjustments may be made to ensure that financial instruments are recorded at fair value, as described below.

The level of precision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of different methodologies or assumptions by other market participants compared with those used by the Firm could result in the Firm deriving a different estimate of fair value at the reporting date.

Valuation process

Risk-taking functions are responsible for providing fair value estimates for assets and liabilities carried on the Consolidated balance sheets at fair value. The Firm's Valuation Control Group ("VCG"), which is part of the Firm's Finance function and independent of the risk-taking functions, is responsible for verifying these estimates and determining any fair value adjustments that may be required to ensure that the Firm's positions are recorded at fair value. In addition, the Firm's Valuation Governance Forum ("VGF"), which is composed of senior finance and risk executives, is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The Firmwide VGF is chaired by the Firmwide head of the VCG (under the direction of the Firm's Controller), and includes sub-forums covering the

CIB, CCB, CB, AWM and certain corporate functions including Treasury and CIO.

Price verification process

The VCG verifies fair value estimates provided by the risk-taking functions by leveraging independently derived prices, valuation inputs and other market data, where available. Where independent prices or inputs are not available, the VCG performs additional review to ensure the reasonableness of the estimates. The additional review may include evaluating the limited market activity including client unwinds, benchmarking valuation inputs to those used for similar instruments, decomposing the valuation of structured instruments into individual components, comparing expected to actual cash flows, reviewing profit and loss trends, and reviewing trends in collateral valuation. There are also additional levels of management review for more significant or complex positions.

The VCG determines any valuation adjustments that may be required to the estimates provided by the risk-taking functions. No adjustments to quoted prices are applied for instruments classified within level 1 of the fair value hierarchy (refer to the discussion below for further information on the fair value hierarchy). For other positions, judgment is required to assess the need for valuation adjustments to appropriately reflect liquidity considerations, unobservable parameters, and, for certain portfolios that meet specified criteria, the size of the net open risk position. The determination of such adjustments follows a consistent framework across the Firm:

- Liquidity valuation adjustments are considered where an observable external price or valuation parameter exists but is of lower reliability, potentially due to lower market activity. Liquidity valuation adjustments are made based on current market conditions. Factors that may be considered in determining the liquidity adjustment include analysis of: (1) the estimated bid-offer spread for the instrument being traded; (2) alternative pricing points for similar instruments in active markets; and (3) the range of reasonable values that the price or parameter could take.
- The Firm manages certain portfolios of financial instruments on the basis of net open risk exposure and, as permitted by U.S. GAAP, has elected to estimate the fair value of such portfolios on the basis of a transfer of the entire net open risk position in an orderly transaction. Where this is the case, valuation adjustments may be necessary to reflect the cost of exiting a larger-than-normal market-size net open risk position. Where applied, such adjustments are based on factors that a relevant market participant would consider in the transfer of the net open risk position, including the size of the adverse market move that is likely to occur during the period required to reduce the net open risk position to a normal market-size.

Notes to consolidated financial statements

- Uncertainty adjustments related to unobservable parameters may be made when positions are valued using prices or input parameters to valuation models that are unobservable due to a lack of market activity or because they cannot be implied from observable market data. Such prices or parameters must be estimated and are, therefore, subject to management judgment. Adjustments are made to reflect the uncertainty inherent in the resulting valuation estimate.
- Where appropriate, the Firm also applies adjustments to its estimates of fair value in order to appropriately reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA) and the impact of funding (FVA), using a consistent framework across the Firm. Refer to Credit and funding adjustments on page 184 of this Note for more information on such adjustments.

Valuation model review and approval

If prices or quotes are not available for an instrument or a similar instrument, fair value is generally determined using valuation models that consider relevant transaction terms such as maturity and use as inputs market-based or independently sourced parameters. Where this is the case the price verification process described above is applied to the inputs in those models.

Under the Firm's Estimations and Model Risk Management Policy, MRGR reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances exceptions may be granted to the Firm's policy to allow a model to be used prior to review or approval. MRGR may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

Fair value hierarchy

A three-level fair value hierarchy has been established under U.S. GAAP for disclosure of fair value measurements. The fair value hierarchy is based on the observability of inputs to the valuation of an asset or liability as of the measurement date. The three levels are defined as follows.

- Level 1 - inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2 - inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.
- Level 3 - one or more inputs to the valuation methodology are unobservable and significant to the fair value measurement.

A financial instrument's categorization within the fair value hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The following table describes the valuation methodologies generally used by the Firm to measure its significant products/instruments at fair value, including the general classification of such instruments pursuant to the fair value hierarchy.

Product/instrument	Valuation methodology	Classifications in the fair value hierarchy
Securities financing agreements	Valuations are based on discounted cash flows, which consider: <ul style="list-style-type: none"> • Derivative features: refer to the discussion of derivatives below for further information • Market rates for the respective maturity • Collateral characteristics 	Predominantly level 2
Loans and lending-related commitments – wholesale Loans carried at fair value (trading loans and non-trading loans) and associated lending-related commitments	Where observable market data is available, valuations are based on: <ul style="list-style-type: none"> • Observed market prices (circumstances are infrequent) • Relevant broker quotes • Observed market prices for similar instruments Where observable market data is unavailable or limited, valuations are based on discounted cash flows, which consider the following: <ul style="list-style-type: none"> • Credit spreads derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed • Collateral characteristics 	Level 2 or 3
Loans – consumer Loans carried at fair value – conforming residential mortgage loans expected to be sold	Fair value is based on observable market prices for mortgage-backed securities with similar collateral and incorporates adjustments to these prices to account for differences between the securities and the value of the underlying loans, which include credit characteristics, portfolio composition, and liquidity.	Predominantly level 2
Investment and trading securities	Quoted market prices In the absence of quoted market prices, securities are valued based on: <ul style="list-style-type: none"> • Observable market prices for similar securities • Relevant broker quotes • Discounted cash flows In addition, the following inputs to discounted cash flows are used for the following products: <ul style="list-style-type: none"> Mortgage- and asset-backed securities specific inputs: <ul style="list-style-type: none"> • Collateral characteristics • Deal-specific payment and loss allocations • Current market assumptions related to yield, prepayment speed, conditional default rates and loss severity Collateralized loan obligations (“CLOs”) specific inputs: <ul style="list-style-type: none"> • Collateral characteristics • Deal-specific payment and loss allocations • Expected prepayment speed, conditional default rates, loss severity • Credit spreads • Credit rating data 	Level 1 Level 2 or 3
Physical commodities	Valued using observable market prices or data.	Level 1 or 2

Notes to consolidated financial statements

Product/instrument	Valuation methodology	Classifications in the fair value hierarchy
Derivatives	<p>Actively traded derivatives, e.g., exchange-traded derivatives, that are valued using quoted prices.</p> <p>Derivatives that are valued using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that may use observable or unobservable valuation inputs as well as considering the contractual terms.</p> <p>The key valuation inputs used will depend on the type of derivative and the nature of the underlying instruments and may include equity prices, commodity prices, foreign exchange rates, volatilities, correlations, CDS spreads, recovery rates and prepayment speed.</p> <p>In addition, specific inputs used for derivatives that are valued based on models with significant unobservable inputs are as follows:</p> <ul style="list-style-type: none"> Interest rate and FX exotic derivatives specific inputs include: <ul style="list-style-type: none"> Interest rate curve Interest rate volatility Interest rate spread volatility Bermudan switch value Interest rate correlation Interest rate-FX correlation Foreign exchange correlation Credit derivatives specific inputs include: <ul style="list-style-type: none"> Credit correlation between the underlying debt instruments Equity derivatives specific inputs include: <ul style="list-style-type: none"> Forward equity price Equity volatility Equity correlation Equity-FX correlation Equity-IR correlation Commodity derivatives specific inputs include: <ul style="list-style-type: none"> Forward commodity price Commodity volatility Commodity correlation <p>Additionally, adjustments are made to reflect counterparty credit quality (CVA) and the impact of funding (FVA). Refer to page 184 of this Note.</p>	<p>Level 1</p> <p>Level 2 or 3</p>
Mortgage servicing rights	Refer to Mortgage servicing rights in Note 15.	Level 3
Private equity direct investments	Fair value is estimated using all available information; the range of potential inputs include: <ul style="list-style-type: none"> Transaction prices Trading multiples of comparable public companies Operating performance of the underlying portfolio company Adjustments as required, since comparable public companies are not identical to the company being valued, and for company-specific issues and lack of liquidity Additional available inputs relevant to the investment 	Level 2 or 3
Fund investments (e.g., mutual/collective investment funds, private equity funds, hedge funds, and real estate funds)	<p>Net asset value</p> <ul style="list-style-type: none"> NAV is supported by the ability to redeem and purchase at the NAV level Adjustments to the NAV as required, for restrictions on redemption (e.g., lock-up periods or withdrawal limitations) or where observable activity is limited 	<p>Level 1</p> <p>Level 2 or 3^(a)</p>
Beneficial interests issued by consolidated VIEs	<p>Valued using observable market information, where available.</p> <p>In the absence of observable market information, valuations are based on the fair value of the underlying assets held by the VIE.</p>	Level 2 or 3

(a) Excludes certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient.

Product/instrument	Valuation methodology	Classification in the fair value hierarchy
Structured notes (included in deposits, short-term borrowings and long-term debt)	<p>Valuations are based on discounted cash flow analyses that consider the embedded derivative and the terms and payment structure of the note.</p> <p>The embedded derivative features are considered using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that may use observable or unobservable valuation inputs, depending on the embedded derivative. The specific inputs used vary according to the nature of the embedded derivative features, as described in the discussion above regarding derivatives valuation. Adjustments are then made to this base valuation to reflect the Firm's own credit risk (DVA). Refer to page 184 of this Note.</p>	Level 2 or 3

Notes to consolidated financial statements

The following table presents the assets and liabilities reported at fair value as of December 31, 2022 and 2021, by major product category and fair value hierarchy.

Assets and liabilities measured at fair value on a recurring basis

December 31, 2022 (in millions)	Fair value hierarchy				Derivative netting adjustments ^(f)	Total fair value
	Level 1	Level 2	Level 3			
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 311,883	\$ —	\$ —	\$ —	\$ 311,883
Securities borrowed	—	70,041	—	—	—	70,041
Trading assets:						
Debt instruments:						
Mortgage-backed securities:						
U.S. GSEs and government agencies ^(a)	—	68,162	759	—	—	68,921
Residential - nonagency	—	2,498	5	—	—	2,503
Commercial - nonagency	—	1,448	7	—	—	1,455
Total mortgage-backed securities	—	72,108	771	—	—	72,879
U.S. Treasury, GSEs and government agencies ^(a)	61,191	8,546	—	—	—	69,737
Obligations of U.S. states and municipalities	—	6,608	7	—	—	6,615
Certificates of deposit, bankers' acceptances and commercial paper	—	2,009	—	—	—	2,009
Non-U.S. government debt securities	18,213	48,429	155	—	—	66,797
Corporate debt securities	—	25,626	463	—	—	26,089
Loans	—	5,744	759	—	—	6,503
Asset-backed securities	—	2,536	23	—	—	2,559
Total debt instruments	79,404	171,606	2,178	—	—	253,188
Equity securities	82,483	2,060	665	—	—	85,208
Physical commodities ^(b)	9,595	16,673	2	—	—	26,270
Other	—	18,146	64	—	—	18,210
Total debt and equity instruments ^(c)	171,482	208,485	2,909	—	—	382,876
Derivative receivables:						
Interest rate	3,390	292,956	4,069	(271,996)	—	28,419
Credit	—	9,722	607	(9,239)	—	1,090
Foreign exchange	169	240,207	1,203	(218,214)	—	23,365
Equity	—	57,485	4,428	(52,774)	—	9,139
Commodity	—	24,982	375	(16,490)	—	8,867
Total derivative receivables	3,559	625,352	10,682	(568,713)	—	70,880
Total trading assets ^(d)	175,041	833,837	13,591	(568,713)	—	453,756
Available-for-sale securities:						
Mortgage-backed securities:						
U.S. GSEs and government agencies ^(a)	3	71,500	—	—	—	71,503
Residential - nonagency	—	4,620	—	—	—	4,620
Commercial - nonagency	—	1,958	—	—	—	1,958
Total mortgage-backed securities	3	78,078	—	—	—	78,081
U.S. Treasury and government agencies	92,060	—	—	—	—	92,060
Obligations of U.S. states and municipalities	—	6,786	—	—	—	6,786
Non-U.S. government debt securities	10,591	9,105	—	—	—	19,696
Corporate debt securities	—	118	239	—	—	357
Asset-backed securities:						
Collateralized loan obligations	—	5,792	—	—	—	5,792
Other	—	3,085	—	—	—	3,085
Total available-for-sale securities	102,654	102,964	239	—	—	205,857
Loans ^(e)	—	40,661	1,418	—	—	42,079
Mortgage servicing rights	—	—	7,973	—	—	7,973
Other assets ^(d)	7,544	6,065	405	—	—	14,014
Total assets measured at fair value on a recurring basis	\$ 285,239	\$ 1,365,451	\$ 23,626	\$ (568,713)	\$ 1,105,603	
Deposits	\$ —	\$ 26,458	\$ 2,162	\$ —	\$ —	\$ 28,620
Federal funds purchased and securities loaned or sold under repurchase agreements	—	151,999	—	—	—	151,999
Short-term borrowings	—	14,391	1,401	—	—	15,792
Trading liabilities:						
Debt and equity instruments ^(c)	98,719	28,032	84	—	—	126,835
Derivative payables:						
Interest rate	2,643	284,280	3,368	(274,321)	—	15,970
Credit	—	9,377	594	(9,217)	—	754
Foreign exchange	160	250,647	714	(232,665)	—	18,856
Equity	—	57,649	4,812	(53,657)	—	8,804
Commodity	—	22,748	521	(16,512)	—	6,757
Total derivative payables	2,803	624,701	10,009	(586,372)	—	51,141
Total trading liabilities	101,522	652,733	10,093	(586,372)	—	177,976
Accounts payable and other liabilities	5,702	1,283	53	—	—	7,038
Beneficial interests issued by consolidated VIEs	—	5	—	—	—	5
Long-term debt	—	48,189	24,092	—	—	72,281
Total liabilities measured at fair value on a recurring basis	\$ 107,224	\$ 895,058	\$ 37,801	\$ (586,372)	\$ 453,711	

December 31, 2021 (in millions)	Fair value hierarchy					Derivative netting adjustments ^(f)	Total fair value
	Level 1	Level 2	Level 3	—	—		
Federal funds sold and securities purchased under resale agreements	\$ —	\$ 252,720	\$ —	\$ —	\$ —	\$ —	\$ 252,720
Securities borrowed	—	81,463	—	—	—	—	81,463
Trading assets:							
Debt instruments:							
Mortgage-backed securities:							
U.S. GSEs and government agencies ^(a)	—	38,944	265	—	—	39,209	
Residential - nonagency	—	2,358	28	—	—	2,386	
Commercial - nonagency	—	1,506	10	—	—	1,516	
Total mortgage-backed securities	—	42,808	303	—	—	43,111	
U.S. Treasury, GSEs and government agencies ^(a)	68,527	9,181	—	—	—	77,708	
Obligations of U.S. states and municipalities	—	7,068	7	—	—	7,075	
Certificates of deposit, bankers' acceptances and commercial paper	—	852	—	—	—	852	
Non-U.S. government debt securities	26,982	44,581	81	—	—	71,644	
Corporate debt securities	—	24,491	332	—	—	24,823	
Loans	—	7,366	708	—	—	8,074	
Asset-backed securities	—	2,668	26	—	—	2,694	
Total debt instruments	95,509	139,015	1,457	—	—	235,981	
Equity securities	86,904	1,741	662	—	—	89,307	
Physical commodities ^(b)	5,357	20,788	—	—	—	26,145	
Other	—	24,850	160	—	—	25,010	
Total debt and equity instruments ^(c)	187,770	186,394	2,279	—	—	376,443	
Derivative receivables:							
Interest rate	1,072	267,493	2,020	(248,611)	—	21,974	
Credit	—	9,321	518	(8,808)	—	1,031	
Foreign exchange	134	168,590	855	(156,954)	—	12,625	
Equity	—	65,139	3,492	(58,650)	—	9,981	
Commodity	—	26,232	421	(15,183)	—	11,470	
Total derivative receivables	1,206	536,775	7,306	(488,206)	—	57,081	
Total trading assets ^(d)	188,976	723,169	9,585	(488,206)	—	433,524	
Available-for-sale securities:							
Mortgage-backed securities:							
U.S. GSEs and government agencies ^(a)	4	72,539	—	—	—	72,543	
Residential - nonagency	—	6,070	—	—	—	6,070	
Commercial - nonagency	—	4,949	—	—	—	4,949	
Total mortgage-backed securities	4	83,558	—	—	—	83,562	
U.S. Treasury and government agencies	177,463	—	—	—	—	177,463	
Obligations of U.S. states and municipalities	—	15,860	—	—	—	15,860	
Non-U.S. government debt securities	5,430	10,779	—	—	—	16,209	
Corporate debt securities	—	160	161	—	—	321	
Asset-backed securities:							
Collateralized loan obligations	—	9,662	—	—	—	9,662	
Other	—	5,448	—	—	—	5,448	
Total available-for-sale securities	182,897	125,467	161	—	—	308,525	
Loans ^(e)	—	56,887	1,933	—	—	58,820	
Mortgage servicing rights	—	—	5,494	—	—	5,494	
Other assets ^(d)	9,558	4,139	306	—	—	14,003	
Total assets measured at fair value on a recurring basis	\$ 381,431	\$ 1,243,845	\$ 17,479	\$ (488,206)	\$ 1,154,549		
Deposits	\$ —	\$ 9,016	\$ 2,317	\$ —	\$ —	\$ 11,333	
Federal funds purchased and securities loaned or sold under repurchase agreements	—	126,435	—	—	—	126,435	
Short-term borrowings	—	17,534	2,481	—	—	20,015	
Trading liabilities:							
Debt and equity instruments ^(c)	87,831	26,716	30	—	—	114,577	
Derivative payables:							
Interest rate	981	237,714	2,036	(232,537)	—	8,194	
Credit	—	10,468	444	(10,032)	—	880	
Foreign exchange	123	174,349	1,274	(161,649)	—	14,097	
Equity	—	72,609	7,118	(62,494)	—	17,233	
Commodity	—	26,600	1,328	(18,216)	—	9,712	
Total derivative payables	1,104	521,740	12,200	(484,928)	—	50,116	
Total trading liabilities	88,935	548,456	12,230	(484,928)	—	164,693	
Accounts payable and other liabilities	5,115	467	69	—	—	5,651	
Beneficial interests issued by consolidated VIEs	—	12	—	—	—	12	
Long-term debt	—	50,560	24,374	—	—	74,934	
Total liabilities measured at fair value on a recurring basis	\$ 94,050	\$ 752,480	\$ 41,471	\$ (484,928)	\$ 403,073		

(a) At December 31, 2022 and 2021, included total U.S. GSE obligations of \$73.8 billion and \$73.9 billion, respectively, which were mortgage-related.

(b) Physical commodities inventories are generally accounted for at the lower of cost or net realizable value. "Net realizable value" is a term defined in U.S. GAAP as not exceeding fair value less costs to sell ("transaction costs"). Transaction costs for the Firm's physical commodities inventories are either not applicable or immaterial to the value of the inventory. Therefore, net realizable value approximates fair value for the Firm's physical commodities inventories. When fair value hedging has been applied (or when net realizable value is below cost), the carrying value of physical commodities approximates fair value, because under fair value hedge accounting, the cost basis is adjusted for changes in fair value. Refer to Note 5 for a further discussion of the Firm's hedge accounting relationships. To provide consistent fair value disclosure information, all physical commodities inventories have been included in each period presented.

(c) Balances reflect the reduction of securities owned (long positions) by the amount of identical securities sold but not yet purchased (short positions).

Notes to consolidated financial statements

- (d) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2022 and 2021, the fair values of these investments, which include certain hedge funds, private equity funds, real estate and other funds, were \$950 million and \$801 million, respectively. Included in these balances at December 31, 2022 and 2021, were trading assets of \$43 million and \$51 million, respectively, and other assets of \$907 million and \$750 million, respectively.
- (e) At December 31, 2022 and 2021, included \$9.7 billion and \$26.2 billion, respectively, of residential first-lien mortgages, and \$6.8 billion and \$8.2 billion, respectively, of commercial first-lien mortgages. Residential mortgage loans include conforming mortgage loans originated with the intent to sell to U.S. GSEs and government agencies of \$2.4 billion and \$13.6 billion, respectively.
- (f) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral received and paid when a legally enforceable master netting agreement exists. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.

Level 3 valuations

The Firm has established well-structured processes for determining fair value, including for instruments where fair value is estimated using significant unobservable inputs (level 3). Refer to pages 167-171 of this Note for further information on the Firm's valuation process and a detailed discussion of the determination of fair value for individual financial instruments.

Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed valuation models and other valuation techniques that use significant unobservable inputs and are therefore classified within level 3 of the fair value hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate valuation model or other valuation technique to use. Second, due to the lack of observability of significant inputs, management must assess relevant empirical data in deriving valuation inputs including transaction details, yield curves, interest rates, prepayment speed, default rates, volatilities, correlations, prices (such as commodity, equity or debt prices), valuations of comparable instruments, foreign exchange rates and credit curves.

The following table presents the Firm's primary level 3 financial instruments, the valuation techniques used to measure the fair value of those financial instruments, the significant unobservable inputs, the range of values for those inputs and the weighted or arithmetic averages of such inputs. While the determination to classify an instrument within level 3 is based on the significance of the unobservable inputs to the overall fair value measurement, level 3 financial instruments typically include observable components (that is, components that are actively quoted and can be validated to external sources) in addition to the unobservable components. The level 1 and/or level 2 inputs are not included in the table. In addition, the Firm manages the risk of the observable components of level 3 financial instruments using securities and derivative positions that are classified within levels 1 or 2 of the fair value hierarchy.

The range of values presented in the table is representative of the highest and lowest level input used to value the significant groups of instruments within a product/instrument classification. Where provided, the weighted averages of the input values presented in the table are calculated based on the fair value of the instruments that the input is being used to value.

In the Firm's view, the input range, weighted and arithmetic average values do not reflect the degree of input uncertainty or an assessment of the reasonableness of the Firm's estimates and assumptions. Rather, they reflect the characteristics of the various instruments held by the Firm and the relative distribution of instruments within the range of characteristics. For example, two option contracts may have similar levels of market risk exposure and valuation uncertainty, but may have significantly different implied volatility levels because the option contracts have different underlyings, tenors, or strike prices. The input range and weighted average values will therefore vary from period-to-period and parameter-to-parameter based on the characteristics of the instruments held by the Firm at each balance sheet date.

Notes to consolidated financial statements

Level 3 inputs^(a)

December 31, 2022

Product/Instrument	Fair value (in millions)	Principal valuation technique	Unobservable inputs ^(g)	Range of input values	Average ⁽ⁱ⁾
Residential mortgage-backed securities and loans ^(b)	\$ 1,649	Discounted cash flows	Yield	4%	15%
			Prepayment speed	3%	11%
			Conditional default rate	0%	5%
			Loss severity	0%	110%
Commercial mortgage-backed securities and loans ^(c)	423	Market comparables	Price	\$0	\$99
Corporate debt securities	702	Market comparables	Price	\$0	\$243
Loans ^(d)	876	Market comparables	Price	\$0	\$356
Non-U.S. government debt securities	155	Market comparables	Price	\$6	\$100
Net interest rate derivatives	735	Option pricing	Interest rate volatility	28bps	674bps
			Interest rate spread volatility	23bps	35bps
			Bermudan switch value	0%	57%
			Interest rate correlation	(82)%	89%
			IR-FX correlation	(35)%	60%
	(34)	Discounted cash flows	Prepayment speed	0%	21%
Net credit derivatives	(9)	Discounted cash flows	Credit correlation	30%	60%
			Credit spread	1bps	12,107bps
			Recovery rate	10%	67%
	22	Market comparables	Price	\$15	\$115
Net foreign exchange derivatives	577	Option pricing	IR-FX correlation	(40)%	60%
	(88)	Discounted cash flows	Prepayment speed	9%	9%
			Interest rate curve	2%	29%
Net equity derivatives	(384)	Option pricing	Forward equity price ^(h)	84%	144%
			Equity volatility	5%	141%
			Equity correlation	17%	99%
			Equity-FX correlation	(86)%	60%
			Equity-IR correlation	(5)%	50%
Net commodity derivatives	(146)	Option pricing	Oil commodity forward	\$72 / BBL	\$251 / BBL
			Natural gas commodity forward	\$1 / MMBTU	\$24 / MMBTI
			Commodity volatility	4%	154%
			Commodity correlation	(45)%	77%
MSRs	7,973	Discounted cash flows	Refer to Note 15		
Long-term debt, short-term borrowings, and deposits ^(e)	26,583	Option pricing	Interest rate volatility	28bps	674bps
			Bermudan switch value	0%	57%
			Interest rate correlation	(82)%	89%
			IR-FX correlation	(35)%	60%
			Equity correlation	17%	99%
			Equity-FX correlation	(86)%	60%
			Equity-IR correlation	(5)%	50%
			Credit correlation	30%	60%
Other level 3 assets and liabilities, net ^(f)	1,029				

- (a) The categories presented in the table have been aggregated based upon the product type, which may differ from their classification on the Consolidated balance sheets. Furthermore, the inputs presented for each valuation technique in the table are, in some cases, not applicable to every instrument valued using the technique as the characteristics of the instruments can differ.
- (b) Comprises U.S. GSE and government agency securities of \$752 million, nonagency securities of \$5 million and non-trading loans of \$892 million.
- (c) Comprises U.S. GSE and government agency securities of \$7 million, nonagency securities of \$7 million, trading loans of \$40 million and non-trading loans of \$369 million.
- (d) Comprises trading loans of \$719 million and non-trading loans of \$157 million.
- (e) Long-term debt, short-term borrowings and deposits include structured notes issued by the Firm that are financial instruments that typically contain embedded derivatives. The estimation of the fair value of structured notes includes the derivative features embedded within the instrument. The significant unobservable inputs are broadly consistent with those presented for derivative receivables.
- (f) Includes equity securities of \$880 million including \$216 million in Other assets, for which quoted prices are not readily available and the fair value is generally based on internal valuation techniques such as EBITDA multiples and comparable analysis. All other level 3 assets and liabilities are insignificant both individually and in aggregate.
- (g) Price is a significant unobservable input for certain instruments. When quoted market prices are not readily available, reliance is generally placed on price-based internal valuation techniques. The price input is expressed assuming a par value of \$100.
- (h) Forward equity price is expressed as a percentage of the current equity price.
- (i) Amounts represent weighted averages except for derivative related inputs where arithmetic averages are used.

Changes in and ranges of unobservable inputs

The following discussion provides a description of the impact on a fair value measurement of a change in each unobservable input in isolation, and the interrelationship between unobservable inputs, where relevant and significant. The impact of changes in inputs may not be independent, as a change in one unobservable input may give rise to a change in another unobservable input. Where relationships do exist between two unobservable inputs, those relationships are discussed below. Relationships may also exist between observable and unobservable inputs (for example, as observable interest rates rise, unobservable prepayment rates decline); such relationships have not been included in the discussion below. In addition, for each of the individual relationships described below, the inverse relationship would also generally apply.

The following discussion also provides a description of attributes of the underlying instruments and external market factors that affect the range of inputs used in the valuation of the Firm's positions.

Yield – The yield of an asset is the interest rate used to discount future cash flows in a discounted cash flow calculation. An increase in the yield, in isolation, would result in a decrease in a fair value measurement.

Credit spread – The credit spread is the amount of additional annualized return over the market interest rate that a market participant would demand for taking exposure to the credit risk of an instrument. The credit spread for an instrument forms part of the discount rate used in a discounted cash flow calculation. Generally, an increase in the credit spread would result in a decrease in a fair value measurement.

The yield and the credit spread of a particular mortgage-backed security primarily reflect the risk inherent in the instrument. The yield is also impacted by the absolute level of the coupon paid by the instrument (which may not correspond directly to the level of inherent risk). Therefore, the range of yield and credit spreads reflects the range of risk inherent in various instruments owned by the Firm. The risk inherent in mortgage-backed securities is driven by the subordination of the security being valued and the characteristics of the underlying mortgages within the collateralized pool, including borrower FICO scores, LTV ratios for residential mortgages and the nature of the property and/or any tenants for commercial mortgages. For corporate debt securities, obligations of U.S. states and municipalities and other similar instruments, credit spreads reflect the credit quality of the obligor and the tenor of the obligation.

Prepayment speed – The prepayment speed is a measure of the voluntary unscheduled principal repayments of a prepayable obligation in a collateralized pool. Prepayment speeds generally decline as borrower delinquencies rise. An increase in prepayment speeds, in isolation, would result in a decrease in a fair value measurement of assets valued at a premium to par and an increase in a fair value measurement of assets valued at a discount to par.

Prepayment speeds may vary from collateral pool to collateral pool, and are driven by the type and location of the underlying borrower, and the remaining tenor of the obligation as well as the level and type (e.g., fixed or floating) of interest rate being paid by the borrower. Typically collateral pools with higher borrower credit quality have a higher prepayment rate than those with lower borrower credit quality, all other factors being equal.

Conditional default rate – The conditional default rate is a measure of the reduction in the outstanding collateral balance underlying a collateralized obligation as a result of defaults. While there is typically no direct relationship between conditional default rates and prepayment speeds, collateralized obligations for which the underlying collateral has high prepayment speeds will tend to have lower conditional default rates. An increase in conditional default rates would generally be accompanied by an increase in loss severity and an increase in credit spreads. An increase in the conditional default rate, in isolation, would result in a decrease in a fair value measurement. Conditional default rates reflect the quality of the collateral underlying a securitization and the structure of the securitization itself. Based on the types of securities owned in the Firm's market-making portfolios, conditional default rates are most typically at the lower end of the range presented.

Loss severity – The loss severity (the inverse concept is the recovery rate) is the expected amount of future realized losses resulting from the ultimate liquidation of a particular loan, expressed as the net amount of loss relative to the outstanding loan balance. An increase in loss severity is generally accompanied by an increase in conditional default rates. An increase in the loss severity, in isolation, would result in a decrease in a fair value measurement.

The loss severity applied in valuing a mortgage-backed security investment depends on factors relating to the underlying mortgages, including the LTV ratio, the nature of the lender's lien on the property and other instrument-specific factors.

Notes to consolidated financial statements

Correlation – Correlation is a measure of the relationship between the movements of two variables. Correlation is a pricing input for a derivative product where the payoff is driven by one or more underlying risks. Correlation inputs are related to the type of derivative (e.g., interest rate, credit, equity, foreign exchange and commodity) due to the nature of the underlying risks. When parameters are positively correlated, an increase in one parameter will result in an increase in the other parameter. When parameters are negatively correlated, an increase in one parameter will result in a decrease in the other parameter. An increase in correlation can result in an increase or a decrease in a fair value measurement. Given a short correlation position, an increase in correlation, in isolation, would generally result in a decrease in a fair value measurement.

The level of correlation used in the valuation of derivatives with multiple underlying risks depends on a number of factors including the nature of those risks. For example, the correlation between two credit risk exposures would be different than that between two interest rate risk exposures. Similarly, the tenor of the transaction may also impact the correlation input, as the relationship between the underlying risks may be different over different time periods. Furthermore, correlation levels are very much dependent on market conditions and could have a relatively wide range of levels within or across asset classes over time, particularly in volatile market conditions.

Volatility – Volatility is a measure of the variability in possible returns for an instrument, parameter or market index given how much the particular instrument, parameter or index changes in value over time. Volatility is a pricing input for options, including equity options, commodity options, and interest rate options. Generally, the higher the volatility of the underlying, the riskier the instrument. Given a long position in an option, an increase in volatility, in isolation, would generally result in an increase in a fair value measurement.

The level of volatility used in the valuation of a particular option-based derivative depends on a number of factors, including the nature of the risk underlying the option (e.g., the volatility of a particular equity security may be significantly different from that of a particular commodity index), the tenor of the derivative as well as the strike price of the option.

Bermudan switch value – The switch value is the difference between the overall value of a Bermudan swaption, which can be exercised at multiple points in time, and its most expensive European swaption and reflects the additional value that the multiple exercise dates provide the holder. Switch values are dependent on market conditions and can vary greatly depending on a number of factors, such as the tenor of the underlying swap as well as the strike price of the option. An increase in switch value, in isolation, would generally result in an increase in a fair value measurement.

Interest rate curve – represents the relationship of interest rates over differing tenors. The interest rate curve is used to set interest rate and foreign exchange derivative cash flows and is also a pricing input used in the discounting of any derivative cash flow.

Forward price – Forward price is the price at which the buyer agrees to purchase the asset underlying a forward contract on the predetermined future delivery date, and is such that the value of the contract is zero at inception.

The forward price is used as an input in the valuation of certain derivatives and depends on a number of factors including interest rates, the current price of the underlying asset, and the expected income to be received and costs to be incurred by the seller as a result of holding that asset until the delivery date. An increase in the forward can result in an increase or a decrease in a fair value measurement.

Changes in level 3 recurring fair value measurements

The following tables include a rollforward of the Consolidated balance sheets amounts (including changes in fair value) for financial instruments classified by the Firm within level 3 of the fair value hierarchy for the years ended December 31, 2022, 2021 and 2020. When a determination is made to classify a financial instrument within level 3, the determination is based on the significance of the unobservable inputs to the overall fair value measurement. However, level 3 financial instruments typically include, in addition to the unobservable or level 3 components, observable components (that is, components that are actively quoted and can be validated to external sources); accordingly, the gains and losses in the table below include changes in fair value due in part to observable factors that are part of the valuation methodology. Also, the Firm risk-manages the observable components of level 3 financial instruments using securities and derivative positions that are classified within level 1 or 2 of the fair value hierarchy; as these level 1 and level 2 risk management instruments are not included below, the gains or losses in the following tables do not reflect the effect of the Firm's risk management activities related to such level 3 instruments.

Fair value measurements using significant unobservable inputs												Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2022
Year ended December 31, 2022 (in millions)	Fair value at January 1, 2022	Total realized/unrealized gains/(losses)	Purchases ^(g)	Sales	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2022	-	-	-	
Assets: ^(a)												
Federal funds sold and securities purchased under resale agreements	\$ -	\$ -	\$ 1	\$ (1)	\$ (1)	\$ 4	\$ (5)	\$ 759	\$ -	\$ -	\$ -	\$ -
Trading assets:												
Debt instruments:												
Mortgage-backed securities:												
U.S. GSEs and government agencies	265	31	673	(125)	(84)	4	(5)	759	29			
Residential - nonagency	28	(1)	7	(5)	(12)	—	(12)	5	—			
Commercial - nonagency	10	—	—	(1)	—	3	(5)	7	—			
Total mortgage-backed securities	303	30	680	(131)	(96)	7	(22)	771	29			
Obligations of U.S. states and municipalities	7	—	—	—	—	—	—	7	—			
Non-U.S. government debt securities	81	(92)	494	(338)	(4)	84	(70)	155	(153)			
Corporate debt securities	332	(30)	404	(178)	(100)	357	(322)	463	(48)			
Loans	708	(51)	652	(605)	(230)	925	(640)	759	(26)			
Asset-backed securities	26	5	19	(24)	(1)	5	(7)	23	1			
Total debt instruments	1,457	(138)	2,249	(1,276)	(431)	1,378	(1,061)	2,178	(197)			
Equity securities	662	(1,036)	473	(377)	(2)	1,066	(121)	665	(840)			
Physical commodities	—	(1)	3	—	—	—	—	2	(1)			
Other	160	93	37	—	(221)	1	(6)	64	46			
Total trading assets - debt and equity instruments	2,279	(1,082) ^(c)	2,762	(1,653)	(654)	2,445	(1,188)	2,909	(992) ^(c)			
Net derivative receivables: ^(b)												
Interest rate	(16)	187	325	(483)	329	732	(373)	701	332			
Credit	74	226	17	(9)	(271)	5	(29)	13	170			
Foreign exchange	(419)	726	215	(114)	83	3	(5)	489	459			
Equity	(3,626)	5,016	1,226	(2,530)	96	(656)	90	(384)	3,435			
Commodity	(907)	571	110	(331)	350	5	56	(146)	369			
Total net derivative receivables	(4,894)	6,726 ^(c)	1,893	(3,467)	587	89	(261)	673	4,765 ^(c)			
Available-for-sale securities:												
Mortgage-backed securities	—	—	—	—	—	—	—	—	—			
Corporate debt securities	161	5	88	—	(15)	—	—	239	5			
Total available-for-sale securities	161	5 ^(d)	88	—	(15)	—	—	239	5 ^(d)			
Loans	1,933	(158) ^(c)	568	(261)	(886)	1,053	(831)	1,418	(76) ^(c)			
Mortgage servicing rights	5,494	2,039 ^(e)	2,198	(822)	(936)	—	—	7,973	2,039 ^(e)			
Other assets	306	194 ^(c)	50	(38)	(103)	2	(6)	405	191 ^(c)			
Fair value measurements using significant unobservable inputs												Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2022
Year ended December 31, 2022 (in millions)	Fair value at January 1, 2022	Total realized/unrealized gains/(losses)	Purchases	Sales	Issuances	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2022	-	-	
Liabilities: ^(a)												
Deposits	\$ 2,317	\$ (292) ^{(c)(f)}	\$ —	\$ —	\$ 531	\$ (114)	\$ (280)	\$ 2,162	\$ (76) ^{(c)(f)}			
Short-term borrowings	2,481	(358) ^{(c)(f)}	—	—	3,963	(4,685)	15	(15)	1,401	90 ^{(c)(f)}		
Trading liabilities - debt and equity instruments	30	(31) ^(c)	(41)	77	—	—	57	(8)	84	101 ^(c)		
Accounts payable and other liabilities	69	(16) ^(c)	(37)	42	—	—	1	(6)	53	(16) ^(c)		
Long-term debt	24,374	(3,869) ^{(c)(f)}	—	—	12,714	(8,876)	793	(1,044)	24,092	(3,447) ^{(c)(f)}		

Notes to consolidated financial statements

Year ended December 31, 2021 (in millions)	Fair value measurements using significant unobservable inputs										Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2021
	Fair value at January 1, 2021	Total realized/ unrealized gains/ (losses)	Purchases ^(g)	Sales	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2021			
Assets:^(a)											
Federal funds sold and securities purchased under resale agreements	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –	\$ –
Trading assets:											
Debt instruments:											
Mortgage-backed securities:											
U.S. GSEs and government agencies	449	(28)	21	(67)	(110)	1	(1)	265	(31)		
Residential - nonagency	28	–	26	(24)	(5)	4	(1)	28	(3)		
Commercial - nonagency	3	5	12	(7)	(17)	14	–	10	(2)		
Total mortgage-backed securities	480	(23)	59	(98)	(132)	19	(2)	303	(36)		
Obligations of U.S. states and municipalities	8	–	–	–	(1)	–	–	7	–		
Non-U.S. government debt securities	182	(14)	359	(332)	(7)	–	(107)	81	(10)		
Corporate debt securities	507	(23)	404	(489)	(4)	162	(225)	332	(16)		
Loans	893	2	994	(669)	(287)	648	(873)	708	(20)		
Asset-backed securities	28	28	76	(99)	(2)	2	(7)	26	(2)		
Total debt instruments	2,098	(30)	1,892	(1,687)	(433)	831	(1,214)	1,457	(84)		
Equity securities	476	(77)	378	(168)	–	164	(111)	662	(335)		
Physical commodities	–	–	–	–	–	–	–	–	–		
Other	49	74	233	–	(98)	5	(103)	160	31		
Total trading assets - debt and equity instruments	2,623	(33) ^(c)	2,503	(1,855)	(531)	1,000	(1,428)	2,279	(388) ^(c)		
Net derivative receivables: ^(b)											
Interest rate	258	1,789	116	(192)	(2,011)	112	(88)	(16)	282		
Credit	(224)	130	6	(12)	146	34	(6)	74	141		
Foreign exchange	(434)	(209)	110	(110)	222	(12)	14	(419)	13		
Equity	(3,862)	(480)	1,285	(2,813)	1,758	315	171	(3,626)	(155)		
Commodity	(731)	(728)	145	(493)	916	(4)	(12)	(907)	(426)		
Total net derivative receivables	(4,993)	502 ^(c)	1,662	(3,620)	1,031	445	79	(4,894)	(145) ^(c)		
Available-for-sale securities:											
Mortgage-backed securities	–	–	–	–	–	–	–	–	–		
Corporate debt securities	–	(1)	162	–	–	–	–	161	(1)		
Total available-for-sale securities	–	(1) ^(d)	162	–	–	–	–	161	(1) ^(d)		
Loans	2,305	(87) ^(c)	612	(439)	(965)	1,301	(794)	1,933	(59) ^(c)		
Mortgage servicing rights	3,276	98 ^(e)	3,022	(114)	(788)	–	–	5,494	98 ^(e)		
Other assets	538	16 ^(c)	9	(17)	(239)	–	(1)	306	11 ^(c)		
Fair value measurements using significant unobservable inputs											
Year ended December 31, 2021 (in millions)	Fair value at January 1, 2021	Total realized/ unrealized (gains)/losses	Purchases	Sales	Issuances	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2021	Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2021	
Liabilities:^(a)											
Deposits	\$ 2,913	\$ (80) ^{(c)(f)}	\$ –	\$ –	\$ 431	\$ (467)	\$ 2	\$ (482)	\$ 2,317	\$ (77) ^{(c)(f)}	
Short-term borrowings	2,420	(1,391) ^{(c)(f)}	–	–	6,823	(5,308)	9	(72)	2,481	(83) ^{(c)(f)}	
Trading liabilities - debt and equity instruments	51	(8) ^(c)	(101)	38	–	–	64	(14)	30	(157) ^(c)	
Accounts payable and other liabilities	68	8 ^(c)	–	1	–	–	–	(8)	69	8 ^(c)	
Long-term debt	23,397	369 ^{(c)(f)}	–	–	13,505	(12,191)	103	(809)	24,374	87 ^{(c)(f)}	

Fair value measurements using significant unobservable inputs													Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2020
Year ended December 31, 2020 (in millions)	Fair value at January 1, 2020	Total realized/ unrealized gains/(losses)	Purchases ^(g)	Sales	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2020					
Assets:^(a)													
Federal funds sold and securities purchased under resale agreements	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Trading assets:													
Debt instruments:													
Mortgage-backed securities:													
U.S. GSEs and government agencies	797	(172)		134	(149)		(161)		-	-	449	(150)	
Residential - nonagency	23	2		15	(5)		(4)		-	(3)	28	(1)	
Commercial - nonagency	4	-		1	-		(1)		2	(3)	3	-	
Total mortgage-backed securities	824	(170)		150	(154)		(166)		2	(6)	480	(151)	
Obligations of U.S. states and municipalities	10	-		-	(1)		(1)		-	-	8	-	
Non-U.S. government debt securities	155	21		281	(245)		(7)		-	(23)	182	11	
Corporate debt securities	558	(23)		582	(205)		(236)		411	(580)	507	(25)	
Loans	673	(73)		1,112	(484)		(182)		791	(944)	893	(40)	
Asset-backed securities	37	(3)		44	(40)		(9)		9	(10)	28	(4)	
Total debt instruments	2,257	(248)		2,169	(1,129)		(601)		1,213	(1,563)	2,098	(209)	
Equity securities	196	(137)		412	(376)		(1)		535	(153)	476	(82)	
Physical commodities	-	-		-	-		-		-	-	-	-	
Other	232	333		229	(9)		(497)		6	(245)	49	268	
Total trading assets - debt and equity instruments	2,685	(52) ^(c)		2,810	(1,514)		(1,099)		1,754	(1,961)	2,623	(23) ^(c)	
Net derivative receivables: ^(b)													
Interest rate	(332)	2,682		308	(148)		(2,228)		(332)	308	258	325	
Credit	(139)	(212)		73	(154)		181		59	(32)	(224)	(110)	
Foreign exchange	(607)	49		49	(24)		83		13	3	(434)	116	
Equity	(3,395)	(65)		1,664	(2,317)		1,162		(935)	24	(3,862)	(556)	
Commodity	(16)	(546)		27	(241)		356		(310)	(1)	(731)	267	
Total net derivative receivables	(4,489)	1,908 ^(c)		2,121	(2,884)		(446)		(1,505)	302	(4,993)	42 ^(c)	
Available-for-sale securities:													
Mortgage-backed securities	1	-		-	-		(1)		-	-	-	-	
Corporate debt securities	-	-		-	-		-		-	-	-	-	
Total available-for-sale securities	1	-		-	-		(1)		-	-	-	-	
Loans	516	(243) ^(c)		962	(84)		(733)		2,571	(684)	2,305	(18) ^(c)	
Mortgage servicing rights	4,699	(1,540) ^(e)		1,192	(176)		(899)		-	-	3,276	(1,540) ^(e)	
Other assets	917	(63) ^(c)		75	(104)		(320)		40	(7)	538	(3) ^(c)	
Fair value measurements using significant unobservable inputs													Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2020
Year ended December 31, 2020 (in millions)	Fair value at January 1, 2020	Total realized/ unrealized gains/(losses)	Purchases	Sales	Issuances	Settlements ^(h)	Transfers into level 3	Transfers (out of) level 3	Fair value at Dec. 31, 2020				
Liabilities:^(a)													
Deposits	\$ 3,360	\$ 165 ^{(c)(f)}	\$ -	\$ -	\$ 671	\$ (605)	\$ 265	\$ (943)	\$ 2,913	\$ 455 ^{(c)(f)}			
Short-term borrowings	1,674	(338) ^{(c)(f)}	-	-	5,140	(4,115)	105	(46)	2,420	143 ^{(c)(f)}			
Trading liabilities - debt and equity instruments	41	(2) ^(c)	(126)	14	-	(4)	136	(8)	51	(1) ^(c)			
Accounts payable and other liabilities	45	33 ^(c)	(87)	37	-	-	47	(7)	68	28 ^(c)			
Long-term debt	23,339	40 ^{(c)(f)}	-	-	9,883	(9,833)	1,250	(1,282)	23,397	1,920 ^{(c)(f)}			

Notes to consolidated financial statements

- (a) Level 3 assets at fair value as a percentage of total Firm assets at fair value (including assets measured at fair value on a nonrecurring basis) were 2% at both December 31, 2022 and December 31, 2021 and 1% at December 31, 2020. Level 3 liabilities at fair value as a percentage of total Firm liabilities at fair value (including liabilities measured at fair value on a nonrecurring basis) were 8%, 10% and 9% at December 31, 2022, 2021 and 2020, respectively.
- (b) All level 3 derivatives are presented on a net basis, irrespective of the underlying counterparty.
- (c) Predominantly reported in principal transactions revenue, except for changes in fair value for CCB mortgage loans and lending-related commitments originated with the intent to sell, and mortgage loan purchase commitments, which are reported in mortgage fees and related income.
- (d) Realized gains/(losses) on AFS securities are reported in investment securities gains/(losses). Unrealized gains/(losses) are reported in OCI. Realized and unrealized gains/(losses) recorded on AFS securities were not material for the years ended December 31, 2022, 2021 and 2020.
- (e) Changes in fair value for MSRs are reported in mortgage fees and related income.
- (f) Realized (gains)/losses due to DVA for fair value option elected liabilities are reported in principal transactions revenue, and were not material for the years ended December 31, 2022, 2021 and 2020. Unrealized (gains)/losses are reported in OCI, and they were \$(529) million, \$258 million and \$221 million for the years ended December 31, 2022, 2021 and 2020, respectively.
- (g) Loan originations are included in purchases.
- (h) Includes financial assets and liabilities that have matured, been partially or fully repaid, impacts of modifications, deconsolidations associated with beneficial interests in VIEs and other items.

Level 3 analysis

Consolidated balance sheets changes

The following describes significant changes to level 3 assets since December 31, 2021, for those items measured at fair value on a recurring basis. Refer to Assets and liabilities measured at fair value on a nonrecurring basis on page 185 for further information on changes impacting items measured at fair value on a nonrecurring basis.

For the year ended December 31, 2022

Level 3 assets were \$23.6 billion at December 31, 2022, reflecting an increase of \$6.1 billion from December 31, 2021.

The increase for the year ended December 31, 2022 was predominantly driven by:

- \$3.4 billion increase in gross derivative receivables due to gains and purchases partially offset by settlements.
- \$2.5 billion increase in MSRs.

Refer to Note 15 for information on MSRs.

Refer to the sections below for additional information.

Transfers between levels for instruments carried at fair value on a recurring basis

During the year ended December 31, 2022, significant transfers from level 2 into level 3 included the following:

- \$2.4 billion of total debt and equity instruments, predominantly due to equity securities of \$1.1 billion driven by a decrease in observability predominantly as a result of restricted access to certain markets and trading loans of \$925 million driven by a decrease in observability.
- \$1.6 billion of gross interest rate derivative receivables and \$878 million of gross interest rate derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$1.6 billion of gross equity derivative receivables and \$2.3 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$1.1 billion of non-trading loans driven by a decrease in observability.
- \$793 million of long-term debt driven by a decrease in observability and an increase in the significance of unobservable inputs for structured notes.

During the year ended December 31, 2022, significant transfers from level 3 into level 2 included the following:

- \$1.2 billion of total debt and equity instruments, largely due to trading loans, driven by an increase in observability.
- \$1.2 billion of gross interest rate derivative receivables and \$807 million of gross interest rate derivative payables as a result of an increase in observability and a decrease in the significance of unobservable inputs.
- \$2.2 billion of gross equity derivative receivables and \$2.3 billion of gross equity derivative payables as a result of an increase in observability and a decrease in the significance of unobservable inputs.
- \$831 million of non-trading loans driven by an increase in observability.
- \$1.0 billion of long-term debt driven by an increase in observability and a decrease in the significance of unobservable inputs for structured notes.

During the year ended December 31, 2021, significant transfers from level 2 into level 3 included the following:

- \$1.0 billion of total debt and equity instruments, largely due to trading loans, driven by a decrease in observability.
- \$1.5 billion of gross equity derivative receivables and \$1.2 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$1.3 billion of non-trading loans driven by a decrease in observability.

During the year ended December 31, 2021, significant transfers from level 3 into level 2 included the following:

- \$1.4 billion of total debt and equity instruments, largely due to trading loans, driven by an increase in observability.
- \$1.9 billion of gross equity derivative receivables and \$2.1 billion of gross equity derivative payables as a result of an increase in observability and a decrease in the significance of unobservable inputs.
- \$794 million of non-trading loans driven by an increase in observability.
- \$809 million of long-term debt driven by an increase in observability and a decrease in the significance of unobservable inputs for structured notes.

During the year ended December 31, 2020, significant transfers from level 2 into level 3 included the following:

- \$1.8 billion of total debt and equity instruments, predominantly equity securities and trading loans, driven by a decrease in observability.
- \$2.6 billion of gross equity derivative receivables and \$3.5 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$880 million of gross interest rate derivative payables as a result of a decrease in observability and an increase in the significance of unobservable inputs.
- \$2.6 billion of non-trading loans driven by a decrease in observability.
- \$1.2 billion of long-term debt driven by a decrease in observability and an increase in the significance of unobservable inputs for structured notes.

During the year ended December 31, 2020, significant transfers from level 3 into level 2 included the following:

- \$2.0 billion of total debt and equity instruments, predominantly due to corporate debt and trading loans, driven by an increase in observability
- \$2.4 billion of gross equity derivative receivables and \$2.4 billion of gross equity derivative payables as a result of an increase in observability and a decrease in the significance of unobservable inputs.
- \$943 million of deposits as a result of an increase in observability and a decrease in the significance of unobservable inputs.
- \$1.3 billion of long-term debt driven by an increase in observability and a decrease in the significance of unobservable inputs for structured notes.

All transfers are based on changes in the observability and/or significance of the valuation inputs and are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Gains and losses

The following describes significant components of total realized/unrealized gains/(losses) for instruments measured at fair value on a recurring basis for the years ended December 31, 2022, 2021 and 2020. These amounts exclude any effects of the Firm's risk management activities where the financial instruments are classified as level 1 and 2 of the fair value hierarchy. Refer to Changes in level 3 recurring fair value measurements rollforward tables on pages 178-182 for further information on these instruments.

2022

- \$7.7 billion of net gains on assets, predominantly driven by gains in net equity derivative receivables due to market movements and gains in MSRs reflecting lower prepayment speeds on higher rates.
- \$4.6 billion of net gains on liabilities, predominantly driven by a decline in the fair value of long-term debt due to market movements.

2021

- \$495 million of net gains on assets, driven by gains in net interest rate derivative receivables due to market movements, partially offset by losses in net equity derivative receivables and net commodity derivative receivables due to market movements.
- \$1.1 billion of net gains on liabilities, driven by gains in short-term borrowings due to market movements.

2020

- \$10 million of net gains on assets driven by gains in net interest rate derivative receivables due to market movements largely offset by losses in MSRs reflecting faster prepayment speeds on lower rates.
- \$102 million of net gains on liabilities driven by market movements in short-term borrowings.

Refer to Note 15 for information on MSRs.

Notes to consolidated financial statements

Credit and funding adjustments - derivatives

Derivatives are generally valued using models that use as their basis observable market parameters. These market parameters generally do not consider factors such as counterparty nonperformance risk, the Firm's own credit quality, and funding costs. Therefore, it is generally necessary to make adjustments to the base estimate of fair value to reflect these factors.

CVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect counterparty nonperformance risk. The Firm estimates CVA using a scenario analysis to estimate the expected positive credit exposure across all of the Firm's existing positions with each counterparty, and then estimates losses based on the probability of default and estimated recovery rate as a result of a counterparty credit event considering contractual factors designed to mitigate the Firm's credit exposure, such as collateral and legal rights of offset. The key inputs to this methodology are (i) the probability of a default event occurring for each counterparty, as derived from observed or estimated CDS spreads; and (ii) estimated recovery rates implied by CDS spreads, adjusted to consider the differences in recovery rates as a derivative creditor relative to those reflected in CDS spreads, which generally reflect senior unsecured creditor risk.

FVA represents the adjustment to reflect the impact of funding and is recognized where there is evidence that a market participant in the principal market would incorporate it in a transfer of the instrument. The Firm's FVA framework, applied to uncollateralized (including partially collateralized) over-the-counter ("OTC") derivatives incorporates key inputs such as: (i) the expected funding requirements arising from the Firm's positions with

each counterparty and collateral arrangements; and (ii) the estimated market funding cost in the principal market which, for derivative liabilities, considers the Firm's credit risk (DVA). For collateralized derivatives, the fair value is estimated by discounting expected future cash flows at the relevant overnight indexed swap rate given the underlying collateral agreement with the counterparty, and therefore a separate FVA is not necessary.

The following table provides the impact of credit and funding adjustments on principal transactions revenue in the respective periods, excluding the effect of any associated hedging activities. The FVA presented below includes the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality over time.

Year ended December 31, (in millions)	2022	2021	2020
Credit and funding adjustments:			
Derivatives CVA	\$ 22	\$ 362	\$ (337)
Derivatives FVA	42	47	(64)

Valuation adjustments on fair value option elected liabilities

The valuation of the Firm's liabilities for which the fair value option has been elected requires consideration of the Firm's own credit risk. DVA on fair value option elected liabilities reflects changes (subsequent to the issuance of the liability) in the Firm's probability of default and LGD, which are estimated based on changes in the Firm's credit spread observed in the bond market. Realized (gains)/losses due to DVA for fair value option elected liabilities are reported in principal transactions revenue. Unrealized (gains)/losses are reported in OCI. Refer to page 182 in this Note and Note 24 for further information.

Assets and liabilities measured at fair value on a nonrecurring basis

The following tables present the assets and liabilities held as of December 31, 2022 and 2021, for which nonrecurring fair value adjustments were recorded during the years ended December 31, 2022 and 2021, by major product category and fair value hierarchy.

December 31, 2022 (in millions)	Fair value hierarchy				Total fair value
	Level 1	Level 2	Level 3		
Loans	\$ —	\$ 643	\$ 627 ^(b)	\$ 1,270	
Other assets ^(a)	—	36	1,352		1,388
Total assets measured at fair value on a nonrecurring basis	\$ —	\$ 679	\$ 1,979	\$ 2,658	
Accounts payable and other liabilities	—	—	84		84
Total liabilities measured at fair value on a nonrecurring basis	\$ —	\$ —	\$ 84	\$ 84	

December 31, 2021 (in millions)	Fair value hierarchy				Total fair value
	Level 1	Level 2	Level 3		
Loans	\$ —	\$ 1,006	\$ 856	\$ 1,862	
Other assets	—	4	1,612		1,616
Total assets measured at fair value on a nonrecurring basis	\$ —	\$ 1,010	\$ 2,468	\$ 3,478	
Accounts payable and other liabilities	—	—	3		3
Total liabilities measured at fair value on a nonrecurring basis	\$ —	\$ —	\$ 3	\$ 3	

(a) Primarily includes equity securities without readily determinable fair values that were adjusted based on observable price changes in orderly transactions from an identical or similar investment of the same issuer (measurement alternative). Of the \$1.4 billion in level 3 assets measured at fair value on a nonrecurring basis as of December 31, 2022, \$1.2 billion related to equity securities adjusted based on the measurement alternative. These equity securities are classified as level 3 due to the infrequency of the observable prices and/or the restrictions on the shares.

(b) Of the \$627 million in level 3 assets measured at fair value on a nonrecurring basis as of December 31, 2022, \$83 million related to residential real estate loans carried at the net realizable value of the underlying collateral (e.g., collateral-dependent loans). These amounts are classified as level 3 as they are valued using information from broker's price opinions, appraisals and automated valuation models and discounted based upon the Firm's experience with actual liquidation values. These discounts ranged from 9% to 56% with a weighted average of 23%.

Nonrecurring fair value changes

The following table presents the total change in value of assets and liabilities for which fair value adjustments have been recognized for the years ended December 31, 2022, 2021 and 2020, related to assets and liabilities held at those dates.

December 31, (in millions)	2022	2021	2020
Loans	\$ (55)	\$ (72)	\$ (393)
Other assets ^(a)	(409)	344	(529)
Accounts payable and other liabilities	(83)	5	(11)
Total nonrecurring fair value gains/ (losses)	\$ (547)	\$ 277	\$ (933)

(a) Included \$(338) million, \$379 million and \$(134) million for the years ended December 31, 2022, 2021 and 2020, respectively, of net gains/(losses) as a result of the measurement alternative.

Refer to Note 12 for further information about the measurement of collateral-dependent loans.

Notes to consolidated financial statements

Equity securities without readily determinable fair values

The Firm measures certain equity securities without readily determinable fair values at cost less impairment (if any), plus or minus observable price changes from an identical or similar investment of the same issuer (i.e., measurement alternative), with such changes recognized in other income.

In its determination of the new carrying values upon observable price changes, the Firm may adjust the prices if deemed necessary to arrive at the Firm's estimated fair values. Such adjustments may include adjustments to reflect the different rights and obligations of similar securities, and other adjustments that are consistent with the Firm's valuation techniques for private equity direct investments.

The following table presents the carrying value of equity securities without readily determinable fair values held as of December 31, 2022 and 2021, that are measured under the measurement alternative and the related adjustments recorded during the periods presented for those securities with observable price changes. These securities are included in the nonrecurring fair value tables when applicable price changes are observable.

As of or for the year ended December 31, (in millions)	2022	2021
Other assets		
Carrying value ^(a)	\$ 4,096	\$ 3,642
Upward carrying value changes ^(b)	488	432
Downward carrying value changes/impairment ^(c)	(826)	(53)

(a) The period-end carrying values reflect cumulative purchases and sales in addition to upward and downward carrying value changes.

(b) The cumulative upward carrying value changes between January 1, 2018 and December 31, 2022 were \$1.4 billion.

(c) The cumulative downward carrying value changes/impairment between January 1, 2018 and December 31, 2022 were \$(918) million.

Included in other assets above is the Firm's interest in Visa Class B common shares ("Visa B shares") recorded at a nominal carrying value. In November 2022, the Firm sold approximately 3 million Visa B shares, resulting in a net pretax gain of \$914 million recorded in other income. Visa B shares are subject to certain transfer restrictions and are convertible into Visa Class A common shares ("Visa A shares") at a specified conversion rate upon final resolution of certain litigation matters involving Visa. In connection with the sale, and consistent with the Firm's sale of 20 million Visa B shares in 2013, the Firm entered into a derivative instrument with the purchaser of the shares, under which the Firm retains the risk associated with changes in the conversion rate.

Under the terms of the derivative instrument, the Firm will (a) make or receive payments based on subsequent changes in the conversion rate and (b) make periodic interest payments to the purchaser of the Visa B shares. The payments under the derivative continue as long as the Visa B shares remain subject to transfer restrictions. The derivative is accounted for at fair value using a discounted cash flow methodology based upon the Firm's estimate of the timing and magnitude of final resolution of the litigation matters. The derivative is recorded in trading liabilities and changes in fair value are recognized in other income. As of December 31, 2022, the Firm held derivative instruments associated with the 23 million Visa B shares that it has sold, which are all subject to similar terms and conditions.

As of December 31, 2022, the Firm's remaining interest in Visa B shares was approximately 37 million shares. On January 5, 2023, Visa filed a Current Report on Form 8-K with the SEC indicating that the conversion rate of Visa B shares to Visa A shares decreased from 1.6059 to 1.5991 effective December 29, 2022. The conversion rate may be further adjusted by Visa depending on developments related to the litigation matters. The outcome of those litigation matters, and the effect that the resolution of those matters may have on the conversion rate, is unknown, and accordingly, as of December 31, 2022, there is significant uncertainty regarding the date of the termination of transfer restrictions and the value of the final conversion rate. As a result of this, as well as differences in voting rights, Visa B shares are not considered to be similar to Visa A shares, and they continue to be held at their nominal carrying value.

Additional disclosures about the fair value of financial instruments that are not carried on the Consolidated balance sheets at fair value

U.S. GAAP requires disclosure of the estimated fair value of certain financial instruments, which are included in the following table. However, this table does not include other items, such as nonfinancial assets, intangible assets, certain financial instruments, and customer relationships. In the opinion of management, these items, in the aggregate, add significant value to JPMorgan Chase, but their fair value is not disclosed in this table.

Financial instruments for which carrying value approximates fair value

Certain financial instruments that are not carried at fair value on the Consolidated balance sheets are carried at amounts that approximate fair value, due to their short-term nature and generally negligible credit risk. These instruments include cash and due from banks, deposits with banks, federal funds sold, securities purchased under resale agreements and securities borrowed, short-term receivables and accrued interest receivable, short-term borrowings, federal funds purchased, securities loaned and sold under repurchase agreements, accounts payable, and

accrued liabilities. In addition, U.S. GAAP requires that the fair value of deposit liabilities with no stated maturity (i.e., demand, savings and certain money market deposits) be

equal to their carrying value; recognition of the inherent funding value of these instruments is not permitted.

The following table presents, by fair value hierarchy classification, the carrying values and estimated fair values at December 31, 2022 and 2021, of financial assets and liabilities, excluding financial instruments that are carried at fair value on a recurring basis, and their classification within the fair value hierarchy.

(in billions)	December 31, 2022					December 31, 2021				
	Estimated fair value hierarchy					Estimated fair value hierarchy				
	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value
Financial assets										
Cash and due from banks	\$ 27.7	\$ 27.7	\$ —	\$ —	\$ 27.7	\$ 26.4	\$ 26.4	\$ —	\$ —	\$ 26.4
Deposits with banks	539.5	539.3	0.2	—	539.5	714.4	714.1	(b)	0.3	—
Accrued interest and accounts receivable	124.7	—	124.6	0.1	124.7	102.1	—	102.0	0.1	102.1
Federal funds sold and securities purchased under resale agreements	3.7	—	3.7	—	3.7	9.0	—	9.0	—	9.0
Securities borrowed	115.3	—	115.3	—	115.3	124.6	—	124.6	—	124.6
Investment securities, held-to-maturity	425.3	189.1	199.5	—	388.6	363.7	183.3	179.3	—	362.6
Loans, net of allowance for loan losses ^(a)	1,073.9	—	194.0	853.9	1,047.9	1,002.5	—	202.1	821.1	1,023.2
Other	101.2	—	99.6	1.7	101.3	98.7	—	97.4	1.4	98.8
Financial liabilities										
Deposits	\$ 2,311.6	\$ —	\$ 2,311.5	\$ —	\$ 2,311.5	\$ 2,451.0	\$ —	\$ 2,451.0	\$ —	\$ 2,451.0
Federal funds purchased and securities loaned or sold under repurchase agreements	50.6	—	50.6	—	50.6	67.9	—	67.9	—	67.9
Short-term borrowings	28.2	—	28.2	—	28.2	33.6	—	33.6	—	33.6
Accounts payable and other liabilities	257.5	—	251.2	5.6	256.8	217.6	—	212.1	4.9	217.0
Beneficial interests issued by consolidated VIEs	12.6	—	12.6	—	12.6	10.7	—	10.8	—	10.8
Long-term debt	223.6	—	216.5	2.8	219.3	226.0	—	229.5	3.1	232.6

(a) Fair value is typically estimated using a discounted cash flow model that incorporates the characteristics of the underlying loans (including principal, contractual interest rate and contractual fees) and other key inputs, including expected lifetime credit losses, interest rates, prepayment rates, and primary origination or secondary market spreads. For certain loans, the fair value is measured based on the value of the underlying collateral. Carrying value of the loan takes into account the loan's allowance for loan losses, which represents the loan's expected credit losses over its remaining expected life. The difference between the estimated fair value and carrying value of a loan is generally attributable to changes in market interest rates, including credit spreads, market liquidity premiums and other factors that affect the fair value of a loan but do not affect its carrying value.

(b) Prior-period amounts have been revised to conform with the current presentation.

The majority of the Firm's lending-related commitments are not carried at fair value on a recurring basis on the Consolidated balance sheets. The carrying value and the estimated fair value of these wholesale lending-related commitments were as follows for the periods indicated.

(in billions)	December 31, 2022					December 31, 2021				
	Estimated fair value hierarchy					Estimated fair value hierarchy				
	Carrying value ^{(a)(b)}	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value ^{(a)(b)}	Level 1	Level 2	Level 3	Total estimated fair value
Wholesale lending-related commitments	\$ 2.3	\$ —	\$ —	\$ 3.2	\$ 3.2	\$ 2.1	\$ —	\$ —	\$ 2.9	\$ 2.9

(a) Excludes the current carrying values of the guarantee liability and the offsetting asset, each of which is recognized at fair value at the inception of the guarantees.

(b) Includes the wholesale allowance for lending-related commitments.

The Firm does not estimate the fair value of consumer off-balance sheet lending-related commitments. In many cases, the Firm can reduce or cancel these commitments by providing the borrower notice or, in some cases as permitted by law, without notice. Refer to page 169 of this Note for a further discussion of the valuation of lending-related commitments.

Note 3 – Fair value option

The fair value option provides an option to elect fair value for selected financial assets, financial liabilities, unrecognized firm commitments, and written loan commitments.

The Firm has elected to measure certain instruments at fair value for several reasons including to mitigate income statement volatility caused by the differences between the measurement basis of elected instruments (e.g., certain instruments that otherwise would be accounted for on an accrual basis) and the associated risk management arrangements that are accounted for on a fair value basis, as well as to better reflect those instruments that are managed on a fair value basis.

The Firm's election of fair value includes the following instruments:

- Loans purchased or originated as part of securitization warehousing activity, subject to bifurcation accounting, or managed on a fair value basis, including lending-related commitments
- Certain securities financing agreements
- Owned beneficial interests in securitized financial assets that contain embedded credit derivatives, which would otherwise be required to be separately accounted for as a derivative instrument
- Structured notes and other hybrid instruments, which are predominantly financial instruments that contain embedded derivatives, that are issued or transacted as part of client-driven activities
- Certain long-term beneficial interests issued by CIB's consolidated securitization trusts where the underlying assets are carried at fair value

Changes in fair value under the fair value option election

The following table presents the changes in fair value included in the Consolidated statements of income for the years ended December 31, 2022, 2021 and 2020, for items for which the fair value option was elected. The profit and loss information presented below only includes the financial instruments that were elected to be measured at fair value; related risk management instruments, which are required to be measured at fair value, are not included in the table.

December 31, (in millions)	2022			2021			2020		
	Principal transactions	All other income	Total changes in fair value recorded ^(e)	Principal transactions	All other income	Total changes in fair value recorded ^(e)	Principal transactions	All other income	Total changes in fair value recorded ^(e)
Federal funds sold and securities purchased under resale agreements	\$ (384)	\$ –	\$ (384)	\$ (112)	\$ –	\$ (112)	12	\$ –	\$ 12
Securities borrowed	(499)	–	(499)	(200)	–	(200)	143	–	143
Trading assets:									
Debt and equity instruments, excluding loans	(1,703)	–	(1,703)	(2,171)	(1) ^(c)	(2,172)	2,587	(1) ^(c)	2,586
Loans reported as trading assets:									
Changes in instrument-specific credit risk	(136)	–	(136)	353	–	353	135	–	135
Other changes in fair value	(59)	–	(59)	(8)	–	(8)	(19)	–	(19)
Loans:									
Changes in instrument-specific credit risk	(242)	21 ^(c)	(221)	589	(7) ^(c)	582	190	7 ^(c)	197
Other changes in fair value	(1,421)	(794) ^(c)	(2,215)	(139)	2,056 ^(c)	1,917	470	3,239 ^(c)	3,709
Other assets	39	(6) ^(d)	33	12	(26) ^(d)	(14)	103	(65) ^(d)	38
Deposits ^(a)	901	–	901	(183)	–	(183)	(726)	–	(726)
Federal funds purchased and securities loaned or sold under repurchase agreements	181	–	181	69	–	69	(6)	–	(6)
Short-term borrowings ^(a)	473	–	473	(366)	–	(366)	294	–	294
Trading liabilities	43	–	43	7	–	7	2	–	2
Beneficial interests issued by consolidated VIEs	(1)	–	(1)	–	–	–	–	–	–
Other liabilities	(11)	–	(11)	(17)	–	(17)	(94)	–	(94)
Long-term debt ^{(a)(b)}	8,990	98 ^{(c)(d)}	9,088	(980)	4 ^{(c)(d)}	(976)	(2,120)	(1) ^(c)	(2,121)

- (a) Unrealized gains/(losses) due to instrument-specific credit risk (DVA) for liabilities for which the fair value option has been elected are recorded in OCI, while realized gains/(losses) are recorded in principal transactions revenue. Realized gains/(losses) due to instrument-specific credit risk recorded in principal transactions revenue were not material for the years ended December 31, 2022, 2021 and 2020.
- (b) Long-term debt measured at fair value predominantly relates to structured notes. Although the risk associated with the structured notes is actively managed, the gains/(losses) reported in this table do not include the income statement impact of the risk management instruments used to manage such risk.
- (c) Reported in mortgage fees and related income.
- (d) Reported in other income.
- (e) Changes in fair value exclude contractual interest, which is included in interest income and interest expense for all instruments other than certain hybrid financial instruments in CIB. Refer to Note 7 for further information regarding interest income and interest expense.

Determination of instrument-specific credit risk for items for which the fair value option was elected

The following describes how the gains and losses that are attributable to changes in instrument-specific credit risk, were determined.

- Loans and lending-related commitments: For floating-rate instruments, all changes in value are attributed to instrument-specific credit risk. For fixed-rate instruments, an allocation of the changes in value for the period is made between those changes in value that are interest rate-related and changes in value that are credit-related. Allocations are generally based on an analysis of borrower-specific credit spread and recovery

information, where available, or benchmarking to similar entities or industries.

- Long-term debt: Changes in value attributable to instrument-specific credit risk were derived principally from observable changes in the Firm's credit spread as observed in the bond market.
- Securities financing agreements: Generally, for these types of agreements, there is a requirement that collateral be maintained with a market value equal to or in excess of the principal amount loaned; as a result, there would be no adjustment or an immaterial adjustment for instrument-specific credit risk related to these agreements.

Notes to consolidated financial statements

Difference between aggregate fair value and aggregate remaining contractual principal balance outstanding

The following table reflects the difference between the aggregate fair value and the aggregate remaining contractual principal balance outstanding as of December 31, 2022 and 2021, for loans, long-term debt and long-term beneficial interests for which the fair value option has been elected.

December 31, (in millions)	2022			2021		
	Contractual principal outstanding	Fair value	Fair value over/(under) contractual principal outstanding	Contractual principal outstanding	Fair value	Fair value over/(under) contractual principal outstanding
Loans						
Nonaccrual loans						
Loans reported as trading assets	\$ 2,517	\$ 368	\$ (2,149)	\$ 3,263	\$ 546	\$ (2,717)
Loans	967	829	(138)	918	797	(121)
Subtotal	3,484	1,197	(2,287)	4,181	1,343	(2,838)
90 or more days past due and government guaranteed						
Loans ^(a)	124	115	(9)	293	281	(12)
All other performing loans^(b)						
Loans reported as trading assets	7,823	6,135	(1,688)	8,529 ^(e)	7,528	(1,001) ^(e)
Loans	42,588	41,135	(1,453)	57,490 ^(e)	57,742	252 ^(e)
Subtotal	50,411	47,270	(3,141)	66,019	65,270	(749)
Total loans	\$ 54,019	\$ 48,582	\$ (5,437)	\$ 70,493	\$ 66,894	\$ (3,599)
Long-term debt						
Principal-protected debt	\$ 41,341 ^(d)	\$ 31,105	\$ (10,236)	\$ 35,957 ^(d)	\$ 33,799	\$ (2,158)
Nonprincipal-protected debt ^(c)	NA	41,176	NA	NA	41,135	NA
Total long-term debt	NA	\$ 72,281	NA	NA	\$ 74,934	NA
Long-term beneficial interests						
Nonprincipal-protected debt ^(c)	NA	\$ 5	NA	NA	\$ 12	NA
Total long-term beneficial interests	NA	\$ 5	NA	NA	\$ 12	NA

(a) These balances are excluded from nonaccrual loans as the loans are insured and/or guaranteed by U.S. government agencies.

(b) There were no performing loans that were ninety days or more past due as of December 31, 2022 and 2021.

(c) Remaining contractual principal is not applicable to nonprincipal-protected structured notes and long-term beneficial interests. Unlike principal-protected structured notes and long-term beneficial interests, for which the Firm is obligated to return a stated amount of principal at maturity, nonprincipal-protected structured notes and long-term beneficial interests do not obligate the Firm to return a stated amount of principal at maturity, but for structured notes to return an amount based on the performance of an underlying variable or derivative feature embedded in the note. However, investors are exposed to the credit risk of the Firm as issuer for both nonprincipal-protected and principal-protected notes.

(d) Where the Firm issues principal-protected zero-coupon or discount notes, the balance reflects the contractual principal payment at maturity or, if applicable, the contractual principal payment at the Firm's next call date.

(e) Prior-period amounts have been revised to conform with the current presentation.

At December 31, 2022 and 2021, the contractual amount of lending-related commitments for which the fair value option was elected was \$7.6 billion and \$11.9 billion, respectively, with a corresponding fair value of \$24 million and \$10 million, respectively. Refer to Note 28 for further information regarding off-balance sheet lending-related financial instruments.

Structured note products by balance sheet classification and risk component

The following table presents the fair value of structured notes, by balance sheet classification and the primary risk type.

(in millions)	December 31, 2022				December 31, 2021			
	Long-term debt	Short-term borrowings	Deposits	Total	Long-term debt	Short-term borrowings	Deposits	Total
Risk exposure								
Interest rate	\$ 31,973	\$ 260	\$ 24,655	\$ 56,888	\$ 34,127	\$ 1	\$ 4,860	\$ 38,988
Credit	4,105	170	—	4,275	6,352	858	—	7,210
Foreign exchange	2,674	788	50	3,512	3,386	315	1,066	4,767
Equity	30,864	4,272	3,545	38,681	29,317	6,827	5,125	41,269
Commodity	1,655	16	2 ^(a)	1,673	405	—	3 ^(a)	408
Total structured notes	\$ 71,271	\$ 5,506	\$ 28,252	\$ 105,029	\$ 73,587	\$ 8,001	\$ 11,054	\$ 92,642

(a) Excludes deposits linked to precious metals for which the fair value option has not been elected of \$602 million and \$692 million for the years ended December 31, 2022 and 2021, respectively.

Note 4 – Credit risk concentrations

Concentrations of credit risk arise when a number of clients, counterparties or customers are engaged in similar business activities or activities in the same geographic region, or when they have similar economic features that would cause their ability to meet contractual obligations to be similarly affected by changes in economic conditions.

JPMorgan Chase regularly monitors various segments of its credit portfolios to assess potential credit risk concentrations and to obtain additional collateral when deemed necessary and permitted under the Firm's agreements. Senior management is significantly involved in the credit approval and review process, and risk levels are adjusted as needed to reflect the Firm's risk appetite.

In the Firm's consumer portfolio, concentrations are managed primarily by product and by U.S. geographic region, with a key focus on trends and concentrations at the portfolio level, where potential credit risk concentrations can be remedied through changes in underwriting policies and portfolio guidelines. Refer to Note 12 for additional information on the geographic composition of the Firm's consumer loan portfolios. In the wholesale portfolio, credit risk concentrations are evaluated primarily by industry and monitored regularly on both an aggregate portfolio level and on an individual client or counterparty basis.

The Firm's wholesale exposure is managed through loan syndications and participations, loan sales, securitizations, credit derivatives, master netting agreements, collateral and other risk-reduction techniques. Refer to Note 12 for additional information on loans.

The Firm does not believe that its exposure to any particular loan product or industry segment results in a significant concentration of credit risk.

Terms of loan products and collateral coverage are included in the Firm's assessment when extending credit and establishing its allowance for loan losses.

The table below presents both on-balance sheet and off-balance sheet consumer and wholesale credit exposure by the Firm's three credit portfolio segments as of December 31, 2022 and 2021. The wholesale industry of risk category is generally based on the client or counterparty's primary business activity.

December 31, (in millions)	2022				2021			
	Credit exposure ^(h)	On-balance sheet		Off-balance sheet ⁽ⁱ⁾	Credit exposure ^(h)	On-balance sheet		Off-balance sheet ^(j)
		Loans	Derivatives			Loans	Derivatives	
Consumer, excluding credit card	\$ 344,893	\$ 311,375 ⁽ⁱ⁾	\$ —	\$ 33,518	\$ 368,640	\$ 323,306 ⁽ⁱ⁾	\$ —	\$ 45,334
Credit card^(a)	1,006,459	185,175	—	821,284	884,830	154,296	—	730,534
Total consumer^(a)	1,351,352	496,550	—	854,802	1,253,470	477,602	—	775,868
Wholesale^(b)								
Real Estate	170,857	131,681	249	38,927	155,069	119,753	1,113	34,203
Individuals and Individual Entities ^(c)	130,815	120,424	434	9,957	141,973	130,576	1,317	10,080
Consumer & Retail	120,555	45,867	1,650	73,038	122,789	39,588	2,669	80,532
Asset Managers	95,656	40,511	16,397	38,748	81,228	41,031	9,351	30,846
Industrials	72,483	26,960	1,770	43,753	66,974	21,652	1,224	44,098
Technology, Media & Telecommunications	72,286	21,622	2,950	47,714	84,070	17,815	2,640	63,615
Healthcare	62,613	22,970	1,683	37,960	59,014	18,587	2,575	37,852
Banks & Finance Cos	51,816	32,172	3,246	16,398	54,684	34,217	4,418	16,049
Oil & Gas	38,668	9,632	5,121	23,915	42,606	11,039	6,034	25,533
Utilities	36,218	9,107	3,269	23,842	33,203	5,969	3,736	23,498
State & Municipal Govt ^(d)	33,847	18,147	585	15,115	33,216	15,322	1,563	16,331
Automotive	33,287	14,735	529	18,023	34,573	11,759	720	22,094
Insurance	21,045	2,387	8,081	10,577	13,926	1,303	2,700	9,923
Chemicals & Plastics	20,030	5,771	407	13,852	17,660	5,033	564	12,063
Central Govt	19,095	3,167	12,955	2,973	11,317	2,889	6,837	1,591
Metals & Mining	15,915	5,398	475	10,042	16,696	5,696	924	10,076
Transportation	15,009	5,005	567	9,437	14,635	5,453	782	8,400
Securities Firms	8,066	556	3,387	4,123	4,180	469	1,260	2,451
Financial Markets Infrastructure	4,962	13	3,050	1,899	4,377	5	2,487	1,885
All other ^(e)	123,307	87,545	4,075	31,687	111,690	72,198	4,167	35,325
Subtotal	1,146,530	603,670	70,880	471,980	1,103,880	560,354	57,081	486,445
Loans held-for-sale and loans at fair value	35,427	35,427	—	—	39,758	39,758	—	—
Receivables from customers ^(f)	49,257	—	—	—	59,645	—	—	—
Total wholesale	1,231,214	639,097	70,880	471,980	1,203,283	600,112	57,081	486,445
Total exposure^{(g)(h)}	\$ 2,582,566	\$ 1,135,647	\$ 70,880	\$ 1,326,782	\$ 2,456,753	\$ 1,077,714	\$ 57,081	\$ 1,262,313

(a) Also includes commercial card lending-related commitments primarily in CB and CIB.

(b) The industry rankings presented in the table as of December 31, 2021, are based on the industry rankings of the corresponding exposures at December 31, 2022, not actual rankings of such exposures at December 31, 2021.

(c) Individuals and Individual Entities predominantly consists of Global Private Bank clients within AWM and J.P. Morgan Wealth Management within CCB, and includes exposure to personal investment companies and personal and testamentary trusts.

(d) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2022 and 2021, noted above, the Firm held: \$6.6 billion and \$7.1 billion, respectively, of trading assets; \$6.8 billion and \$15.9 billion, respectively, of AFS securities; and \$19.7 billion and \$14.0 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. Refer to Note 2 and Note 10 for further information.

(e) All other includes: SPEs and Private education and civic organizations, representing approximately 95% and 5%, respectively, at December 31, 2022 and 94% and 6%, respectively, at December 31, 2021. Refer to Note 14 for more information on exposures to SPEs.

(f) Receivables from customers reflect held-for-investment margin loans to brokerage clients in CIB, CCB and AWM that are collateralized by assets maintained in the clients' brokerage accounts (e.g., cash on deposit, liquid and readily marketable debt or equity securities). Because of this collateralization, no allowance for credit losses is generally held against these receivables. To manage its credit risk the Firm establishes margin requirements and monitors the required margin levels on an ongoing basis, and requires clients to deposit additional cash or other collateral, or to reduce positions, when appropriate. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

(g) Excludes cash placed with banks of \$556.6 billion and \$729.6 billion, at December 31, 2022 and 2021, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.

(h) Credit exposure is net of risk participations and excludes the benefit of credit derivatives used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.

(i) At December 31, 2022 and 2021, included \$350 million and \$5.4 billion of loans in Business Banking under the PPP, respectively. PPP loans are guaranteed by the SBA. Other than in certain limited circumstances, the Firm typically does not recognize charge-offs, classify as nonaccrual nor record an allowance for loan losses on these loans.

(j) Represents lending-related financial instruments.

Note 5 – Derivative instruments

Derivative contracts derive their value from underlying asset prices, indices, reference rates, other inputs or a combination of these factors and may expose counterparties to risks and rewards of an underlying asset or liability without having to initially invest in, own or exchange the asset or liability. JPMorgan Chase makes markets in derivatives for clients and also uses derivatives to hedge or manage its own risk exposures. Predominantly all of the Firm's derivatives are entered into for market-making or risk management purposes.

Market-making derivatives

The majority of the Firm's derivatives are entered into for market-making purposes. Clients use derivatives to mitigate or modify interest rate, credit, foreign exchange, equity and commodity risks. The Firm actively manages the risks from its exposure to these derivatives by entering into other derivative contracts or by purchasing or selling other financial instruments that partially or fully offset the exposure from client derivatives.

Risk management derivatives

The Firm manages certain market and credit risk exposures using derivative instruments, including derivatives in hedge accounting relationships and other derivatives that are used to manage risks associated with specified assets and liabilities.

The Firm generally uses interest rate derivatives to manage the risk associated with changes in interest rates. Fixed-rate assets and liabilities appreciate or depreciate in market value as interest rates change. Similarly, interest income and expense increase or decrease as a result of variable-rate assets and liabilities resetting to current market rates, and as a result of the repayment and subsequent origination or issuance of fixed-rate assets and liabilities at current market rates. Gains and losses on the derivative instruments related to these assets and liabilities are expected to substantially offset this variability.

Foreign currency derivatives are used to manage the foreign exchange risk associated with certain foreign currency-denominated (i.e., non-U.S. dollar) assets and liabilities and forecasted transactions, as well as the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. As a result of fluctuations in foreign currencies, the U.S. dollar-equivalent values of the foreign currency-denominated assets and liabilities or the forecasted revenues or expenses increase or decrease. Gains or losses on the derivative instruments related to these foreign currency-denominated assets or liabilities, or forecasted transactions, are expected to substantially offset this variability.

Commodities derivatives are used to manage the price risk of certain commodities inventories. Gains or losses on these derivative instruments are expected to substantially offset the depreciation or appreciation of the related inventory.

Credit derivatives are used to manage the counterparty credit risk associated with loans and lending-related commitments. Credit derivatives compensate the purchaser when the entity referenced in the contract experiences a credit event, such as bankruptcy or a failure to pay an obligation when due. Credit derivatives primarily consist of CDS. Refer to the Credit derivatives section on pages 205-207 of this Note for a further discussion of credit derivatives.

Refer to the risk management derivatives gains and losses table on page 205 and the hedge accounting gains and losses tables on pages 202-204 of this Note for more information about risk management derivatives.

Derivative counterparties and settlement types

The Firm enters into OTC derivatives, which are negotiated and settled bilaterally with the derivative counterparty. The Firm also enters into, as principal, certain ETD such as futures and options, and OTC-cleared derivative contracts with CCPs. ETD contracts are generally standardized contracts traded on an exchange and cleared by the CCP, which is the Firm's counterparty from the inception of the transactions. OTC-cleared derivatives are traded on a bilateral basis and then novated to the CCP for clearing.

Derivative clearing services

The Firm provides clearing services for clients in which the Firm acts as a clearing member at certain exchanges and clearing houses. The Firm does not reflect the clients' derivative contracts in its Consolidated Financial Statements. Refer to Note 28 for further information on the Firm's clearing services.

Accounting for derivatives

All free-standing derivatives that the Firm executes for its own account are required to be recorded on the Consolidated balance sheets at fair value.

As permitted under U.S. GAAP, the Firm nets derivative assets and liabilities, and the related cash collateral receivables and payables, when a legally enforceable master netting agreement exists between the Firm and the derivative counterparty. Refer to Note 1 for further discussion of the offsetting of assets and liabilities. The accounting for changes in value of a derivative depends on whether or not the transaction has been designated and qualifies for hedge accounting. Derivatives that are not designated as hedges are reported and measured at fair value through earnings. The tabular disclosures on pages 198-205 of this Note provide additional information on the amount of, and reporting for, derivative assets, liabilities, gains and losses. Refer to Notes 2 and 3 for a further discussion of derivatives embedded in structured notes.

Derivatives designated as hedges

The Firm applies hedge accounting to certain derivatives executed for risk management purposes – generally interest rate, foreign exchange and commodity derivatives. However, JPMorgan Chase does not seek to apply hedge accounting to all of the derivatives associated with the Firm's risk management activities. For example, the Firm does not apply hedge accounting to purchased CDS used to manage the credit risk of loans and lending-related commitments, because of the difficulties in qualifying such contracts as hedges. For the same reason, the Firm does not apply hedge accounting to certain interest rate, foreign exchange, and commodity derivatives used for risk management purposes.

To qualify for hedge accounting, a derivative must be highly effective at reducing the risk associated with the exposure being hedged. In addition, for a derivative to be designated as a hedge, the risk management objective and strategy must be documented. Hedge documentation must identify the derivative hedging instrument, the asset or liability or forecasted transaction and type of risk to be hedged, and how the effectiveness of the derivative is assessed prospectively and retrospectively. To assess effectiveness, the Firm uses statistical methods such as regression analysis, nonstatistical methods such as dollar-value comparisons of the change in the fair value of the derivative to the change in the fair value or cash flows of the hedged item, and qualitative comparisons of critical terms and the evaluation of any changes in those terms. The extent to which a derivative has been, and is expected to continue to be, highly effective at offsetting changes in the fair value or cash flows of the hedged item must be assessed and documented at least quarterly. If it is determined that a derivative is not highly effective at hedging the designated exposure, hedge accounting is discontinued.

There are three types of hedge accounting designations: fair value hedges, cash flow hedges and net investment hedges. JPMorgan Chase uses fair value hedges primarily to hedge fixed-rate long-term debt, AFS securities and certain commodities inventories. For qualifying fair value hedges, the changes in the fair value of the derivative, and in the value of the hedged item for the risk being hedged, are recognized in earnings. Certain amounts excluded from the assessment of effectiveness are recorded in OCI and recognized in earnings over the life of the derivative. If the hedge relationship is terminated, then the adjustment to the hedged item continues to be reported as part of the basis of the hedged item, and for benchmark interest rate hedges, is amortized to earnings as a yield adjustment. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily net interest income and principal transactions revenue.

JPMorgan Chase uses cash flow hedges primarily to hedge the exposure to variability in forecasted cash flows from floating-rate assets and liabilities and foreign currency-denominated revenue and expense. For qualifying cash flow hedges, changes in the fair value of the derivative are

recorded in OCI and recognized in earnings as the hedged item affects earnings. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily noninterest revenue, net interest income and compensation expense. If the hedge relationship is terminated, then the change in value of the derivative recorded in AOCI is recognized in earnings when the cash flows that were hedged affect earnings. For hedge relationships that are discontinued because a forecasted transaction is expected to not occur according to the original hedge forecast, any related derivative values recorded in AOCI are immediately recognized in earnings.

JPMorgan Chase uses net investment hedges to protect the value of the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. For qualifying net investment hedges, changes in the fair value of the derivatives due to changes in spot foreign exchange rates are recorded in OCI as translation adjustments. Amounts excluded from the assessment of effectiveness are recorded directly in earnings.

Notes to consolidated financial statements

The following table outlines the Firm's primary uses of derivatives and the related hedge accounting designation or disclosure category.

Type of Derivative	Use of Derivative	Designation and disclosure	Affected segment or unit	Page reference
Manage specifically identified risk exposures in qualifying hedge accounting relationships:				
• Interest rate	Hedge fixed rate assets and liabilities	Fair value hedge	Corporate	202-203
• Interest rate	Hedge floating-rate assets and liabilities	Cash flow hedge	Corporate	204
• Foreign exchange	Hedge foreign currency-denominated assets and liabilities	Fair value hedge	Corporate	202-203
• Foreign exchange	Hedge foreign currency-denominated forecasted revenue and expense	Cash flow hedge	Corporate	204
• Foreign exchange	Hedge the value of the Firm's investments in non-U.S. dollar functional currency entities	Net investment hedge	Corporate	204
• Commodity	Hedge commodity inventory	Fair value hedge	CIB, AWM	202-203
Manage specifically identified risk exposures not designated in qualifying hedge accounting relationships:				
• Interest rate	Manage the risk associated with mortgage commitments, warehouse loans and MSRs	Specified risk management	CCB	205
• Credit	Manage the credit risk associated with wholesale lending exposures	Specified risk management	CIB	205
• Interest rate and foreign exchange	Manage the risk associated with certain other specified assets and liabilities	Specified risk management	Corporate	205
Market-making derivatives and other activities:				
• Various	Market-making and related risk management	Market-making and other	CIB	205
• Various	Other derivatives	Market-making and other	CIB, AWM, Corporate	205

Notional amount of derivative contracts

The following table summarizes the notional amount of free-standing derivative contracts outstanding as of December 31, 2022 and 2021.

December 31, (in billions)	Notional amounts ^(b)	
	2022	2021
Interest rate contracts		
Swaps	\$ 24,491	\$ 24,075
Futures and forwards	2,636	2,520
Written options	3,047	3,018
Purchased options	2,992	3,188
Total interest rate contracts	33,166	32,801
Credit derivatives^(a)	1,132	1,053
Foreign exchange contracts		
Cross-currency swaps	4,196	4,112
Spot, futures and forwards	7,017	7,679
Written options	775	741
Purchased options	759	727
Total foreign exchange contracts	12,747	13,259
Equity contracts		
Swaps	618	612
Futures and forwards	110	139
Written options	636	654
Purchased options	580	598
Total equity contracts	1,944	2,003
Commodity contracts		
Swaps	136	185
Spot, futures and forwards	136	188
Written options	117	135
Purchased options	98	111
Total commodity contracts	487	619
Total derivative notional amounts	\$ 49,476	\$ 49,735

(a) Refer to the Credit derivatives discussion on pages 205-207 for more information on volumes and types of credit derivative contracts.

(b) Represents the sum of gross long and gross short third-party notional derivative contracts.

While the notional amounts disclosed above give an indication of the volume of the Firm's derivatives activity, the notional amounts significantly exceed, in the Firm's view, the possible losses that could arise from such transactions. For most derivative contracts, the notional amount is not exchanged; it is simply a reference amount used to calculate payments.

Notes to consolidated financial statements

Impact of derivatives on the Consolidated balance sheets

The following table summarizes information on derivative receivables and payables (before and after netting adjustments) that are reflected on the Firm's Consolidated balance sheets as of December 31, 2022 and 2021, by accounting designation (e.g., whether the derivatives were designated in qualifying hedge accounting relationships or not) and contract type.

Free-standing derivative receivables and payables^(a)

December 31, 2022 (in millions)	Gross derivative receivables				Gross derivative payables				Net derivative payables ^(b)
	Not designated as hedges	Designated as hedges	Total derivative receivables	Net derivative receivables ^(b)	Not designated as hedges	Designated as hedges	Total derivative payables		
Trading assets and liabilities									
Interest rate	\$ 300,411	\$ 4	\$ 300,415	\$ 28,419	\$ 290,291	\$ -	\$ 290,291	\$ 15,970	
Credit	10,329	-	10,329	1,090	9,971	-	9,971	754	
Foreign exchange	239,946	1,633	241,579	23,365	248,911	2,610	251,521	18,856	
Equity	61,913	-	61,913	9,139	62,461	-	62,461	8,804	
Commodity	23,652	1,705	25,357	8,867	20,758	2,511	23,269	6,757	
Total fair value of trading assets and liabilities	\$ 636,251	\$ 3,342	\$ 639,593	\$ 70,880	\$ 632,392	\$ 5,121	\$ 637,513	\$ 51,141	

December 31, 2021 (in millions)	Gross derivative receivables				Gross derivative payables				Net derivative payables ^(b)
	Not designated as hedges	Designated as hedges	Total derivative receivables	Net derivative receivables ^(b)	Not designated as hedges	Designated as hedges	Total derivative payables		
Trading assets and liabilities									
Interest rate	\$ 270,562	\$ 23	\$ 270,585	\$ 21,974	\$ 240,731	\$ -	\$ 240,731	\$ 8,194	
Credit	9,839	-	9,839	1,031	10,912	-	10,912	880	
Foreign exchange	169,186	393	169,579	12,625	174,622	1,124	175,746	14,097	
Equity	68,631	-	68,631	9,981	79,727	-	79,727	17,233	
Commodity	21,233	5,420	26,653	11,470	20,837	7,091	27,928	9,712	
Total fair value of trading assets and liabilities	\$ 539,451	\$ 5,836	\$ 545,287	\$ 57,081	\$ 526,829	\$ 8,215	\$ 535,044	\$ 50,116	

(a) Balances exclude structured notes for which the fair value option has been elected. Refer to Note 3 for further information.

(b) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral receivables and payables when a legally enforceable master netting agreement exists.

Derivatives netting

The following tables present, as of December 31, 2022 and 2021, gross and net derivative receivables and payables by contract and settlement type. Derivative receivables and payables, as well as the related cash collateral from the same counterparty, have been netted on the Consolidated balance sheets where the Firm has obtained an appropriate legal opinion with respect to the master netting agreement. Where such a legal opinion has not been either sought or obtained, amounts are not eligible for netting on the Consolidated balance sheets, and those derivative receivables and payables are shown separately in the tables below.

In addition to the cash collateral received and transferred that is presented on a net basis with derivative receivables and payables, the Firm receives and transfers additional collateral (financial instruments and cash). These amounts mitigate counterparty credit risk associated with the Firm's derivative instruments, but are not eligible for net presentation:

- collateral that consists of liquid securities and other cash collateral held at third-party custodians, which are shown separately as "Collateral not nettable on the Consolidated balance sheets" in the tables below, up to the fair value exposure amount. For the purpose of this disclosure, the definition of liquid securities is consistent with the definition of high quality liquid assets as defined in the LCR rule;
- the amount of collateral held or transferred that exceeds the fair value exposure at the individual counterparty level, as of the date presented, which is excluded from the tables below; and
- collateral held or transferred that relates to derivative receivables or payables where an appropriate legal opinion has not been either sought or obtained with respect to the master netting agreement, which is excluded from the tables below.

December 31, (in millions)	2022			2021		
	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables
U.S. GAAP nettable derivative receivables						
Interest rate contracts:						
OTC	\$ 203,922	\$ (178,261)	\$ 25,661	\$ 251,953	\$ (234,283)	\$ 17,670
OTC-cleared	93,800	(93,424)	376	14,144	(13,839)	305
Exchange-traded ^(a)	559	(311)	248	498	(489)	9
Total interest rate contracts	298,281	(271,996)	26,285	266,595	(248,611)	17,984
Credit contracts:						
OTC	8,474	(7,535)	939	8,035	(7,177)	858
OTC-cleared	1,746	(1,704)	42	1,671	(1,631)	40
Total credit contracts	10,220	(9,239)	981	9,706	(8,808)	898
Foreign exchange contracts:						
OTC	237,941	(216,796)	21,145	166,185	(156,251)	9,934
OTC-cleared	1,461	(1,417)	44	789	(703)	86
Exchange-traded ^(a)	15	(1)	14	6	—	6
Total foreign exchange contracts	239,417	(218,214)	21,203	166,980	(156,954)	10,026
Equity contracts:						
OTC	30,323	(25,665)	4,658	25,704	(23,977)	1,727
Exchange-traded ^(a)	28,467	(27,109)	1,358	36,095	(34,673)	1,422
Total equity contracts	58,790	(52,774)	6,016	61,799	(58,650)	3,149
Commodity contracts:						
OTC	14,430	(7,633)	6,797	15,063	(6,868)	8,195
OTC-cleared	120	(112)	8	49	(49)	—
Exchange-traded ^(a)	9,103	(8,745)	358	8,279	(8,266)	13
Total commodity contracts	23,653	(16,490)	7,163	23,391	(15,183)	8,208
Derivative receivables with appropriate legal opinion	630,361	(568,713)	61,648 ^(d)	528,471	(488,206)	40,265 ^(d)
Derivative receivables where an appropriate legal opinion has not been either sought or obtained	9,232		9,232	16,816		16,816
Total derivative receivables recognized on the Consolidated balance sheets	\$ 639,593		\$ 70,880	\$ 545,287		\$ 57,081
Collateral not nettable on the Consolidated balance sheets^{(b)(c)}			(23,014)			(10,102)
Net amounts			\$ 47,866			\$ 46,979

Notes to consolidated financial statements

December 31, (in millions)	2022			2021		
	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables	Gross derivative payables	Amounts netted on the Consolidated balance sheets	Net derivative payables
U.S. GAAP nettable derivative payables						
Interest rate contracts:						
OTC	\$ 190,108	\$ (176,890)	\$ 13,218	\$ 223,576	\$ (216,757)	\$ 6,819
OTC-cleared	97,417	(97,126)	291	15,695	(15,492)	203
Exchange-traded ^(a)	327	(305)	22	292	(288)	4
Total interest rate contracts	287,852	(274,321)	13,531	239,563	(232,537)	7,026
Credit contracts:						
OTC	8,054	(7,572)	482	9,021	(8,421)	600
OTC-cleared	1,674	(1,645)	29	1,679	(1,611)	68
Total credit contracts	9,728	(9,217)	511	10,700	(10,032)	668
Foreign exchange contracts:						
OTC	246,457	(231,248)	15,209	171,610	(160,946)	10,664
OTC-cleared	1,488	(1,417)	71	706	(703)	3
Exchange-traded ^(a)	20	—	20	7	—	7
Total foreign exchange contracts	247,965	(232,665)	15,300	172,323	(161,649)	10,674
Equity contracts:						
OTC	29,833	(26,554)	3,279	31,379	(27,830)	3,549
Exchange-traded ^(a)	28,291	(27,103)	1,188	40,621	(34,664)	5,957
Total equity contracts	58,124	(53,657)	4,467	72,000	(62,494)	9,506
Commodity contracts:						
OTC	11,954	(7,642)	4,312	14,874	(9,667)	5,207
OTC-cleared	112	(112)	—	73	(73)	—
Exchange-traded ^(a)	9,021	(8,758)	263	8,954	(8,476)	478
Total commodity contracts	21,087	(16,512)	4,575	23,901	(18,216)	5,685
Derivative payables with appropriate legal opinion	624,756	(586,372)	38,384 ^(d)	518,487	(484,928)	33,559 ^(d)
Derivative payables where an appropriate legal opinion has not been either sought or obtained	12,757		12,757	16,557		16,557
Total derivative payables recognized on the Consolidated balance sheets	\$ 637,513		\$ 51,141	\$ 535,044		\$ 50,116
Collateral not nettable on the Consolidated balance sheets^{(b)(c)}			(3,318)			(5,872)
Net amounts			\$ 47,823			\$ 44,244

(a) Exchange-traded derivative balances that relate to futures contracts are settled daily.

(b) Includes liquid securities and other cash collateral held at third-party custodians related to derivative instruments where an appropriate legal opinion has been obtained. For some counterparties, the collateral amounts of financial instruments may exceed the derivative receivables and derivative payables balances. Where this is the case, the total amount reported is limited to the net derivative receivables and net derivative payables balances with that counterparty.

(c) Derivative collateral relates only to OTC and OTC-cleared derivative instruments.

(d) Net derivatives receivable included cash collateral netted of \$51.5 billion and \$67.6 billion at December 31, 2022 and 2021, respectively. Net derivatives payable included cash collateral netted of \$69.2 billion and \$64.3 billion at December 31, 2022 and 2021, respectively. Derivative cash collateral relates to OTC and OTC-cleared derivative instruments.

Liquidity risk and credit-related contingent features

In addition to the specific market risks introduced by each derivative contract type, derivatives expose JPMorgan Chase to credit risk – the risk that derivative counterparties may fail to meet their payment obligations under the derivative contracts and the collateral, if any, held by the Firm proves to be of insufficient value to cover the payment obligation. It is the policy of JPMorgan Chase to actively pursue, where possible, the use of legally enforceable master netting arrangements and collateral agreements to mitigate derivative counterparty credit risk inherent in derivative receivables.

While derivative receivables expose the Firm to credit risk, derivative payables expose the Firm to liquidity risk, as the derivative contracts typically require the Firm to post cash or securities collateral with counterparties as the fair value of the contracts moves in the counterparties' favor or upon specified downgrades in the Firm's and its subsidiaries' respective credit ratings. Certain derivative contracts also provide for termination of the contract, generally upon a downgrade of either the Firm or the counterparty, at the fair value of the derivative contracts. The following table shows the aggregate fair value of net derivative payables related to OTC and OTC-cleared derivatives that contain contingent collateral or termination features that may be triggered upon a ratings downgrade, and the associated collateral the Firm has posted in the normal course of business, at December 31, 2022 and 2021.

OTC and OTC-cleared derivative payables containing downgrade triggers

(in millions)	December 31, 2022	December 31, 2021
Aggregate fair value of net derivative payables	\$ 16,023	\$ 20,114
Collateral posted	15,505	19,402

The following table shows the impact of a single-notch and two-notch downgrade of the long-term issuer ratings of JPMorgan Chase & Co. and its subsidiaries, predominantly JPMorgan Chase Bank, N.A., at December 31, 2022 and 2021, related to OTC and OTC-cleared derivative contracts with contingent collateral or termination features that may be triggered upon a ratings downgrade. Derivatives contracts generally require additional collateral to be posted or terminations to be triggered when the predefined rating threshold is breached. A downgrade by a single rating agency that does not result in a rating lower than a preexisting corresponding rating provided by another major rating agency will generally not result in additional collateral (except in certain instances in which additional initial margin may be required upon a ratings downgrade), nor in termination payment requirements. The liquidity impact in the table is calculated based upon a downgrade below the lowest current rating of the rating agencies referred to in the derivative contract.

Liquidity impact of downgrade triggers on OTC and OTC-cleared derivatives

(in millions)	December 31, 2022		December 31, 2021	
	Single-notch downgrade	Two-notch downgrade	Single-notch downgrade	Two-notch downgrade
Amount of additional collateral to be posted upon downgrade ^(a)	\$ 128	\$ 1,293	\$ 219	\$ 1,577
Amount required to settle contracts with termination triggers upon downgrade ^(b)	88	925	98	787

(a) Includes the additional collateral to be posted for initial margin.

(b) Amounts represent fair values of derivative payables, and do not reflect collateral posted.

Derivatives executed in contemplation of a sale of the underlying financial asset

In certain instances the Firm enters into transactions in which it transfers financial assets but maintains the economic exposure to the transferred assets by entering into a derivative with the same counterparty in contemplation of the initial transfer. The Firm generally accounts for such transfers as collateralized financing transactions as described in Note 11, but in limited circumstances they may qualify to be accounted for as a sale and a derivative under U.S. GAAP. The amount of such transfers accounted for as a sale where the associated derivative was outstanding was not material at both December 31, 2022 and 2021.

Notes to consolidated financial statements

Impact of derivatives on the Consolidated statements of income

The following tables provide information related to gains and losses recorded on derivatives based on their hedge accounting designation or purpose.

Fair value hedge gains and losses

The following tables present derivative instruments, by contract type, used in fair value hedge accounting relationships, as well as pre-tax gains/(losses) recorded on such derivatives and the related hedged items for the years ended December 31, 2022, 2021 and 2020, respectively. The Firm includes gains/(losses) on the hedging derivative in the same line item in the Consolidated statements of income as the related hedged item.

Year ended December 31, 2022 (in millions)	Gains/(losses) recorded in income			Income statement impact of excluded components ^(e)		Derivatives - Gains/(losses) recorded in OCI ^(f)
	Derivatives	Hedged items	Income statement impact	Amortization approach	Changes in fair value	
Contract type						
Interest rate ^{(a)(b)}	\$ (14,352)	\$ 14,047	\$ (305)	–	\$ (262)	\$ –
Foreign exchange ^(c)	(1,317)	1,423	106	(528)	106	130
Commodity ^(d)	106	(70)	36	–	48	–
Total	\$ (15,563)	\$ 15,400	\$ (163)	(528)	\$ (108)	\$ 130

Year ended December 31, 2021 (in millions)	Gains/(losses) recorded in income			Income statement impact of excluded components ^(e)		Derivatives - Gains/(losses) recorded in OCI ^(f)
	Derivatives	Hedged items	Income statement impact	Amortization approach	Changes in fair value	
Contract type						
Interest rate ^{(a)(b)}	\$ (4,323)	\$ 3,765	\$ (558)	–	\$ (439)	\$ –
Foreign exchange ^(c)	(1,317)	1,349	32	(286)	32	(26)
Commodity ^(d)	(9,609)	9,710	101	–	72	–
Total	\$ (15,249)	\$ 14,824	\$ (425)	(286)	\$ (335)	\$ (26)

Year ended December 31, 2020 (in millions)	Gains/(losses) recorded in income			Income statement impact of excluded components ^(e)		Derivatives - Gains/(losses) recorded in OCI ^(f)
	Derivatives	Hedged items	Income statement impact	Amortization approach	Changes in fair value	
Contract type						
Interest rate ^{(a)(b)}	\$ 2,962	\$ (3,684)	\$ (722)	–	\$ (733)	\$ –
Foreign exchange ^(c)	793	(619)	174	(457)	174	25
Commodity ^(d)	(2,507)	2,650	143	–	137	–
Total	\$ 1,248	\$ (1,653)	\$ (405)	(457)	\$ (422)	\$ 25

- (a) Primarily consists of hedges of the benchmark (e.g., Secured Overnight Financing Rate (“SOFR”), London Interbank Offered Rate (“LIBOR”)) interest rate risk of fixed-rate long-term debt and AFS securities. Gains and losses were recorded in net interest income.
- (b) Effective January 1, 2022, the Firm updated its presentation in the tables above to include the amortization of income/expense associated with the inception hedge accounting adjustment applied to the hedged item; prior-period amounts have been revised to conform with the current presentation. Excludes the accrual of interest on interest rate swaps and the related hedged items.
- (c) Primarily consists of hedges of the foreign currency risk of long-term debt and AFS securities for changes in spot foreign currency rates. Gains and losses related to the derivatives and the hedged items due to changes in foreign currency rates and the income statement impact of excluded components were recorded primarily in principal transactions revenue and net interest income.
- (d) Consists of overall fair value hedges of physical commodities inventories that are generally carried at the lower of cost or net realizable value (net realizable value approximates fair value). Gains and losses were recorded in principal transactions revenue.
- (e) The assessment of hedge effectiveness excludes certain components of the changes in fair values of the derivatives and hedged items such as forward points on foreign exchange forward contracts, time values and cross-currency basis spreads. Excluded components may impact earnings either through amortization of the initial amount over the life of the derivative or through fair value changes recognized in the current period.
- (f) Represents the change in value of amounts excluded from the assessment of effectiveness under the amortization approach, predominantly cross-currency basis spreads. The amount excluded at inception of the hedge is recognized in earnings over the life of the derivative.

As of December 31, 2022 and 2021, the following amounts were recorded on the Consolidated balance sheets related to certain cumulative fair value hedge basis adjustments that are expected to reverse through the income statement in future periods as an adjustment to yield.

December 31, 2022 (in millions)	Carrying amount of the hedged items ^{(a)(b)}	Cumulative amount of fair value hedging adjustments included in the carrying amount of hedged items:		
		Active hedging relationships ^(d)	Discontinued hedging relationships ^{(d)(e)}	Total
Assets				
Investment securities - AFS	\$ 84,073 ^(c)	\$ (4,149)	\$ (1,542)	\$ (5,691)
Liabilities				
Long-term debt	\$ 175,257	\$ (11,879)	\$ (3,313)	\$ (15,192)
Beneficial interests issued by consolidated VIEs	—	—	—	—

December 31, 2021 (in millions)	Carrying amount of the hedged items ^{(a)(b)}	Cumulative amount of fair value hedging adjustments included in the carrying amount of hedged items:		
		Active hedging relationships ^(d)	Discontinued hedging relationships ^{(d)(e)}	Total
Assets				
Investment securities - AFS	\$ 65,746 ^(c)	\$ 417	\$ 661	\$ 1,078
Liabilities				
Long-term debt	\$ 195,642	\$ (1,999)	\$ 8,834	\$ 6,835
Beneficial interests issued by consolidated VIEs	749	—	(1)	(1)

- (a) Excludes physical commodities with a carrying value of \$26.0 billion and \$25.7 billion at December 31, 2022 and 2021, respectively, to which the Firm applies fair value hedge accounting. As a result of the application of hedge accounting, these inventories are carried at fair value, thus recognizing unrealized gains and losses in current periods. Since the Firm exits these positions at fair value, there is no incremental impact to net income in future periods.
- (b) Excludes hedged items where only foreign currency risk is the designated hedged risk, as basis adjustments related to foreign currency hedges will not reverse through the income statement in future periods. At December 31, 2022 and 2021, the carrying amount excluded for AFS securities is \$20.3 billion and \$14.0 billion, respectively, and for long-term debt is \$221 million and \$9.7 billion, respectively. Prior-period amount has been revised to conform with the current presentation.
- (c) Carrying amount represents the amortized cost, net of allowance if applicable. Refer to Note 10 for additional information.
- (d) Positive (negative) amounts related to assets represent cumulative fair value hedge basis adjustments that will reduce (increase) net interest income in future periods. Positive (negative) amounts related to liabilities represent cumulative fair value hedge basis adjustments that will increase (reduce) net interest income in future periods.
- (e) Represents basis adjustments existing on the balance sheet date associated with hedged items that have been de-designated from qualifying fair value hedging relationships.

Notes to consolidated financial statements

Cash flow hedge gains and losses

The following tables present derivative instruments, by contract type, used in cash flow hedge accounting relationships, and the pre-tax gains/(losses) recorded on such derivatives, for the years ended December 31, 2022, 2021 and 2020, respectively. The Firm includes the gains/(losses) on the hedging derivative in the same line item in the Consolidated statements of income as the change in cash flows on the related hedged item.

Year ended December 31, 2022 (in millions)	Derivatives gains/(losses) recorded in income and other comprehensive income/(loss)			Total change in OCI for period
	Amounts reclassified from AOCI to income	Amounts recorded in OCI		
Contract type				
Interest rate ^(a)	\$ (153)	\$ (7,131)		\$ (6,978)
Foreign exchange ^(b)	(267)	(342)		(75)
Total	\$ (420)	\$ (7,473)		\$ (7,053)

Year ended December 31, 2021 (in millions)	Derivatives gains/(losses) recorded in income and other comprehensive income/(loss)			Total change in OCI for period
	Amounts reclassified from AOCI to income	Amounts recorded in OCI		
Contract type				
Interest rate ^(a)	\$ 1,032	\$ (2,370)		\$ (3,402)
Foreign exchange ^(b)	190	67		(123)
Total	\$ 1,222	\$ (2,303)		\$ (3,525)

Year ended December 31, 2020 (in millions)	Derivatives gains/(losses) recorded in income and other comprehensive income/(loss)			Total change in OCI for period
	Amounts reclassified from AOCI to income	Amounts recorded in OCI		
Contract type				
Interest rate ^(a)	\$ 570	\$ 3,582		\$ 3,012
Foreign exchange ^(b)	—	41		41
Total	\$ 570	\$ 3,623		\$ 3,053

(a) Primarily consists of hedges of SOFR-indexed and LIBOR-indexed floating-rate assets. Gains and losses were recorded in net interest income.

(b) Primarily consists of hedges of the foreign currency risk of non-U.S. dollar-denominated revenue and expense. The income statement classification of gains and losses follows the hedged item – primarily noninterest revenue and compensation expense.

The Firm did not experience any forecasted transactions that failed to occur for the years ended 2022, 2021 and 2020.

Over the next 12 months, the Firm expects that approximately \$(1.5) billion (after-tax) of net losses recorded in AOCI at December 31, 2022, related to cash flow hedges will be recognized in income. For cash flow hedges that have been terminated, the maximum length of time over which the derivative results recorded in AOCI will be recognized in earnings is approximately seven years, corresponding to the timing of the originally hedged forecasted cash flows. For open cash flow hedges, the maximum length of time over which forecasted transactions are hedged is approximately seven years. The Firm's longer-dated forecasted transactions relate to core lending and borrowing activities.

Net investment hedge gains and losses

The following table presents hedging instruments, by contract type, that were used in net investment hedge accounting relationships, and the pre-tax gains/(losses) recorded on such instruments for the years ended December 31, 2022, 2021 and 2020.

Year ended December 31, (in millions)	2022		2021		2020	
	Amounts recorded in income ^{(a)(b)}	Amounts recorded in OCI	Amounts recorded in income ^{(a)(b)}	Amounts recorded in OCI	Amounts recorded in income ^{(a)(b)}	Amounts recorded in OCI
Foreign exchange derivatives	\$ (123)	\$ 3,591	\$ (228)	\$ 2,452	\$ (122)	\$ (1,408)

(a) Certain components of hedging derivatives are permitted to be excluded from the assessment of hedge effectiveness, such as forward points on foreign exchange forward contracts. The Firm elects to record changes in fair value of these amounts directly in other income.

(b) Excludes amounts reclassified from AOCI to income on the sale or liquidation of hedged entities. The Firm reclassified net pre-tax gains of \$38 million and \$3 million to other income/expense related to the liquidation of certain legal entities during the years ended December 31, 2022 and 2020, respectively. The amount reclassified for the year ended December 31, 2021 was not material. Refer to Note 24 for further information.

Gains and losses on derivatives used for specified risk management purposes

The following table presents pre-tax gains/(losses) recorded on a limited number of derivatives, not designated in hedge accounting relationships, that are used to manage risks associated with certain specified assets and liabilities, including certain risks arising from mortgage commitments, warehouse loans, MSRs, wholesale lending exposures, and foreign currency denominated assets and liabilities.

Year ended December 31, (in millions)	Derivatives gains/(losses) recorded in income		
	2022	2021	2020
Contract type			
Interest rate ^(a)	\$ (827)	\$ 1,078	\$ 2,994
Credit ^(b)	51	(94)	(176)
Foreign exchange ^(c)	(48)	94	43
Total	\$ (824)	\$ 1,078	\$ 2,861

- (a) Primarily represents interest rate derivatives used to hedge the interest rate risk inherent in mortgage commitments, warehouse loans and MSRs, as well as written commitments to originate warehouse loans. Gains and losses were recorded predominantly in mortgage fees and related income.
- (b) Relates to credit derivatives used to mitigate credit risk associated with lending exposures in the Firm's wholesale businesses. These derivatives do not include credit derivatives used to mitigate counterparty credit risk arising from derivative receivables, which is included in gains and losses on derivatives related to market-making activities and other derivatives. Gains and losses were recorded in principal transactions revenue.
- (c) Primarily relates to derivatives used to mitigate foreign exchange risk of specified foreign currency-denominated assets and liabilities. Gains and losses were recorded in principal transactions revenue.

Gains and losses on derivatives related to market-making activities and other derivatives

The Firm makes markets in derivatives in order to meet the needs of customers and uses derivatives to manage certain risks associated with net open risk positions from its market-making activities, including the counterparty credit risk arising from derivative receivables. All derivatives not included in the hedge accounting or specified risk management categories above are included in this category. Gains and losses on these derivatives are primarily recorded in principal transactions revenue. Refer to Note 6 for information on principal transactions revenue.

Credit derivatives

Credit derivatives are financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) and which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Credit derivatives expose the protection purchaser to the creditworthiness of the protection seller, as the protection seller is required to make payments under the contract when the reference entity experiences a credit event, such as a bankruptcy, a failure to pay its obligation or a restructuring. The seller of credit protection receives a premium for providing protection but has the risk that the underlying instrument referenced in the contract will be subject to a credit event.

The Firm is both a purchaser and seller of protection in the credit derivatives market and uses these derivatives for two primary purposes. First, in its capacity as a market-maker, the Firm actively manages a portfolio of credit derivatives by purchasing and selling credit protection, predominantly on corporate debt obligations, to meet the needs of customers. Second, as an end-user, the Firm uses credit derivatives to manage credit risk associated with lending exposures (loans and unfunded commitments) in its wholesale and consumer businesses and derivatives counterparty exposures in its wholesale businesses, and to manage the credit risk arising from certain financial instruments in the Firm's market-making businesses. Following is a summary of various types of credit derivatives.

Notes to consolidated financial statements

Credit default swaps

Credit derivatives may reference the credit of either a single reference entity (“single-name”), broad-based index or portfolio. The Firm purchases and sells protection on both single-name and index-reference obligations. Single-name CDS and index CDS contracts are either OTC or OTC-cleared derivative contracts. Single-name CDS are used to manage the default risk of a single reference entity, while index CDS contracts are used to manage the credit risk associated with the broader credit markets or credit market segments. Like the S&P 500 and other market indices, a CDS index consists of a portfolio of CDS across many reference entities. New series of CDS indices are periodically established with a new underlying portfolio of reference entities to reflect changes in the credit markets. If one of the reference entities in the index experiences a credit event, then the reference entity that defaulted is removed from the index. CDS can also be referenced against specific portfolios of reference names or against customized exposure levels based on specific client demands: for example, to provide protection against the first \$1 million of realized credit losses in a \$10 million portfolio of exposure. Such structures are commonly known as tranche CDS.

For both single-name CDS contracts and index CDS contracts, upon the occurrence of a credit event, under the terms of a CDS contract neither party to the CDS contract has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value of the reference obligation at settlement of the credit derivative contract, also known as the recovery value. The protection purchaser does not need to hold the debt instrument of the underlying reference entity in order to receive amounts due under the CDS contract when a credit event occurs.

Credit-related notes

A credit-related note is a funded derivative with a credit risk component where the issuer of the credit-related note purchases from the note investor credit protection on a reference entity or an index. Under the contract, the investor pays the issuer the par value of the note at the inception of the transaction, and in return, the issuer pays periodic payments to the investor, based on the credit risk of the referenced entity. The issuer also repays the investor the par value of the note at maturity unless the reference entity (or one of the entities that makes up a reference index) experiences a specified credit event. If a credit event occurs, the issuer is not obligated to repay the par value of the note, but rather, the issuer pays the investor the difference between the par value of the note and the fair value of the defaulted reference obligation at the time of settlement. Neither party to the credit-related note has recourse to the defaulting reference entity.

The following tables present a summary of the notional amounts of credit derivatives and credit-related notes the Firm sold and purchased as of December 31, 2022 and 2021. Upon a credit event, the Firm as a seller of protection would typically pay out only a percentage of the full notional amount of net protection sold, as the amount actually required to be paid on the contracts takes into account the recovery value of the reference obligation at the time of settlement. The Firm manages the credit risk on contracts to sell protection by purchasing protection with identical or similar underlying reference entities. Other purchased protection referenced in the following tables includes credit derivatives bought on related, but not identical, reference positions (including indices, portfolio coverage and other reference points) as well as protection purchased by CIB through credit-related notes primarily in its market-making businesses. In addition, the Firm obtains credit protection against certain loans in the retained consumer portfolio through the issuance of credit-related notes. Since these credit-related notes are not part of the market-making businesses they are not included in the table below.

The Firm does not use notional amounts of credit derivatives as the primary measure of risk management for such derivatives, because the notional amount does not take into account the probability of the occurrence of a credit event, the recovery value of the reference obligation, or related cash instruments and economic hedges, each of which reduces, in the Firm's view, the risks associated with such derivatives.

Total credit derivatives and credit-related notes

December 31, 2022 (in millions)	Maximum payout/Notional amount				
	Protection sold	Protection purchased with identical underlyings ^(c)	Net protection (sold)/ purchased ^(d)	Other protection purchased ^(e)	
Credit derivatives					
Credit default swaps	\$ (495,557)	\$ 509,846	\$ 14,289	\$ 2,917	
Other credit derivatives ^(a)	(47,165)	65,029	17,864	11,746	
Total credit derivatives	(542,722)	574,875	32,153	14,663	
Credit-related notes ^(b)	—	—	—	7,863	
Total	\$ (542,722)	\$ 574,875	\$ 32,153	\$ 22,526	
December 31, 2021 (in millions)					
Maximum payout/Notional amount					
Protection sold	Protection purchased with identical underlyings ^(c)	Net protection (sold)/ purchased ^(d)	Other protection purchased ^(e)		
Credit derivatives					
Credit default swaps	\$ (443,481)	\$ 458,180	\$ 14,699	\$ 2,269	
Other credit derivatives ^(a)	(56,130)	79,586	23,456	13,435	
Total credit derivatives	(499,611)	537,766	38,155	15,704	
Credit-related notes ^(b)	—	—	—	9,437	
Total	\$ (499,611)	\$ 537,766	\$ 38,155	\$ 25,141	

(a) Other credit derivatives predominantly consist of credit swap options and total return swaps.

(b) Represents Other protection purchased by CIB, primarily in its market-making businesses.

(c) Represents the total notional amount of protection purchased where the underlying reference instrument is identical to the reference instrument on protection sold; the notional amount of protection purchased for each individual identical underlying reference instrument may be greater or lower than the notional amount of protection sold.

(d) Does not take into account the fair value of the reference obligation at the time of settlement, which would generally reduce the amount the seller of protection pays to the buyer of protection in determining settlement value.

(e) Represents protection purchased by the Firm on referenced instruments (single-name, portfolio or index) where the Firm has not sold any protection on the identical reference instrument.

The following tables summarize the notional amounts by the ratings, maturity profile, and total fair value, of credit derivatives as of December 31, 2022 and 2021, where JPMorgan Chase is the seller of protection. The maturity profile is based on the remaining contractual maturity of the credit derivative contracts. The ratings profile is based on the rating of the reference entity on which the credit derivative contract is based. The ratings and maturity profile of credit derivatives where JPMorgan Chase is the purchaser of protection are comparable to the profile reflected below.

Protection sold – credit derivatives ratings^(a)/maturity profile

December 31, 2022 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables ^(b)	Fair value of payables ^(b)	Net fair value
Risk rating of reference entity							
Investment-grade	\$ (90,484)	\$ (294,791)	\$ (30,822)	\$ (416,097)	\$ 2,324	\$ (1,495)	\$ 829
Noninvestment-grade	(33,244)	(87,011)	(6,370)	(126,625)	1,267	(3,209)	(1,942)
Total	\$ (123,728)	\$ (381,802)	\$ (37,192)	\$ (542,722)	\$ 3,591	\$ (4,704)	\$ (1,113)
December 31, 2021 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables ^(b)	Fair value of payables ^(b)	Net fair value
Risk rating of reference entity							
Investment-grade	\$ (91,155)	\$ (255,106)	\$ (29,035)	\$ (375,296)	\$ 3,645	\$ (623)	\$ 3,022
Noninvestment-grade	(32,175)	(84,851)	(7,289)	(124,315)	2,630	(2,003)	627
Total	\$ (123,330)	\$ (339,957)	\$ (36,324)	\$ (499,611)	\$ 6,275	\$ (2,626)	\$ 3,649

(a) The ratings scale is primarily based on external credit ratings defined by S&P and Moody's.

(b) Amounts are shown on a gross basis, before the benefit of legally enforceable master netting agreements including cash collateral netting.

Note 6 – Noninterest revenue and noninterest expense

Noninterest revenue

The Firm records noninterest revenue from certain contracts with customers in investment banking fees, deposit-related fees, asset management, administration, and commissions, and components of card income. The related contracts are often terminable on demand and the Firm has no remaining obligation to deliver future services. For arrangements with a fixed term, the Firm may commit to deliver services in the future. Revenue associated with these remaining performance obligations typically depends on the occurrence of future events or underlying asset values, and is not recognized until the outcome of those events or values are known.

Investment banking fees

This revenue category includes debt and equity underwriting and advisory fees. As an underwriter, the Firm helps clients raise capital via public offering and private placement of various types of debt and equity instruments. Underwriting fees are primarily based on the issuance price and quantity of the underlying instruments, and are recognized as revenue typically upon execution of the client's transaction. The Firm also manages and syndicates loan arrangements. Credit arrangement and syndication fees, included within debt underwriting fees, are recorded as revenue after satisfying certain retention, timing and yield criteria.

The Firm also provides advisory services, by assisting its clients with mergers and acquisitions, divestitures, restructuring and other complex transactions. Advisory fees are recognized as revenue typically upon execution of the client's transaction.

The following table presents the components of investment banking fees.

Year ended December 31, (in millions)	2022	2021	2020
Underwriting			
Equity	\$ 975	\$ 3,969	\$ 2,759
Debt	2,732	4,853	4,362
Total underwriting	3,707	8,822	7,121
Advisory	2,979	4,394	2,365
Total investment banking fees	\$ 6,686	\$ 13,216	\$ 9,486

Investment banking fees are earned primarily by CIB. Refer to Note 32 for segment results.

Principal transactions

Principal transactions revenue is driven by many factors, including:

- the bid-offer spread, which is the difference between the price at which a market participant is willing and able to sell an instrument to the Firm and the price at which another market participant is willing and able to buy it from the Firm, and vice versa; and
- realized and unrealized gains and losses on financial instruments and commodities transactions, including those accounted for under the fair value option, primarily used in client-driven market-making activities, and on private equity investments.
 - Realized gains and losses result from the sale of instruments, closing out or termination of transactions, or interim cash payments.
 - Unrealized gains and losses result from changes in valuation.

In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities, including physical commodities inventories and financial instruments that reference commodities.

Principal transactions revenue also includes realized and unrealized gains and losses related to:

- derivatives designated in qualifying hedge accounting relationships, primarily fair value hedges of commodity and foreign exchange risk;
- derivatives used for specific risk management purposes, primarily to mitigate credit, foreign exchange and interest rate risks.

Refer to Note 5 for further information on the income statement classification of gains and losses from derivatives activities.

In the financial commodity markets, the Firm transacts in OTC derivatives (e.g., swaps, forwards, options) and ETD that reference a wide range of underlying commodities. In the physical commodity markets, the Firm primarily purchases and sells precious and base metals and may hold other commodities inventories under financing and other arrangements with clients.

The following table presents all realized and unrealized gains and losses recorded in principal transactions revenue. This table excludes interest income and interest expense on trading assets and liabilities, which are an integral part of the overall performance of the Firm's client-driven market-making activities in CIB and fund deployment activities in Treasury and CIO. Refer to Note 7 for further information on interest income and interest expense.

Trading revenue is presented primarily by instrument type. The Firm's client-driven market-making businesses generally utilize a variety of instrument types in connection with their market-making and related risk-management activities; accordingly, the trading revenue presented in the table below is not representative of the total revenue of any individual LOB.

Year ended December 31, (in millions)	2022	2021	2020
Trading revenue by instrument type			
Interest rate ^(a)	\$ 3,010	\$ 1,646	\$ 2,575
Credit ^(b)	1,412 ^(c)	2,691	2,753
Foreign exchange	5,119	2,787	4,253
Equity	8,068	7,773	6,171
Commodity	2,348	1,428	2,088
Total trading revenue	19,957	16,325	17,840
Private equity gains/(losses)	(45)	(21)	181
Principal transactions	\$ 19,912	\$ 16,304	\$ 18,021

- (a) Includes the impact of changes in funding valuation adjustments on derivatives.
- (b) Includes the impact of changes in credit valuation adjustments on derivatives, net of the associated hedging activities.
- (c) Includes net markdowns on held-for-sale positions, primarily unfunded commitments, in the bridge financing portfolio.

Principal transactions revenue is earned primarily by CIB. Refer to Note 32 for segment results.

Lending- and deposit-related fees

Lending-related fees include fees earned from loan commitments, standby letters of credit, financial guarantees, and other loan-servicing activities. Deposit-related fees include fees earned from providing overdraft and other deposit account services, and from performing cash management activities. Lending- and deposit-related fees in this revenue category are recognized over the period in which the related service is provided.

The following table presents the components of lending- and deposit-related fees.

Year ended December 31, (in millions)	2022	2021	2020
Lending-related fees	\$ 1,468	\$ 1,472	\$ 1,271
Deposit-related fees	5,630	5,560	5,240
Total lending- and deposit-related fees	\$ 7,098	\$ 7,032	\$ 6,511

Lending- and deposit-related fees are earned by CCB, CIB, CB, and AWM. Refer to Note 32 for segment results.

Asset management, administration and commissions

This revenue category includes fees from investment management and related services, custody, brokerage services and other products. The Firm manages assets on behalf of its clients, including investors in Firm-sponsored funds and owners of separately managed investment accounts. Management fees are typically based on the value of assets under management and are collected and recognized at the end of each period over which the management services are provided and the value of the managed assets is known. The Firm also receives performance-based management fees, which are earned based on exceeding certain benchmarks or other performance targets and are accrued and recognized when the probability of reversal is remote, typically at the end of the related billing period. The Firm has contractual arrangements with third parties to provide distribution and other services in connection with its asset management activities. Amounts paid to these third-party service

providers are generally recorded in professional and outside services expense.

The following table presents the components of Firmwide asset management, administration and commissions.

Year ended December 31, (in millions)	2022	2021	2020
Asset management fees			
Investment management fees ^(a)	\$ 13,765	\$ 14,027	\$ 11,694
All other asset management fees ^(b)	331	378	338
Total asset management fees	14,096	14,405	12,032
Total administration fees ^(c)	2,348	2,554	2,249
Commissions and other fees			
Brokerage commissions ^(d)	2,831	3,046	2,959
All other commissions and fees ^(e)	1,402	1,024	937
Total commissions and fees	4,233	4,070	3,896
Total asset management, administration and commissions	\$ 20,677	\$ 21,029	\$ 18,177

- (a) Represents fees earned from managing assets on behalf of the Firm's clients, including investors in Firm-sponsored funds and owners of separately managed investment accounts.
- (b) Represents fees for services that are ancillary to investment management services, such as commissions earned on the sales or distribution of mutual funds to clients. These fees are recorded as revenue at the time the service is rendered or, in the case of certain distribution fees based on the underlying fund's asset value and/or investor redemption, recorded over time as the investor remains in the fund or upon investor redemption.
- (c) Predominantly includes fees for custody, securities lending, funds services and securities clearance. These fees are recorded as revenue over the period in which the related service is provided.
- (d) Represents commissions earned when the Firm acts as a broker, by facilitating its clients' purchases and sales of securities and other financial instruments. Brokerage commissions are collected and recognized as revenue upon occurrence of the client transaction. The Firm reports certain costs paid to third-party clearing houses and exchanges net against commission revenue.
- (e) Includes travel-related and annuity sales commissions, depositary receipt-related service fees, as well as other service fees, which are recognized as revenue when the services are rendered.

Asset management, administration and commissions are earned primarily by AWM, CIB and CCB. Refer to Note 32 for segment results.

Mortgage fees and related income

This revenue category reflects CCB's Home Lending production and net mortgage servicing revenue.

Production revenue includes fees and income recognized as earned on mortgage loans originated with the intent to sell, and the impact of risk management activities associated with the mortgage pipeline and warehouse loans.

Production revenue also includes gains and losses on sales and lower of cost or fair value adjustments on mortgage loans held-for-sale (excluding certain repurchased loans insured by U.S. government agencies), and changes in the fair value of financial instruments measured under the fair value option. Net mortgage servicing revenue includes operating revenue earned from servicing third-party mortgage loans, which is recognized over the period in which the service is provided; changes in the fair value of MSRs; the impact of risk management activities associated

Notes to consolidated financial statements

with MSRs; and gains and losses on securitization of excess mortgage servicing. Net mortgage servicing revenue also includes gains and losses on sales and lower of cost or fair value adjustments of certain repurchased loans insured by U.S. government agencies.

Refer to Note 15 for further information on risk management activities and MSRs.

Net interest income from mortgage loans is recorded in interest income.

Card income

This revenue category includes interchange and other income from credit and debit card transactions; and fees earned from processing card transactions for merchants, both of which are recognized when purchases are made by a cardholder and presented net of certain transaction-related costs. Card income also includes account origination costs and annual fees, which are deferred and recognized on a straight-line basis over a 12-month period.

Certain credit card products offer the cardholder the ability to earn points based on account activity, which the cardholder can choose to redeem for cash and non-cash rewards. The cost to the Firm related to these proprietary rewards programs varies based on multiple factors including the terms and conditions of the rewards programs, cardholder activity, cardholder reward redemption rates and cardholder reward selections. The Firm maintains a liability for its obligations under its rewards programs and reports the current-period cost as a reduction of card income.

Credit card revenue sharing agreements

The Firm has contractual agreements with numerous co-brand partners that grant the Firm exclusive rights to issue co-branded credit card products and market them to the customers of such partners. These partners endorse the co-brand credit card programs and provide their customer or member lists to the Firm. The partners may also conduct marketing activities and provide rewards redeemable under their own loyalty programs that the Firm will grant to co-brand credit cardholders based on account activity. The terms of these agreements generally range from five to ten years.

The Firm typically makes payments to the co-brand credit card partners based on the cost of partners' marketing activities and loyalty program rewards provided to credit cardholders, new account originations and sales volumes. Payments to partners based on marketing efforts undertaken by the partners are expensed by the Firm as incurred and reported as marketing expense. Payments for partner loyalty program rewards are reported as a reduction of card income when incurred. Payments to partners based on new credit card account originations are accounted for as direct loan origination costs and are deferred and recognized as a reduction of card income on a straight-line basis over a 12-month period. Payments to partners based on sales volumes are reported as a reduction of card income when the related interchange

income is earned.

The following table presents the components of card income:

Year ended December 31, (in millions)	2022	2021	2020
Interchange and merchant processing income	\$ 28,085	\$ 23,592	\$ 18,563
Reward costs and partner payments	(22,162)	(17,868)	(13,637)
Other card income ^(a)	(1,503)	(622)	(491)
Total card income	\$ 4,420	\$ 5,102	\$ 4,435

(a) Predominantly represents the amortization of account origination costs and annual fees, which are deferred and recognized on a straight-line basis over a 12-month period.

Card income is earned primarily by CCB, CIB and CB. Refer to Note 32 for segment results.

Other income

This revenue category includes operating lease income, as well as losses associated with the Firm's tax-oriented investments, predominantly alternative energy equity-method investments in CIB.

The following table presents certain components of other income:

Year ended December 31, (in millions)	2022	2021	2020
Operating lease income	\$ 3,654	\$ 4,914	\$ 5,539
Losses on tax-oriented investments ^(a)	(1,491)	(1,570)	(1,280)
Gain on sale of Visa B shares	914	—	—

(a) The losses associated with these tax-oriented investments are more than offset by lower income tax expense from the associated tax credits.

Refer to Note 2 and 18 for additional information on Visa B shares and operating leases, respectively.

Noninterest expense

Other expense

Other expense on the Firm's Consolidated statements of income included:

Year ended December 31, (in millions)	2022	2021	2020
Legal expense	\$ 266	\$ 426	\$ 1,115

Note 7 – Interest income and Interest expense

Interest income and interest expense are recorded in the Consolidated statements of income and classified based on the nature of the underlying asset or liability.

The following table presents the components of interest income and interest expense:

Year ended December 31, (in millions)	2022	2021	2020
Interest income			
Loans ^(a)	\$ 52,736	\$ 41,537	\$ 43,758
Taxable securities	10,372	6,460	7,843
Non-taxable securities ^(b)	975	1,063	1,184
Total investment securities ^(a)	11,347	7,523	9,027
Trading assets - debt instruments	9,053	6,825	7,832
Federal funds sold and securities purchased under resale agreements	4,632	958	2,436
Securities borrowed ^(c)	2,237	(385)	(302)
Deposits with banks	9,039	512	749
All other interest-earning assets ^(d)	3,763	894	1,023
Total interest income	\$ 92,807	\$ 57,864	\$ 64,523
Interest expense			
Interest bearing deposits	\$ 10,082	\$ 531	\$ 2,357
Federal funds purchased and securities loaned or sold under repurchase agreements	3,721	274	1,058
Short-term borrowings ^(e)	747	126	372
Trading liabilities - debt and all other interest-bearing liabilities ^(f)	3,246	257	195
Long-term debt	8,075	4,282	5,764
Beneficial interest issued by consolidated VIEs	226	83	214
Total interest expense	\$ 26,097	\$ 5,553	\$ 9,960
Net interest income	\$ 66,710	\$ 52,311	\$ 54,563
Provision for credit losses	6,389	(9,256)	17,480
Net interest income after provision for credit losses	\$ 60,321	\$ 61,567	\$ 37,083

- (a) Includes the amortization/accretion of unearned income (e.g., purchase premiums/discounts and net deferred fees/costs).
- (b) Represents securities that are tax-exempt for U.S. federal income tax purposes.
- (c) Negative interest and rates reflect the net impact of interest earned offset by fees paid on client-driven prime brokerage securities borrowed transactions.
- (d) Includes interest earned on brokerage-related held-for-investment customer receivables, which are classified in accrued interest and accounts receivable, and all other interest-earning assets, which are classified in other assets on the Consolidated balance sheets.
- (e) Includes commercial paper.
- (f) All other interest-bearing liabilities includes interest expense on brokerage-related customer payables.

Interest income and interest expense includes the current-period interest accruals for financial instruments measured at fair value, except for derivatives and financial instruments containing embedded derivatives that would be separately accounted for in accordance with U.S. GAAP, absent the fair value option election; for those instruments, all changes in fair value including any interest elements, are primarily reported in principal transactions revenue. For financial instruments that are not measured at fair value, the related interest is included within interest income or interest expense, as applicable. Refer to Notes 12, 10, 11 and 20 for further information on accounting for interest income and interest expense related to loans, investment securities, securities financing activities (i.e., securities purchased or sold under resale or repurchase agreements; securities borrowed; and securities loaned) and long-term debt, respectively.

Notes to consolidated financial statements

Note 8 – Pension and other postretirement employee benefit plans

The Firm has various defined benefit pension plans and OPEB plans that provide benefits to its employees in the U.S. and certain non-U.S. locations. Substantially all the defined benefit pension plans are closed to new participants. The principal defined benefit pension plan in the U.S., which covered substantially all U.S. employees, was closed to new participants and frozen for existing participants on January 1, 2020, (and January 1, 2019 for new hires on or after December 2, 2017). Interest credits continue to accrue to participants' accounts based on their accumulated balances.

The Firm maintains funded and unfunded postretirement benefit plans that provide medical and life insurance for certain eligible employees and retirees as well as their

dependents covered under these programs. None of these plans have a material impact on the Firm's Consolidated Financial Statements.

The Firm also provides a qualified defined contribution plan in the U.S. and maintains other similar arrangements in certain non-U.S. locations. The most significant of these plans is the JPMorgan Chase 401(k) Savings Plan ("the 401(k) Savings Plan"), which covers substantially all U.S. employees. Employees can contribute to the 401(k) Savings Plan on a pretax and/or Roth 401(k) after-tax basis. The Firm makes an annual matching contribution as well as an annual profit-sharing contribution to the 401(k) Savings Plan on behalf of eligible participants.

The following table presents the pretax benefit obligations, plan assets, the net funded status, and the amounts recorded in AOCI on the Consolidated balance sheets for the Firm's significant defined benefit pension and OPEB plans.

As of or for the year ended December 31, (in millions)	Defined benefit pension and OPEB plans	
	2022	2021
Projected benefit obligations	\$ (13,545)	\$ (18,046)
Fair value of plan assets	19,890	25,692
Net funded status	6,345	7,646
Accumulated other comprehensive income/(loss)	(1,916)	(453)

The weighted-average discount rate used to value the benefit obligations as of December 31, 2022 and 2021, was 5.14% and 2.54%, respectively.

Gains and losses

Gains or losses resulting from changes in the benefit obligation and the fair value of plan assets are recorded in OCI. Amortization of net gains or losses are recognized as part of the net periodic benefit cost over subsequent periods, if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the projected benefit obligation or the fair value of the plan assets. Amortization is generally over the average expected remaining lifetime of plan participants, given the frozen status of most plans.

During the year ended December 31, 2022, a remeasurement of the Firm's U.S. principal defined benefit plan in the third quarter, was required as a result of a

pension settlement. The remeasurement resulted in a reduction in the fair value of the Firm's U.S. principal defined benefit plan assets, reflecting market conditions at the time of remeasurement, and a reduction in the plan's projected benefit obligation totaling \$4.0 billion and \$2.6 billion, respectively, resulting in a net decrease of \$1.4 billion in pre-tax AOCI. For the year ended December 31, 2021, the net gain was predominantly attributable to market-driven increases in the fair value of plan assets and the discount rate.

The following table presents the net periodic benefit costs reported in the Consolidated statements of income for the Firm's defined benefit pension, defined contribution and OPEB plans, and in other comprehensive income for the defined benefit pension and OPEB plans.

Year ended December 31, (in millions)	Pension and OPEB plans		
	2022	2021	2020
Total net periodic defined benefit plan cost/(credit) ^(a)	\$ (192)	\$ (201)	\$ (285)
Total defined contribution plans	1,408	1,333	1,332
Total pension and OPEB cost included in noninterest expense	\$ 1,216	\$ 1,132	\$ 1,047
Total recognized in other comprehensive (income)/loss	\$ 1,459	\$ (1,129)	\$ (214)

(a) Includes pension settlement loss of \$92 million and \$33 million, respectively, for the years ended December 31, 2022 and 2021.

The following table presents the weighted-average actuarial assumptions used to determine the net periodic benefit costs for the defined benefit pension and OPEB plans.

	Defined benefit pension and OPEB plans		
Year ended December 31,	2022	2021	2020
Discount rate	2.54 %	2.17 %	2.93 %
Expected long-term rate of return on plan assets	3.68 %	2.97 %	3.91 %

Plan assumptions

The Firm's expected long-term rate of return is a blended weighted average, by asset allocation of the projected long-term returns for the various asset classes, taking into consideration local market conditions and the specific allocation of plan assets. Returns on asset classes are developed using a forward-looking approach and are not strictly based on historical returns, with consideration given to current market conditions and the portfolio mix of each plan.

The discount rates used in determining the benefit obligations are generally provided by the Firm's actuaries, with the Firm's principal defined benefit pension plan using a rate that was selected by reference to the yields on portfolios of bonds with maturity dates and coupons that closely match each of the plan's projected cash flows.

Investment strategy and asset allocation

The assets of the Firm's defined benefit pension plans are held in various trusts and are invested in well-diversified portfolios of equity and fixed income securities, cash and cash equivalents, and alternative investments. The Firm regularly reviews the asset allocations and asset managers, as well as other factors that could impact the portfolios, which are rebalanced when deemed necessary. The approved asset allocation ranges by asset class for the Firm's principal defined benefit plan are 42-100% debt securities, 0-40% equity securities, 0-3% real estate, and 0-12% alternatives as of December 31, 2022.

As of December 31, 2022, assets held by the Firm's defined benefit pension and OPEB plans do not include securities issued by JPMorgan Chase or its affiliates, except through indirect exposures through investments in exchange traded funds, mutual funds and collective investment funds managed by third-parties. The defined benefit pension and OPEB plans hold investments that are sponsored or managed by affiliates of JPMorgan Chase in the amount of \$1.7 billion and \$2.5 billion, as of December 31, 2022 and 2021, respectively.

Fair value measurement of the plans' assets and liabilities

Refer to Note 2 for information on fair value measurements, including descriptions of level 1, 2, and 3 of the fair value hierarchy and the valuation methods employed by the Firm.

Pension plan assets and liabilities measured at fair value

December 31, (in millions)	Defined benefit pension and OPEB plans							
	2022				2021			
	Level 1 ^(a)	Level 2 ^(b)	Level 3 ^(c)	Total fair value	Level 1 ^(a)	Level 2 ^(b)	Level 3 ^(c)	Total fair value
Assets measured at fair value classified in fair value hierarchy	\$ 5,308	\$ 9,617	\$ 2,613	\$ 17,538	\$ 6,541	\$ 12,315	\$ 3,172	\$ 22,028
Assets measured at fair value using NAV as practical expedient not classified in fair value hierarchy				2,593				3,960
Net defined benefit pension plan payables not classified in fair value hierarchy				(241)				(296)
Total fair value of plan assets	\$ 19,890				\$ 25,692			

(a) Consists predominantly of equity securities, U.S. federal, state, and local and non-U.S. government debt securities, and cash equivalents.

(b) Consists predominantly of corporate debt securities and U.S. federal, state, and local and non-U.S. government debt securities.

(c) Consists of corporate-owned life insurance policies and participating annuity contracts.

Notes to consolidated financial statements

Changes in level 3 fair value measurements using significant unobservable inputs

Investments classified in level 3 of the fair value hierarchy decreased in 2022 to \$2.6 billion, due to \$501 million in unrealized losses and \$54 million in settlements, and increased in 2021 to \$3.2 billion, predominantly due to \$332 million in unrealized gains, partially offset by \$94 million in settlements.

Estimated future benefit payments

The following table presents benefit payments expected to be paid for the defined benefit pension and OPEB plans for the years indicated.

Year ended December 31, (in millions)	Defined benefit pension and OPEB plans
2023	\$ 1,022
2024	1,016
2025	1,007
2026	980
2027	977
Years 2028-2032	4,720

Note 9 – Employee share-based incentives

Employee share-based awards

In 2022, 2021 and 2020, JPMorgan Chase granted long-term share-based awards to certain employees under its LTIP, as amended and restated effective May 15, 2018, and subsequently amended effective May 18, 2021. Under the terms of the LTIP, as of December 31, 2022, 69 million shares of common stock were available for issuance through May 2025. The LTIP is the only active plan under which the Firm is currently granting share-based incentive awards. In the following discussion, the LTIP, plus prior Firm plans and plans assumed as the result of acquisitions, are referred to collectively as the “LTI Plans,” and such plans constitute the Firm’s share-based incentive plans.

RSUs are awarded at no cost to the recipient upon their grant. Generally, RSUs are granted annually and vest at a rate of 50% after two years and 50% after three years and are converted into shares of common stock as of the vesting date. In addition, RSUs typically include full-career eligibility provisions, which allow employees to continue to vest upon voluntary termination based on age and/or service-related requirements, subject to post-employment and other restrictions. All RSU awards are subject to forfeiture until vested and contain clawback provisions that may result in cancellation under certain specified circumstances. Predominantly all RSUs entitle the recipient to receive cash payments equivalent to any dividends paid on the underlying common stock during the period the RSUs are outstanding.

Performance share units (“PSUs”) are granted annually, and approved by the Firm’s Board of Directors, to members of the Firm’s Operating Committee under the variable compensation program. PSUs are subject to the Firm’s achievement of specified performance criteria over a three-year period. The number of awards that vest can range from zero to 150% of the grant amount. In addition, dividends that accrue during the vesting period are reinvested in dividend equivalent share units. PSUs and the related dividend equivalent share units are converted into shares of common stock after vesting.

Once the PSUs and dividend equivalent share units have vested, the shares of common stock that are delivered, after applicable tax withholding, must be retained for an additional holding period, for a total combined vesting and holding period of approximately five to eight years from the grant date depending on regulations in certain countries.

Under the LTI Plans, stock appreciation rights (“SARs”) and stock options have generally been granted with an exercise price equal to the fair value of JPMorgan Chase’s common stock on the grant date. SARs and stock options generally expire ten years after the grant date. In 2021, the Firm awarded its Chairman and CEO and its President and Chief Operating Officer 1.5 million and 750,000 SARs, respectively. There were no grants of SARs or stock options in 2022 and grants in 2020 were not material.

The Firm separately recognizes compensation expense for each tranche of each award, net of estimated forfeitures, as if it were a separate award with its own vesting date.

Generally, for each tranche granted, compensation expense is recognized on a straight-line basis from the grant date until the vesting date of the respective tranche, provided that the employees will not become full-career eligible during the vesting period. For awards with full-career eligibility provisions and awards granted with no future substantive service requirement, the Firm accrues the estimated value of awards expected to be awarded to employees as of the grant date without giving consideration to the impact of post-employment restrictions. For each tranche granted to employees who will become full-career eligible during the vesting period, compensation expense is recognized on a straight-line basis from the grant date until the earlier of the employee’s full-career eligibility date or the vesting date of the respective tranche.

The Firm’s policy for issuing shares upon settlement of employee share-based incentive awards is to issue either new shares of common stock or treasury shares. During 2022, 2021 and 2020, the Firm settled all of its employee share-based awards by issuing treasury shares.

Refer to Note 23 for further information on the classification of share-based awards for purposes of calculating earnings per share.

Notes to consolidated financial statements

RSUs, PSUs, SARs and stock options activity

Generally, compensation expense for RSUs and PSUs is measured based on the number of units granted multiplied by the stock price at the grant date, and for SARs and stock options, is measured at the grant date using the Black-Scholes valuation model. Compensation expense for these awards is recognized in net income as described previously. The following table summarizes JPMorgan Chase's RSUs, PSUs, SARs and stock options activity for 2022.

Year ended December 31, 2022 (in thousands, except weighted-average data, and where otherwise stated)	RSUs/PSUs		SARs/Options			
	Number of units	Weighted-average grant date fair value	Number of awards	Weighted-average exercise price	Weighted-average remaining contractual life (in years)	Aggregate intrinsic value
Outstanding, January 1	45,405	\$ 126.32	3,369	\$ 116.62		
Granted	23,729	147.17	—	—		
Exercised or vested	(19,517)	117.06	(858)	44.70		
Forfeited	(1,891)	141.74	—	—		
Canceled	NA	NA	—	—		
Outstanding, December 31	47,726	\$ 139.90	2,511	\$ 141.19	7.8	\$ 22,695
Exercisable, December 31	NA	NA	261	46.58	0.1	22,695

The total fair value of RSUs that vested during the years ended December 31, 2022, 2021 and 2020, was \$3.2 billion, \$2.9 billion and \$2.8 billion, respectively. The total intrinsic value of options exercised during the years ended December 31, 2022, 2021 and 2020, was \$75 million, \$232 million and \$182 million, respectively.

Compensation expense

The Firm recognized the following noncash compensation expense related to its various employee share-based incentive plans in its Consolidated statements of income.

Year ended December 31, (in millions)	2022	2021	2020
Cost of prior grants of RSUs, PSUs, SARs and stock options that are amortized over their applicable vesting periods	\$ 1,253	\$ 1,161	\$ 1,101
Accrual of estimated costs of share-based awards to be granted in future periods, predominantly those to full-career eligible employees	1,541	1,768	1,350
Total noncash compensation expense related to employee share-based incentive plans	\$ 2,794	\$ 2,929	\$ 2,451

At December 31, 2022, approximately \$1.0 billion (pretax) of compensation expense related to unvested awards had not yet been charged to net income. That cost is expected to be amortized into compensation expense over a weighted-average period of 1.8 years. The Firm does not capitalize any compensation expense related to share-based compensation awards to employees.

Tax benefits

Income tax benefits (including tax benefits from dividends or dividend equivalents) related to share-based incentive arrangements recognized in the Firm's Consolidated statements of income for the years ended December 31, 2022, 2021 and 2020, were \$901 million, \$957 million and \$837 million, respectively.

Note 10 – Investment securities

Investment securities consist of debt securities that are classified as AFS or HTM. Debt securities classified as trading assets are discussed in Note 2. Predominantly all of the Firm's AFS and HTM securities are held by Treasury and CIO in connection with its asset-liability management activities.

AFS securities are carried at fair value on the Consolidated balance sheets. Unrealized gains and losses, after any applicable hedge accounting adjustments or allowance for credit losses, are reported in AOCI. The specific identification method is used to determine realized gains and losses on AFS securities, which are included in investment securities gains/(losses) on the Consolidated statements of income. HTM securities, which the Firm has the intent and ability to hold until maturity, are carried at amortized cost, net of allowance for credit losses, on the Consolidated balance sheets.

For both AFS and HTM securities, purchase discounts or premiums are generally amortized into interest income on a level-yield basis over the contractual life of the security. However, premiums on certain callable debt securities are amortized to the earliest call date.

During 2022 and 2021, the Firm transferred \$78.3 billion and \$104.5 billion of investment securities, respectively, from AFS to HTM for capital management purposes. AOCI included pretax unrealized gains/(losses) of \$(4.8) billion and \$425 million, respectively, on the securities at the dates of transfer.

Unrealized gains or losses at the date of transfer of these securities continue to be reported in AOCI and are amortized into interest income on a level-yield basis over the remaining life of the securities. This amortization will offset the effect on interest income of the amortization of the premium or discount resulting from the transfer recorded at fair value.

Transfers of securities from AFS to HTM are non-cash transactions and are recorded at fair value.

Notes to consolidated financial statements

The amortized costs and estimated fair values of the investment securities portfolio were as follows for the dates indicated.

December 31, (in millions)	2022				2021			
	Amortized cost ^{(b)(c)}	Gross unrealized gains	Gross unrealized losses	Fair value	Amortized cost ^{(b)(c)}	Gross unrealized gains	Gross unrealized losses	Fair value
Available-for-sale securities								
Mortgage-backed securities:								
U.S. GSEs and government agencies	\$ 77,194	\$ 479	\$ 6,170	\$ 71,503	\$ 72,800	\$ 736	\$ 993	\$ 72,543
Residential:								
U.S.	1,576	1	111	1,466	2,128	38	2	2,164
Non-U.S.	3,176	5	27	3,154	3,882	25	1	3,906
Commercial	2,113	—	155	1,958	4,944	22	17	4,949
Total mortgage-backed securities	84,059	485	6,463	78,081	83,754	821	1,013	83,562
U.S. Treasury and government agencies	95,217	302	3,459	92,060	178,038	668	1,243	177,463
Obligations of U.S. states and municipalities	7,103	86	403	6,786	14,890	972	2	15,860
Non-U.S. government debt securities	20,360	14	678	19,696	16,163	92	46	16,209
Corporate debt securities	381	—	24	357	332	8	19	321
Asset-backed securities:								
Collateralized loan obligations	5,916	1	125	5,792	9,674	6	18	9,662
Other	3,152	2	69	3,085	5,403	47	2	5,448
Total available-for-sale securities	216,188	890	11,221	205,857	308,254	2,614	2,343	308,525
Held-to-maturity securities^(a)								
Mortgage-backed securities:								
U.S. GSEs and government agencies	113,492	35	13,709	99,818	102,556	1,400	853	103,103
U.S. Residential	10,503	3	1,244	9,262	7,316	1	106	7,211
Commercial	10,361	10	734	9,637	3,730	11	54	3,687
Total mortgage-backed securities	134,356	48	15,687	118,717	113,602	1,412	1,013	114,001
U.S. Treasury and government agencies	207,463	—	18,363	189,100	185,204	169	2,103	183,270
Obligations of U.S. states and municipalities	19,747	53	1,080	18,720	13,985	453	44	14,394
Asset-backed securities:								
Collateralized loan obligations	61,414	4	1,522	59,896	48,869	75	22	48,922
Other	2,325	—	110	2,215	2,047	1	7	2,041
Total held-to-maturity securities	425,305	105	36,762	388,648	363,707	2,110	3,189	362,628
Total investment securities, net of allowance for credit losses	\$ 641,493	\$ 995	\$ 47,983	\$ 594,505	\$ 671,961	\$ 4,724	\$ 5,532	\$ 671,153

(a) The Firm purchased \$33.7 billion, \$111.8 billion and \$12.4 billion of HTM securities for the years ended December 31, 2022, 2021 and 2020, respectively.

(b) The amortized cost of investment securities is reported net of allowance for credit losses of \$96 million and \$42 million at December 31, 2022 and 2021, respectively.

(c) Excludes \$2.5 billion and \$1.9 billion of accrued interest receivable at December 31, 2022 and 2021, respectively, included in accrued interest and accounts receivable on the Consolidated balance sheets. The Firm generally does not recognize an allowance for credit losses on accrued interest receivable, consistent with its policy to write them off no later than 90 days past due by reversing interest income. The Firm did not reverse through interest income any accrued interest receivable for the years ended December 31, 2022 and 2021.

At December 31, 2022, the investment securities portfolio consisted of debt securities with an average credit rating of AA+ (based upon external ratings where available, and where not available, based primarily upon internal risk ratings). Risk ratings are used to identify the credit quality of securities and differentiate risk within the portfolio. The Firm's internal risk ratings generally align with the qualitative characteristics (e.g., borrower capacity to meet financial commitments and vulnerability to changes in the economic environment) defined by S&P and Moody's,

however the quantitative characteristics (e.g., probability of default ("PD") and loss given default ("LGD")) may differ as they reflect internal historical experiences and assumptions. Risk ratings are assigned at acquisition, reviewed on a regular and ongoing basis by Credit Risk Management and adjusted as necessary over the life of the investment for updated information affecting the issuer's ability to fulfill its obligations.

AFS securities impairment

The following tables present the fair value and gross unrealized losses by aging category for AFS securities at December 31, 2022 and 2021. The tables exclude U.S. Treasury and government agency securities and U.S. GSE and government agency MBS with unrealized losses of \$9.6 billion and \$2.2 billion, at December 31, 2022 and 2021, respectively; changes in the value of these securities are generally driven by changes in interest rates rather than changes in their credit profile given the explicit or implicit guarantees provided by the U.S. government.

December 31, 2022 (in millions)	Available-for-sale securities with gross unrealized losses							
	Less than 12 months		12 months or more		Total fair value	Total gross unrealized losses		
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses				
Available-for-sale securities								
Mortgage-backed securities:								
Residential:								
U.S.	\$ 1,187	\$ 71	\$ 260	\$ 40	\$ 1,447	\$ 111		
Non-U.S.	2,848	25	70	2	2,918	27		
Commercial	1,131	74	813	81	1,944	155		
Total mortgage-backed securities	5,166	170	1,143	123	6,309	293		
Obligations of U.S. states and municipalities	3,051	241	364	162	3,415	403		
Non-U.S. government debt securities	6,941	321	3,848	357	10,789	678		
Corporate debt securities	150	2	207	22	357	24		
Asset-backed securities:								
Collateralized loan obligations	3,010	61	2,701	64	5,711	125		
Other	2,586	51	256	18	2,842	69		
Total available-for-sale securities with gross unrealized losses	\$ 20,904	\$ 846	\$ 8,519	\$ 746	\$ 29,423	\$ 1,592		
Available-for-sale securities with gross unrealized losses								
December 31, 2021 (in millions)	Available-for-sale securities with gross unrealized losses							
	Less than 12 months		12 months or more		Total fair value	Total gross unrealized losses		
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses				
Available-for-sale securities								
Mortgage-backed securities:								
Residential:								
U.S.	\$ 303	\$ 1	\$ 45	\$ 1	\$ 348	\$ 2		
Non-U.S.	133	1	—	—	133	1		
Commercial	2,557	5	349	12	2,906	17		
Total mortgage-backed securities	2,993	7	394	13	3,387	20		
Obligations of U.S. states and municipalities	120	2	—	—	120	2		
Non-U.S. government debt securities	5,060	37	510	9	5,570	46		
Corporate debt securities	166	1	46	18	212	19		
Asset-backed securities:								
Collateralized loan obligations	8,110	18	208	—	8,318	18		
Other	89	—	178	2	267	2		
Total available-for-sale securities with gross unrealized losses	\$ 16,538	\$ 65	\$ 1,336	\$ 42	\$ 17,874	\$ 107		

Notes to consolidated financial statements

AFS securities are considered impaired if the fair value is less than the amortized cost.

The Firm recognizes impairment losses in earnings if the Firm has the intent to sell the debt security, or if it is more likely than not that the Firm will be required to sell the debt security before recovery of its amortized cost. In these circumstances the impairment loss is recognized in investment securities gains/(losses) in the Consolidated Statements of Income and is equal to the full difference between the amortized cost (net of allowance if applicable) and the fair value of the security.

For impaired debt securities that the Firm has the intent and ability to hold, the securities are evaluated to determine if a credit loss exists. If it is determined that a credit loss exists, that loss is recognized as an allowance for credit losses through the provision for credit losses in the Consolidated Statements of Income, limited by the amount of impairment. Any impairment on debt securities that the Firm has the intent and ability to hold not due to credit losses is recorded in OCI.

Factors considered in evaluating credit losses include adverse conditions specifically related to the industry, geographic area or financial condition of the issuer or underlying collateral of a security; and payment structure of the security.

When assessing securities issued in a securitization for credit losses, the Firm estimates cash flows considering relevant market and economic data, underlying loan-level data, and structural features of the securitization, such as subordination, excess spread, overcollateralization or other forms of credit enhancement, and compares the losses projected for the underlying collateral (“pool losses”) against the level of credit enhancement in the securitization structure to determine whether these features are sufficient to absorb the pool losses, or whether a credit loss exists.

For beneficial interests in securitizations that are rated below “AA” at their acquisition, or that can be contractually prepaid or otherwise settled in such a way that the Firm would not recover substantially all of its recorded investment, the Firm evaluates impairment for credit losses when there is an adverse change in expected cash flows.

HTM securities – credit risk

Allowance for credit losses

The allowance for credit losses represents expected credit losses over the remaining expected life of HTM securities.

The allowance for credit losses on HTM obligations of U.S. states and municipalities and commercial mortgage-backed securities is calculated by applying statistical credit loss factors (estimated PD and LGD) to the amortized cost. The credit loss factors are derived using a weighted average of five internally developed eight-quarter macroeconomic scenarios, followed by a single year straight-line interpolation to revert to long run historical information for periods beyond the forecast period. Refer to Note 13 for further information on the eight-quarter macroeconomic forecast.

The allowance for credit losses on HTM collateralized loan obligations and U.S. residential mortgage-backed securities is calculated as the difference between the amortized cost and the present value of the cash flows expected to be collected, discounted at the security’s effective interest rate. These cash flow estimates are developed based on expectations of underlying collateral performance derived using the eight-quarter macroeconomic forecast and the single year straight-line interpolation, as well as considering the structural features of the security.

The application of different inputs and assumptions into the calculation of the allowance for credit losses is subject to significant management judgment, and emphasizing one input or assumption over another, or considering other inputs or assumptions, could affect the estimate of the allowance for credit losses on HTM securities.

Credit quality indicator

The primary credit quality indicator for HTM securities is the risk rating assigned to each security. At both December 31, 2022 and 2021, all HTM securities were rated investment grade and were current and accruing, with approximately 98% rated at least AA+.

Allowance for credit losses on investment securities

The allowance for credit losses on investment securities was \$96 million, \$42 million and \$78 million as of December 31, 2022, 2021 and 2020, respectively.

Selected impacts of investment securities on the Consolidated statements of income

Year ended December 31, (in millions)	2022	2021	2020
Realized gains	\$ 198	\$ 595	\$ 3,080
Realized losses	(2,578)	(940)	(2,278)
Investment securities gains/ (losses)	\$ (2,380)	\$ (345)	\$ 802
Provision for credit losses	\$ 54	\$ (36)	\$ 68

Contractual maturities and yields

The following table presents the amortized cost and estimated fair value at December 31, 2022, of JPMorgan Chase's investment securities portfolio by contractual maturity.

By remaining maturity December 31, 2022 (in millions)	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years ^(b)	Total
Available-for-sale securities					
Mortgage-backed securities					
Amortized cost	\$ 14	\$ 3,634	\$ 4,534	\$ 75,877	\$ 84,059
Fair value	14	3,459	4,573	70,035	78,081
Average yield ^(a)	2.21 %	3.58 %	5.25 %	3.62 %	3.71 %
U.S. Treasury and government agencies					
Amortized cost	\$ 16,335	\$ 54,936	\$ 17,749	\$ 6,197	\$ 95,217
Fair value	16,011	52,703	17,167	6,179	92,060
Average yield ^(a)	1.27 %	3.00 %	3.99 %	6.01 %	3.08 %
Obligations of U.S. states and municipalities					
Amortized cost	\$ 18	\$ 47	\$ 215	\$ 6,823	\$ 7,103
Fair value	18	46	216	6,506	6,786
Average yield ^(a)	5.03 %	3.96 %	5.24 %	5.85 %	5.81 %
Non-U.S. government debt securities					
Amortized cost	\$ 12,803	\$ 3,228	\$ 4,329	—	\$ 20,360
Fair value	12,795	3,107	3,794	—	19,696
Average yield ^(a)	3.54 %	2.59 %	1.37 %	— %	2.93 %
Corporate debt securities					
Amortized cost	\$ 125	\$ 272	\$ 13	—	\$ 410
Fair value	76	268	13	—	357
Average yield ^(a)	16.22 %	12.07 %	5.78 %	— %	13.14 %
Asset-backed securities					
Amortized cost	\$ 99	\$ 1,517	\$ 3,665	\$ 3,787	\$ 9,068
Fair value	95	1,487	3,605	3,690	8,877
Average yield ^(a)	5.11 %	3.11 %	4.98 %	5.19 %	4.76 %
Total available-for-sale securities					
Amortized cost	\$ 29,394	\$ 63,634	\$ 30,505	\$ 92,684	\$ 216,217
Fair value	29,009	61,070	29,368	86,410	205,857
Average yield ^(a)	2.34 %	3.05 %	3.94 %	4.01 %	3.49 %
Held-to-maturity securities					
Mortgage-backed securities					
Amortized cost	\$ 98	\$ 1,718	\$ 12,350	\$ 120,206	\$ 134,372
Fair value	96	1,584	10,909	106,128	118,717
Average yield ^(a)	5.54 %	2.23 %	2.56 %	2.93 %	2.89 %
U.S. Treasury and government agencies					
Amortized cost	\$ 34,157	\$ 106,325	\$ 66,981	—	\$ 207,463
Fair value	33,433	99,345	56,322	—	189,100
Average yield ^(a)	0.57 %	0.71 %	1.27 %	— %	0.87 %
Obligations of U.S. states and municipalities					
Amortized cost	\$ —	\$ 106	\$ 2,741	\$ 16,951	\$ 19,798
Fair value	—	100	2,710	15,910	18,720
Average yield ^(a)	— %	3.39 %	4.03 %	4.24 %	4.21 %
Asset-backed securities					
Amortized cost	\$ —	\$ 30	\$ 19,398	\$ 44,311	\$ 63,739
Fair value	—	29	19,085	42,997	62,111
Average yield ^(a)	— %	5.69 %	4.80 %	4.74 %	4.76 %
Total held-to-maturity securities					
Amortized cost	\$ 34,255	\$ 108,179	\$ 101,470	\$ 181,468	\$ 425,372
Fair value	33,529	101,058	89,026	165,035	388,648
Average yield ^(a)	0.58 %	0.74 %	2.18 %	3.50 %	2.25 %

(a) Average yield is computed using the effective yield of each security owned at the end of the period, weighted based on the amortized cost of each security. The effective yield considers the contractual coupon, amortization of premiums and accretion of discounts, and the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable. The effective yield excludes unscheduled principal prepayments; and accordingly, actual maturities of securities may differ from their contractual or expected maturities as certain securities may be prepaid. However, for certain callable debt securities, the average yield is calculated to the earliest call date.

(b) Substantially all of the Firm's U.S. residential MBS and collateralized mortgage obligations are due in 10 years or more, based on contractual maturity. The estimated weighted-average life, which reflects anticipated future prepayments, is approximately eight years for agency residential MBS, and six years for both agency residential collateralized mortgage obligations and nonagency residential collateralized mortgage obligations.

Note 11 – Securities financing activities

JPMorgan Chase enters into resale, repurchase, securities borrowed and securities loaned agreements (collectively, “securities financing agreements”) primarily to finance the Firm’s inventory positions, acquire securities to cover short sales, accommodate customers’ financing needs, settle other securities obligations and to deploy the Firm’s excess cash.

Securities financing agreements are treated as collateralized financings on the Firm’s Consolidated balance sheets. Where appropriate under applicable accounting guidance, securities financing agreements with the same counterparty are reported on a net basis. Refer to Note 1 for further discussion of the offsetting of assets and liabilities. Fees received and paid in connection with securities financing agreements are recorded over the life of the agreement in interest income and interest expense on the Consolidated statements of income.

The Firm has elected the fair value option for certain securities financing agreements. Refer to Note 3 for further information regarding the fair value option. The securities financing agreements for which the fair value option has been elected are reported within securities purchased under resale agreements, securities loaned or sold under repurchase agreements, and securities borrowed on the Consolidated balance sheets. Generally, for agreements carried at fair value, current-period interest accruals are recorded within interest income and interest expense, with changes in fair value reported in principal transactions revenue. However, for financial instruments containing embedded derivatives that would be separately accounted for in accordance with accounting guidance for hybrid instruments, all changes in fair value, including any interest elements, are reported in principal transactions revenue.

Securities financing agreements not elected under the fair value option are measured at amortized cost. As a result of the Firm’s credit risk mitigation practices described below, the Firm did not hold any allowance for credit losses with respect to resale and securities borrowed arrangements as of December 31, 2022 and 2021.

Credit risk mitigation practices

Securities financing agreements expose the Firm primarily to credit and liquidity risk. To manage these risks, the Firm monitors the value of the underlying securities (predominantly high-quality securities collateral, including government-issued debt and U.S. GSEs and government agencies MBS) that it has received from or provided to its counterparties compared to the value of cash proceeds and exchanged collateral, and either requests additional collateral or returns securities or collateral when appropriate. Margin levels are initially established based upon the counterparty, the type of underlying securities, and the permissible collateral, and are monitored on an ongoing basis.

In resale and securities borrowed agreements, the Firm is exposed to credit risk to the extent that the value of the securities received is less than initial cash principal advanced and any collateral amounts exchanged. In repurchase and securities loaned agreements, credit risk exposure arises to the extent that the value of underlying securities advanced exceeds the value of the initial cash principal received, and any collateral amounts exchanged.

Additionally, the Firm typically enters into master netting agreements and other similar arrangements with its counterparties, which provide for the right to liquidate the underlying securities and any collateral amounts exchanged in the event of a counterparty default. It is also the Firm’s policy to take possession, where possible, of the securities underlying resale and securities borrowed agreements. Refer to Note 29 for further information regarding assets pledged and collateral received in securities financing agreements.

The table below summarizes the gross and net amounts of the Firm's securities financing agreements, as of December 31, 2022 and 2021. When the Firm has obtained an appropriate legal opinion with respect to a master netting agreement with a counterparty and where other relevant netting criteria under U.S. GAAP are met, the Firm nets, on the Consolidated balance sheets, the balances outstanding under its securities financing agreements with the same counterparty. In addition, the Firm exchanges securities and/or cash collateral with its counterparty to reduce the economic exposure with the counterparty, but such collateral is not eligible for net Consolidated balance sheet presentation. Where the Firm has obtained an appropriate legal opinion with respect to the counterparty master netting agreement, such collateral, along with

securities financing balances that do not meet all these relevant netting criteria under U.S. GAAP, is presented in the table below as "Amounts not nettable on the Consolidated balance sheets," and reduces the "Net amounts" presented. Where a legal opinion has not been either sought or obtained, the securities financing balances are presented gross in the "Net amounts" below. In transactions where the Firm is acting as the lender in a securities-for-securities lending agreement and receives securities that can be pledged or sold as collateral, the Firm recognizes the securities received at fair value within other assets and the obligation to return those securities within accounts payable and other liabilities on the Consolidated balance sheets.

	(in millions)	December 31, 2022				Net amounts ^(c)
		Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets	Amounts not nettable on the Consolidated balance sheets ^(b)	
Assets						
Securities purchased under resale agreements	\$ 597,912	\$ (282,411)	\$ 315,501	\$ (304,120)	\$ 11,381	
Securities borrowed	228,279	(42,910)	185,369	(131,578)		53,791
Liabilities						
Securities sold under repurchase agreements	\$ 480,793	\$ (282,411)	\$ 198,382	\$ (167,427)	\$ 30,955	
Securities loaned and other ^(a)	52,443	(42,910)	9,533	(9,527)		6
	(in millions)	December 31, 2021				Net amounts ^(c)
		Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets	Amounts not nettable on the Consolidated balance sheets ^(b)	
Assets						
Securities purchased under resale agreements	\$ 604,724	\$ (343,093)	\$ 261,631	\$ (245,588)	\$ 16,043	
Securities borrowed	250,333	(44,262)	206,071	(154,599)		51,472
Liabilities						
Securities sold under repurchase agreements	\$ 532,899	\$ (343,093)	\$ 189,806	\$ (166,456)	\$ 23,350	
Securities loaned and other ^(a)	52,610	(44,262)	8,348	(8,133)		215

- (a) Includes securities-for-securities lending agreements of \$7.0 billion and \$5.6 billion at December 31, 2022 and 2021, respectively, accounted for at fair value, where the Firm is acting as lender.
- (b) In some cases, collateral exchanged with a counterparty exceeds the net asset or liability balance with that counterparty. In such cases, the amounts reported in this column are limited to the related net asset or liability with that counterparty.
- (c) Includes securities financing agreements that provide collateral rights, but where an appropriate legal opinion with respect to the master netting agreement has not been either sought or obtained. At December 31, 2022 and 2021, included \$6.0 billion and \$13.9 billion, respectively, of securities purchased under resale agreements; \$49.0 billion and \$46.4 billion, respectively, of securities borrowed; \$29.1 billion and \$21.6 billion, respectively, of securities sold under repurchase agreements. At December 31, 2021 included \$198 million of securities loaned and other, and the amount was not material at December 31, 2022.

Notes to consolidated financial statements

The tables below present as of December 31, 2022 and 2021 the types of financial assets pledged in securities financing agreements and the remaining contractual maturity of the securities financing agreements.

December 31, (in millions)	Gross liability balance			
	2022		2021	
	Securities sold under repurchase agreements	Securities loaned and other	Securities sold under repurchase agreements	Securities loaned and other
Mortgage-backed securities:				
U.S. GSEs and government agencies	\$ 58,050	\$ —	\$ 37,046	\$ —
Residential - nonagency	2,414	—	1,508	—
Commercial - nonagency	2,007	—	1,463	—
U.S. Treasury, GSEs and government agencies	191,254	1,464	241,578	358
Obligations of U.S. states and municipalities	1,735	5	1,916	7
Non-U.S. government debt	155,156	1,259	174,971	1,572
Corporate debt securities	37,121	461	38,180	1,619
Asset-backed securities	2,981	—	1,211	—
Equity securities	30,075	49,254	35,026	49,054
Total	\$ 480,793	\$ 52,443	\$ 532,899	\$ 52,610
Remaining contractual maturity of the agreements				
December 31, 2022 (in millions)	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days
Total securities sold under repurchase agreements	\$ 205,235	\$ 170,696	\$ 37,120	\$ 67,742
Total securities loaned and other	50,138	1,285	3	1,017
Remaining contractual maturity of the agreements				
December 31, 2021 (in millions)	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days
Total securities sold under repurchase agreements	\$ 195,035	\$ 231,171	\$ 47,201	\$ 59,492
Total securities loaned and other	50,034	1,701	—	875

Transfers not qualifying for sale accounting

At December 31, 2022 and 2021, the Firm held \$692 million and \$440 million, respectively, of financial assets for which the rights have been transferred to third parties; however, the transfers did not qualify as a sale in accordance with U.S. GAAP. These transfers have been recognized as collateralized financing transactions. The transferred assets are recorded in trading assets and loans, and the corresponding liabilities are recorded predominantly in short-term borrowings on the Consolidated balance sheets.

Note 12 – Loans

Loan accounting framework

The accounting for a loan depends on management's strategy for the loan. The Firm accounts for loans based on the following categories:

- Originated or purchased loans held-for-investment (i.e., "retained")
- Loans held-for-sale
- Loans at fair value

The following provides a detailed accounting discussion of the Firm's loans by category:

Loans held-for-investment

Originated or purchased loans held-for-investment, including PCD, are recorded at amortized cost, reflecting the principal amount outstanding, net of the following: unamortized deferred loan fees, costs, premiums or discounts; charge-offs; collection of cash; and foreign exchange. Credit card loans also include billed finance charges and fees.

Interest income

Interest income on performing loans held-for-investment is accrued and recognized as interest income at the contractual rate of interest. Purchase price discounts or premiums, as well as net deferred loan fees or costs, are amortized into interest income over the contractual life of the loan as an adjustment of yield.

The Firm classifies accrued interest on loans, including accrued but unbilled interest on credit card loans, in accrued interest and accounts receivables on the Consolidated balance sheets. For credit card loans, accrued interest once billed is then recognized in the loan balances, with the related allowance recorded in the allowance for credit losses. Changes in the allowance for credit losses on accrued interest on credit card loans are recognized in the provision for credit losses and charge-offs are recognized by reversing interest income. For other loans, the Firm generally does not recognize an allowance for credit losses on accrued interest receivables, consistent with its policy to write them off no later than 90 days past due by reversing interest income.

Nonaccrual loans

Nonaccrual loans are those on which the accrual of interest has been suspended. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status and considered nonperforming when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest has been in default for a period of 90 days or more, unless the loan is both well-secured and in the process of collection. A loan is determined to be past due when the minimum payment is not received from the borrower by the contractually specified due date or for certain loans (e.g., residential real estate loans), when a monthly payment is due and unpaid for 30 days or more.

Finally, collateral-dependent loans are typically maintained on nonaccrual status.

On the date a loan is placed on nonaccrual status, all interest accrued but not collected is reversed against interest income. In addition, the amortization of deferred amounts is suspended. Interest income on nonaccrual loans may be recognized as cash interest payments are received (i.e., on a cash basis) if the recorded loan balance is deemed fully collectible; however, if there is doubt regarding the ultimate collectibility of the recorded loan balance, all interest cash receipts are applied to reduce the carrying value of the loan (the cost recovery method). For consumer loans, application of this policy typically results in the Firm recognizing interest income on nonaccrual consumer loans on a cash basis.

A loan may be returned to accrual status when repayment is reasonably assured and there has been demonstrated performance under the terms of the loan or, if applicable, the terms of the restructured loan.

As permitted by regulatory guidance, credit card loans are generally exempt from being placed on nonaccrual status; accordingly, interest and fees related to credit card loans continue to accrue until the loan is charged off or paid in full.

Allowance for loan losses

The allowance for loan losses represents the estimated expected credit losses in the held-for-investment loan portfolio at the balance sheet date and is recognized on the balance sheet as a contra asset, which brings the amortized cost to the net carrying value. Changes in the allowance for loan losses are recorded in the provision for credit losses on the Firm's Consolidated statements of income. Refer to Note 13 for further information on the Firm's accounting policies for the allowance for loan losses.

Charge-offs

Consumer loans are generally charged off or charged down to the lower of the amortized cost or the net realizable value of the underlying collateral (i.e., fair value less estimated costs to sell), with an offset to the allowance for loan losses, upon reaching specified stages of delinquency in accordance with standards established by the FFIEC. Residential real estate loans, unmodified credit card loans and scored business banking loans are generally charged off no later than 180 days past due. Scored auto and modified credit card loans are charged off no later than 120 days past due.

Certain consumer loans are charged off or charged down to their net realizable value earlier than the FFIEC charge-off standards in the following circumstances:

- Loans modified in a TDR that are determined to be collateral-dependent.
- Loans to borrowers who have experienced an event that suggests a loss is either known or highly certain are subject to accelerated charge-off standards (e.g.,

Notes to consolidated financial statements

residential real estate and auto loans are charged off or charged down within 60 days of receiving notification of a bankruptcy filing).

- Auto loans upon repossession of the automobile.

Other than in certain limited circumstances, the Firm typically does not recognize charge-offs on the government-guaranteed portion of loans.

Wholesale loans are charged off when it is highly certain that a loss has been realized. The determination of whether to recognize a charge-off includes many factors, including the prioritization of the Firm's claim in bankruptcy, expectations of the workout/restructuring of the loan and valuation of the borrower's equity or the loan collateral.

When a loan is charged down to the lower of its amortized cost or the estimated net realizable value of the underlying collateral, the determination of the fair value of the collateral depends on the type of collateral (e.g., securities, real estate). In cases where the collateral is in the form of liquid securities, the fair value is based on quoted market prices or broker quotes. For illiquid securities or other financial assets, the fair value of the collateral is generally estimated using a discounted cash flow model.

For residential real estate loans, collateral values are based upon external valuation sources. When it becomes likely that a borrower is either unable or unwilling to pay, the Firm utilizes a broker's price opinion, appraisal and/or an automated valuation model of the home based on an exterior-only valuation ("exterior opinions"), which is then updated at least every 12 months, or more frequently depending on various market factors. As soon as practicable after the Firm receives the property in satisfaction of a debt (e.g., by taking legal title or physical possession), the Firm generally obtains an appraisal based on an inspection that includes the interior of the home ("interior appraisals"). Exterior opinions and interior appraisals are discounted based upon the Firm's experience with actual liquidation values as compared with the estimated values provided by exterior opinions and interior appraisals, considering state-specific factors.

For commercial real estate loans, collateral values are generally based on appraisals from internal and external valuation sources. Collateral values are typically updated every six to twelve months, either by obtaining a new appraisal or by performing an internal analysis, in accordance with the Firm's policies. The Firm also considers both borrower- and market-specific factors, which may result in obtaining appraisal updates or broker price opinions at more frequent intervals.

Loans held-for-sale

Loans held-for-sale are measured at the lower of cost or fair value, with valuation changes recorded in noninterest revenue. For consumer loans, the valuation is performed on a portfolio basis. For wholesale loans, the valuation is performed on an individual loan basis.

Interest income on loans held-for-sale is accrued and recognized based on the contractual rate of interest.

Loan origination fees or costs and purchase price discounts or premiums are deferred in a contra loan account until the related loan is sold. The deferred fees or costs and discounts or premiums are an adjustment to the basis of the loan and therefore are included in the periodic determination of the lower of cost or fair value adjustments and/or the gain or loss recognized at the time of sale.

Because these loans are recognized at the lower of cost or fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans. However, loans held-for-sale are subject to the nonaccrual policies described above.

Loans at fair value

Loans for which the fair value option has been elected are measured at fair value, with changes in fair value recorded in noninterest revenue.

Interest income on these loans is accrued and recognized based on the contractual rate of interest. Changes in fair value are recognized in noninterest revenue. Loan origination fees are recognized upfront in noninterest revenue. Loan origination costs are recognized in the associated expense category as incurred.

Because these loans are recognized at fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans. However, loans at fair value are subject to the nonaccrual policies described above.

Refer to Note 3 for further information on the Firm's elections of fair value accounting under the fair value option. Refer to Note 2 and Note 3 for further information on loans carried at fair value and classified as trading assets.

Loan classification changes

Loans in the held-for-investment portfolio that management decides to sell are transferred to the held-for-sale portfolio at the lower of cost or fair value on the date of transfer. Credit-related losses are charged against the allowance for loan losses; non-credit related losses such as those due to changes in interest rates or foreign currency exchange rates are recognized in noninterest revenue.

In the event that management decides to retain a loan in the held-for-sale portfolio, the loan is transferred to the held-for-investment portfolio at amortized cost on the date of transfer. These loans are subsequently assessed for impairment based on the Firm's allowance methodology. Refer to Note 13 for a further discussion of the methodologies used in establishing the Firm's allowance for loan losses.

Loan modifications

The Firm seeks to modify certain loans in conjunction with its loss mitigation activities. Through the modification, JPMorgan Chase grants one or more concessions to a borrower who is experiencing financial difficulty in order to minimize the Firm's economic loss and avoid foreclosure or repossession of the collateral, and to ultimately maximize payments received by the Firm from the borrower. The concessions granted vary by program and by borrower-specific characteristics, and may include interest rate reductions, term extensions, payment delays, principal forgiveness, or the acceptance of equity or other assets in lieu of payments. Such modifications are accounted for and reported as TDRs. Loans with short-term and other insignificant modifications that are not considered concessions are not TDRs.

Loans, except for credit card loans, modified in a TDR are generally placed on nonaccrual status, although in many cases such loans were already on nonaccrual status prior to modification. These loans may be returned to performing status (the accrual of interest is resumed) if the following criteria are met: (i) the borrower has performed under the modified terms for a minimum of six months and/or six payments, and (ii) the Firm has an expectation that repayment of the modified loan is reasonably assured based on, for example, the borrower's debt capacity and level of future earnings, collateral values, LTV ratios, and other current market considerations. In certain limited and well-defined circumstances in which the loan is current at the modification date, such loans are not placed on nonaccrual status at the time of modification.

Loans modified in TDRs are generally measured for impairment using the Firm's established asset-specific allowance methodology, which considers the expected re-default rates for the modified loans. A loan modified in a TDR generally remains subject to the asset-specific component of the allowance throughout its remaining life, regardless of whether the loan is performing and has been returned to accrual status. Refer to Note 13 for further discussion of the methodology used to estimate the Firm's asset-specific allowance.

Foreclosed property

The Firm acquires property from borrowers through loan restructurings, workouts, and foreclosures. Property acquired may include real property (e.g., residential real estate, land, and buildings) and commercial and personal property (e.g., automobiles, aircraft, railcars, and ships).

The Firm recognizes foreclosed property upon receiving assets in satisfaction of a loan (e.g., by taking legal title or physical possession). For loans collateralized by real property, the Firm generally recognizes the asset received at foreclosure sale or upon the execution of a deed in lieu of foreclosure transaction with the borrower. Foreclosed assets are reported in other assets on the Consolidated balance sheets and initially recognized at fair value less estimated costs to sell. Each quarter the fair value of the acquired property is reviewed and adjusted, if necessary, to the lower of cost or fair value. Subsequent adjustments to fair value are charged/credited to noninterest revenue. Operating expense, such as real estate taxes and maintenance, are charged to other expense.

Notes to consolidated financial statements

Loan portfolio

The Firm's loan portfolio is divided into three portfolio segments, which are the same segments used by the Firm to determine the allowance for loan losses: Consumer, excluding credit card; Credit card; and Wholesale. Within each portfolio segment the Firm monitors and assesses the credit risk in the following classes of loans, based on the risk characteristics of each loan class.

Consumer, excluding credit card	Credit card	Wholesale ^{(c)(d)}
<ul style="list-style-type: none"> Residential real estate^(a) Auto and other^(b) 	<ul style="list-style-type: none"> Credit card loans 	<ul style="list-style-type: none"> Secured by real estate Commercial and industrial Other^(e)

- (a) Includes scored mortgage and home equity loans held in CCB and AWM, and scored mortgage loans held in CIB and Corporate.
- (b) Includes scored auto and business banking loans and overdrafts.
- (c) Includes loans held in CIB, CB, AWM, Corporate, as well as risk-rated BWM and auto dealer loans held in CCB, for which the wholesale methodology is applied when determining the allowance for loan losses.
- (d) The wholesale portfolio segment's classes align with loan classifications as defined by the bank regulatory agencies, based on the loan's collateral, purpose, and type of borrower.
- (e) Includes loans to financial institutions, states and political subdivisions, SPEs, nonprofits, personal investment companies and trusts, as well as loans to individuals and individual entities (predominantly Global Private Bank clients within AWM and J.P. Morgan Wealth Management within CCB). Refer to Note 14 for more information on SPEs.

The following tables summarize the Firm's loan balances by portfolio segment.

December 31, 2022 (in millions)	Consumer, excluding credit card	Credit card	Wholesale	Total ^{(a)(b)}
Retained	\$ 300,753	\$ 185,175	\$ 603,670	\$ 1,089,598
Held-for-sale	618	—	3,352	3,970
At fair value	10,004	—	32,075	42,079
Total	\$ 311,375	\$ 185,175	\$ 639,097	\$ 1,135,647

December 31, 2021 (in millions)	Consumer, excluding credit card	Credit card	Wholesale	Total ^{(a)(b)}
Retained	\$ 295,556	\$ 154,296	\$ 560,354	\$ 1,010,206
Held-for-sale	1,287	—	7,401	8,688
At fair value	26,463	—	32,357	58,820
Total	\$ 323,306	\$ 154,296	\$ 600,112	\$ 1,077,714

- (a) Excludes \$5.2 billion and \$2.7 billion of accrued interest receivable at December 31, 2022 and 2021, respectively. The Firm wrote off accrued interest receivable of \$39 million and \$56 million for the years ended December 31, 2022 and 2021, respectively.
- (b) Loans (other than those for which the fair value option has been elected) are presented net of unamortized discounts and premiums and net deferred loan fees or costs. These amounts were not material as of December 31, 2022 and 2021.

The following tables provide information about the carrying value of retained loans purchased, sold and reclassified to held-for-sale during the periods indicated. Loans that were reclassified to held-for-sale and sold in a subsequent period are excluded from the sales line of this table.

Year ended December 31, (in millions)	2022				Total
	Consumer, excluding credit card	Credit card	Wholesale		
Purchases	\$ 1,625 ^{(b)(c)}	\$ —	\$ 1,088	\$ 2,713	
Sales	2,884	—	41,934	44,818	
Retained loans reclassified to held-for-sale ^(a)	229	—	1,055	1,284	

Year ended December 31, (in millions)	2021				Total
	Consumer, excluding credit card	Credit card	Wholesale		
Purchases	\$ 515 ^{(b)(c)}	\$ —	\$ 1,122	\$ 1,637	
Sales	799	—	31,022	31,821	
Retained loans reclassified to held-for-sale ^(a)	1,225	—	2,178	3,403	

Year ended December 31, (in millions)	2020				
	Consumer, excluding credit card	Credit card	Wholesale	Total	
Purchases	\$ 3,474 ^{(b)(c)}	\$ —	\$ 1,159	\$ 4,633	
Sales	352	—	17,916	18,268	
Retained loans reclassified to held-for-sale ^(a)	2,084	787	1,580	4,451	

(a) Reclassifications of loans to held-for-sale are non-cash transactions.

(b) Predominantly includes purchases of residential real estate loans, including the Firm's voluntary repurchases of certain delinquent loans from loan pools as permitted by Government National Mortgage Association ("Ginnie Mae") guidelines for the years ended December 31, 2022, 2021 and 2020. The Firm typically elects to repurchase these delinquent loans as it continues to service them and/or manage the foreclosure process in accordance with applicable requirements of Ginnie Mae, FHA, RHS, and/or VA.

(c) Excludes purchases of retained loans of \$12.4 billion, \$25.8 billion and \$16.3 billion for the years ended December 31, 2022, 2021 and 2020, respectively, which are predominantly sourced through the correspondent origination channel and underwritten in accordance with the Firm's standards. The amount of purchases of retained loans at December 31, 2020 has been revised to conform with the current presentation.

Gains and losses on sales of loans

Net gains/(losses) on sales of loans and lending-related commitments (including adjustments to record loans and lending-related commitments held-for-sale at the lower of cost or fair value) recognized in noninterest revenue was \$(186) million for the year ended December 31, 2022 of which \$(48) million was related to loans. Net gains/(losses) on sales of loans and lending-related commitments was \$261 million for the year ended December 31, 2021 of which \$253 million was related to loans. Net losses on sales of loans was \$(36) million for the year ended December 31, 2020. In addition, the sale of loans may also result in write downs, recoveries or changes in the allowance recognized in the provision for credit losses.

Consumer, excluding credit card loan portfolio

Consumer loans, excluding credit card loans, consist primarily of scored residential mortgages, home equity loans and lines of credit, auto and business banking loans, with a focus on serving the prime consumer credit market. The portfolio also includes home equity loans secured by junior liens, prime mortgage loans with an interest-only payment period, and certain payment-option loans that may result in negative amortization.

The following table provides information about retained consumer loans, excluding credit card, by class.

December 31, (in millions)	2022	2021
Residential real estate	\$ 237,561	\$ 224,795
Auto and other ^(a)	63,192	70,761
Total retained loans	\$ 300,753	\$ 295,556

(a) At December 31, 2022 and 2021, included \$350 million and \$5.4 billion of loans, respectively, in Business Banking under the PPP.

Delinquency rates are the primary credit quality indicator for consumer loans. Loans that are more than 30 days past due provide an early warning of borrowers who may be experiencing financial difficulties and/or who may be unable or unwilling to repay the loan. As the loan continues to age, it becomes more clear whether the borrower is likely to be unable or unwilling to pay. In the case of residential real estate loans, late-stage delinquencies (greater than 150 days past due) are a strong indicator of loans that will ultimately result in a foreclosure or similar liquidation transaction. In addition to delinquency rates, other credit quality indicators for consumer loans vary based on the class of loan, as follows:

- For residential real estate loans, the current estimated LTV ratio, or the combined LTV ratio in the case of junior lien loans, is an indicator of the potential loss severity in the event of default. Additionally, LTV or combined LTV ratios can provide insight into a borrower's continued willingness to pay, as the delinquency rate of high-LTV loans tends to be greater than that for loans where the borrower has equity in the collateral. The geographic distribution of the loan collateral also provides insight as to the credit quality of the portfolio, as factors such as the regional economy, home price changes and specific events such as natural disasters, will affect credit quality. The borrower's current or "refreshed" FICO score is a secondary credit quality indicator for certain loans, as FICO scores are an indication of the borrower's credit payment history. Thus, a loan to a borrower with a low FICO score (less than 660) is considered to be of higher risk than a loan to a borrower with a higher FICO score. Further, a loan to a borrower with a high LTV ratio and a low FICO score is at greater risk of default than a loan to a borrower that has both a high LTV ratio and a high FICO score.
- For scored auto and business banking loans, geographic distribution is an indicator of the credit performance of the portfolio. Similar to residential real estate loans, geographic distribution provides insights into the portfolio performance based on regional economic activity and events.

Residential real estate

The following tables provide information on delinquency, which is the primary credit quality indicator for retained residential real estate loans.

(in millions, except ratios)	December 31, 2022									
	Term loans by origination year ^(d)						Revolving loans			
	2022	2021	2020	2019	2018	Prior to 2018	Within the revolving period	Converted to term loans	Total	
Loan delinquency^{(a)(b)}										
Current	\$ 39,934	\$ 66,072	\$ 43,315	\$ 15,397	\$ 6,339	\$ 49,632	\$ 5,589	\$ 9,685	\$ 235,963	
30-149 days past due	29	11	14	20	20	597	15	208	914	
150 or more days past due	1	1	6	10	7	480	4	175	684	
Total retained loans	\$ 39,964	\$ 66,084	\$ 43,335	\$ 15,427	\$ 6,366	\$ 50,709	\$ 5,608	\$ 10,068	\$ 237,561	
% of 30+ days past due to total retained loans ^(c)	0.08 %	0.02 %	0.05 %	0.19 %	0.42 %	2.07 %	0.34 %	3.80 %	0.66 %	
December 31, 2021										
(in millions, except ratios)	Term loans by origination year ^(d)						Revolving loans			
	2021	2020	2019	2018	2017	Prior to 2017	Within the revolving period	Converted to term loans	Total	
	Loan delinquency ^{(a)(b)}									
Current	\$ 68,742	\$ 48,334	\$ 18,428	\$ 7,929	\$ 11,684	\$ 49,147	\$ 6,392	\$ 11,807	\$ 222,463	
30-149 days past due	13	23	27	27	22	578	11	182	883	
150 or more days past due	–	11	21	25	33	1,069	6	284	1,449	
Total retained loans	\$ 68,755	\$ 48,368	\$ 18,476	\$ 7,981	\$ 11,739	\$ 50,794	\$ 6,409	\$ 12,273	\$ 224,795	
% of 30+ days past due to total retained loans ^(c)	0.02 %	0.07 %	0.26 %	0.65 %	0.47 %	3.18 %	0.27 %	3.80 %	1.02 %	

(a) Individual delinquency classifications include mortgage loans insured by U.S. government agencies which were not material at December 31, 2022 and 2021.

(b) At December 31, 2022 and 2021, loans under payment deferral programs offered in response to the COVID-19 pandemic which are still within their deferral period and performing according to their modified terms are generally not considered delinquent.

(c) Excludes mortgage loans that are 30 or more days past due insured by U.S. government agencies which were not material at December 31, 2022 and 2021. These amounts have been excluded based upon the government guarantee.

(d) Purchased loans are included in the year in which they were originated.

Approximately 37% of the total revolving loans are senior lien loans; the remaining balance are junior lien loans. The lien position the Firm holds is considered in the Firm's allowance for credit losses. Revolving loans that have been converted to term loans have higher delinquency rates than those that are still within the revolving period. That is primarily because the fully-amortizing payment that is generally required for those products is higher than the minimum payment options available for revolving loans within the revolving period.

Notes to consolidated financial statements

Nonaccrual loans and other credit quality indicators

The following table provides information on nonaccrual and other credit quality indicators for retained residential real estate loans.

(in millions, except weighted-average data)	December 31, 2022	December 31, 2021
Nonaccrual loans ^{(a)(b)(c)(d)(e)}	\$ 3,745	\$ 4,759
Current estimated LTV ratios^{(f)(g)(h)}		
Greater than 125% and refreshed FICO scores:		
Equal to or greater than 660	\$ 2	\$ 2
Less than 660	—	2
101% to 125% and refreshed FICO scores:		
Equal to or greater than 660	174	37
Less than 660	6	15
80% to 100% and refreshed FICO scores:		
Equal to or greater than 660	12,034	2,701
Less than 660	184	89
Less than 80% and refreshed FICO scores:		
Equal to or greater than 660	215,096	209,295
Less than 660	8,659	9,658
No FICO/LTV available	1,360	2,930
U.S. government-guaranteed	46	66
Total retained loans	\$ 237,561	\$ 224,795
Weighted average LTV ratio ^{(f)(i)}	51 %	50 %
Weighted average FICO ^{(g)(i)}	769	765
Geographic region^(j)		
California	\$ 73,111	\$ 71,383
New York	34,469	32,545
Florida	18,868	16,182
Texas	14,961	13,865
Illinois	11,293	11,565
Colorado	9,968	8,885
Washington	9,059	8,292
New Jersey	7,106	6,832
Massachusetts	6,379	6,105
Connecticut	5,432	5,242
All other	46,915	43,899
Total retained loans	\$ 237,561	\$ 224,795

- (a) Includes collateral-dependent residential real estate loans that are charged down to the fair value of the underlying collateral less costs to sell. The Firm reports, in accordance with regulatory guidance, residential real estate loans that have been discharged under Chapter 7 bankruptcy and not reaffirmed by the borrower ("Chapter 7 loans") as collateral-dependent nonaccrual TDRs, regardless of their delinquency status. At December 31, 2022, approximately 5% of Chapter 7 residential real estate loans were 30 days or more past due.
- (b) Nonaccrual loans exclude mortgage loans insured by U.S. government agencies which were not material at December 31, 2022 and 2021.
- (c) Generally, all consumer nonaccrual loans have an allowance. In accordance with regulatory guidance, certain nonaccrual loans that are considered collateral-dependent have been charged down to the lower of amortized cost or the fair value of their underlying collateral less costs to sell. If the value of the underlying collateral improves subsequent to charge down, the related allowance may be negative.
- (d) Interest income on nonaccrual loans recognized on a cash basis was \$175 million and \$172 million for the years ended December 31, 2022 and 2021, respectively.
- (e) Generally excludes loans under payment deferral programs offered in response to the COVID-19 pandemic.
- (f) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.
- (g) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.
- (h) Includes residential real estate loans, primarily held in LLCs in AWM that did not have a refreshed FICO score. These loans have been included in a FICO band based on management's estimation of the borrower's credit quality.
- (i) Excludes loans with no FICO and/or LTV data available.
- (j) The geographic regions presented in the table are ordered based on the magnitude of the corresponding loan balances at December 31, 2022.

Loan modifications

Modifications of residential real estate loans, where the Firm grants concessions to borrowers who are experiencing financial difficulty are generally accounted for and reported as TDRs. Loans with short-term or other insignificant modifications that are not considered concessions are not TDRs. The carrying value of new TDRs was \$362 million, \$866 million and \$819 million for the years ended December 31, 2022, 2021 and 2020, respectively. There were no additional commitments to lend to borrowers whose residential real estate loans have been modified in TDRs.

Nature and extent of modifications

The Firm's proprietary modification programs as well as government programs, including U.S. GSE programs, generally provide various concessions to financially troubled borrowers including, but not limited to, interest rate reductions, term or payment extensions and delays of principal and/or interest payments that would otherwise have been required under the terms of the original agreement. The following table provides information about how residential real estate loans were modified in TDRs under the Firm's loss mitigation programs described above during the periods presented. This table excludes Chapter 7 loans where the sole concession granted is the discharge of debt and loans with short-term or other insignificant modifications that are not considered concessions.

Year ended December 31,	2022	2021	2020
Number of loans approved for a trial modification	3,902	6,246	5,522
Number of loans permanently modified	4,182	4,588	6,850
Concession granted:^(a)			
Interest rate reduction	54 %	74 %	50 %
Term or payment extension	67	53	49
Principal and/or interest deferred	10	23	14
Principal forgiveness	1	2	2
Other ^(b)	37	36	66

(a) Represents concessions granted in permanent modifications as a percentage of the number of loans permanently modified. The sum of the percentages exceeds 100% because predominantly all of the modifications include more than one type of concession. Concessions offered on trial modifications are generally consistent with those granted on permanent modifications.

(b) Includes variable interest rate to fixed interest rate modifications and payment delays that meet the definition of a TDR.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the various concessions granted in modifications of residential real estate loans under the loss mitigation programs described above and about redefaults of certain loans modified in TDRs for the periods presented. The following table presents only the financial effects of permanent modifications and do not include temporary concessions offered through trial modifications. This table also excludes Chapter 7 loans where the sole concession granted is the discharge of debt and loans with short-term or other insignificant modifications that are not considered concessions.

Year ended December 31, (in millions, except weighted - average data)	2022	2021	2020
Weighted-average interest rate of loans with interest rate reductions – before TDR	4.75 %	4.54 %	5.09 %
Weighted-average interest rate of loans with interest rate reductions – after TDR	3.35	2.92	3.28
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – before TDR	22	23	22
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – after TDR	38	38	39
Charge-offs recognized upon permanent modification	\$ 1	\$ –	\$ 5
Principal deferred	16	28	16
Principal forgiven	2	1	5
Balance of loans that redefaulted within one year of permanent modification ^(a)	\$ 147	\$ 160	\$ 199

(a) Represents loans permanently modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The dollar amounts presented represent the balance of such loans at the end of the reporting period in which such loans defaulted. For residential real estate loans modified in TDRs, payment default is deemed to occur when the loan becomes two contractual payments past due. In the event that a modified loan redefaults, it will generally be liquidated through foreclosure or another similar type of liquidation transaction. Redefaults of loans modified within the last twelve months may not be representative of ultimate redefault levels.

At December 31, 2022, the weighted-average estimated remaining lives of residential real estate loans permanently modified in TDRs were six years. The estimated remaining lives of these loans reflect estimated prepayments, both voluntary and involuntary (i.e., foreclosures and other forced liquidations).

Notes to consolidated financial statements

Active and suspended foreclosure

At December 31, 2022 and 2021, the Firm had residential real estate loans, excluding those insured by U.S. government agencies, with a carrying value of \$565 million and \$619 million, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Auto and other

The following tables provide information on delinquency, which is the primary credit quality indicator for retained auto and other consumer loans.

(in millions, except ratios)	December 31, 2022									
	Term loans by origination year						Revolving loans			
	2022	2021	2020	2019	2018	Prior to 2018	Within the revolving period	Converted to term loans	Total	
Loan delinquency										
Current	\$ 22,187	\$ 20,212 ^(b)	\$ 11,401 ^(b)	\$ 3,991	\$ 1,467	\$ 578	\$ 2,342	\$ 118	\$ 62,296	
30-119 days past due	263	308	100	68	33	17	12	10	811	
120 or more days past due	—	53	24	—	—	1	2	5	85	
Total retained loans	\$ 22,450	\$ 20,573	\$ 11,525	\$ 4,059	\$ 1,500	\$ 596	\$ 2,356	\$ 133	\$ 63,192	
% of 30+ days past due to total retained loans ^(a)	1.17 %	1.15 %	0.83 %	1.68 %	2.20 %	3.02 %	0.59 %	11.28 %	1.18 %	
December 31, 2021										
(in millions, except ratios)	Term loans by origination year						Revolving loans			
	2021	2020	2019	2018	2017	Prior to 2017	Within the revolving period	Converted to term loans	Total	
	Loan delinquency									
Current	\$ 35,323 ^(c)	\$ 18,324 ^(c)	\$ 7,443	\$ 3,671	\$ 1,800	\$ 666	\$ 2,242	\$ 120	\$ 69,589	
30-119 days past due	192	720	88	53	31	21	12	6	1,123	
120 or more days past due	—	35	—	—	1	1	5	7	49	
Total retained loans	\$ 35,515	\$ 19,079	\$ 7,531	\$ 3,724	\$ 1,832	\$ 688	\$ 2,259	\$ 133	\$ 70,761	
% of 30+ days past due to total retained loans ^(d)	0.54 %	0.47 %	1.17 %	1.42 %	1.75 %	3.20 %	0.75 %	9.77 %	0.71 % ^(d)	

- (a) At December 31, 2022 and 2021, auto and other loans excluded \$153 million and \$667 million, respectively, of PPP loans guaranteed by the SBA that are 30 or more days past due. These amounts have been excluded based upon the SBA guarantee.
- (b) Includes \$252 million of loans originated in 2021 and \$98 million of loans originated in 2020 in Business Banking under the PPP. PPP loans are guaranteed by the SBA. Other than in certain limited circumstances, the Firm typically does not recognize charge-offs, classify as nonaccrual nor record an allowance for loan losses on these loans.
- (c) Includes \$4.4 billion of loans originated in 2021 and \$1.0 billion of loans originated in 2020 in Business Banking under the PPP.
- (d) Prior-period amount has been revised to conform with the current presentation.

Nonaccrual and other credit quality indicators

The following table provides information on nonaccrual and other credit quality indicators for retained auto and other consumer loans.

(in millions)	Total Auto and other	
	December 31, 2022	December 31, 2021
Nonaccrual loans^{(a)(b)(c)}	\$ 129	\$ 119
Geographic region^(d)		
California	\$ 9,689	\$ 11,163
Texas	7,216	7,859
Florida	4,847	4,901
New York	4,345	5,848
Illinois	2,839	2,930
New Jersey	2,219	2,355
Pennsylvania	1,822	2,004
Georgia	1,708	1,748
Ohio	1,603	1,843
Louisiana	1,576	1,801
All other	25,328	28,309
Total retained loans	\$ 63,192	\$ 70,761

- (a) At December 31, 2022 and 2021, nonaccrual loans excluded \$101 million and \$506 million, respectively, of PPP loans 90 or more days past due and guaranteed by the SBA, of which \$76 million and \$35 million, respectively, were no longer accruing interest based on the guidelines set by the SBA. Typically the principal balance of the loans is insured and interest is guaranteed at a specified reimbursement rate subject to meeting the guidelines set by the SBA. There were no loans that were not guaranteed by the SBA that are 90 or more days past due and still accruing interest at December 31, 2022 and 2021.
- (b) Generally, all consumer nonaccrual loans have an allowance. In accordance with regulatory guidance, certain nonaccrual loans that are considered collateral-dependent have been charged down to the lower of amortized cost or the fair value of their underlying collateral less costs to sell. If the value of the underlying collateral improves subsequent to charge down, the related allowance may be negative.
- (c) Interest income on nonaccrual loans recognized on a cash basis was not material for the years ended December 31, 2022 and 2021.
- (d) The geographic regions presented in this table are ordered based on the magnitude of the corresponding loan balances at December 31, 2022.

Loan modifications

Certain auto and other loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. Loans with short-term or other insignificant modifications that are not considered concessions are not TDRs.

The impact of these modifications, as well as new TDRs, were not material to the Firm for the years ended December 31, 2022, 2021 and 2020. Additional commitments to lend to borrowers whose loans have been modified in TDRs as of December 31, 2022 and 2021 were not material.

Notes to consolidated financial statements

Credit card loan portfolio

The credit card portfolio segment includes credit card loans originated and purchased by the Firm. Delinquency rates are the primary credit quality indicator for credit card loans as they provide an early warning that borrowers may be experiencing difficulties (30 days past due); information on those borrowers that have been delinquent for a longer period of time (90 days past due) is also considered. In addition to delinquency rates, the geographic distribution of the loans provides insight as to the credit quality of the portfolio based on the regional economy.

While the borrower's credit score is another general indicator of credit quality, the Firm does not view credit scores as a primary indicator of credit quality because the borrower's credit score tends to be a lagging indicator. The

distribution of such scores provides a general indicator of credit quality trends within the portfolio; however, the score does not capture all factors that would be predictive of future credit performance. Refreshed FICO score information, which is obtained at least quarterly, for a statistically significant random sample of the credit card portfolio is indicated in the following table. FICO is considered to be the industry benchmark for credit scores.

The Firm generally originates new credit card accounts to prime consumer borrowers. However, certain cardholders' FICO scores may decrease over time, depending on the performance of the cardholder and changes in the credit score calculation.

The following tables provide information on delinquency, which is the primary credit quality indicator for retained credit card loans.

(in millions, except ratios)	December 31, 2022		
	Within the revolving period	Converted to term loans ^(a)	Total
Loan delinquency			
Current and less than 30 days past due and still accruing	\$ 181,793	\$ 696	\$ 182,489
30-89 days past due and still accruing	1,356	64	1,420
90 or more days past due and still accruing	1,230	36	1,266
Total retained loans	\$ 184,379	\$ 796	\$ 185,175
Loan delinquency ratios			
% of 30+ days past due to total retained loans	1.40 %	12.56 %	1.45 %
% of 90+ days past due to total retained loans	0.67	4.52	0.68
December 31, 2021			
(in millions, except ratios)	December 31, 2021		
	Within the revolving period	Converted to term loans ^(a)	Total
Loan delinquency			
Current and less than 30 days past due and still accruing	\$ 151,798	\$ 901	\$ 152,699
30-89 days past due and still accruing	770	59	829
90 or more days past due and still accruing	741	27	768
Total retained loans	\$ 153,309	\$ 987	\$ 154,296
Loan delinquency ratios			
% of 30+ days past due to total retained loans	0.99 %	8.71 %	1.04 %
% of 90+ days past due to total retained loans	0.48	2.74	0.50

(a) Represents TDRs.

Other credit quality indicators

The following table provides information on other credit quality indicators for retained credit card loans.

(in millions, except ratios)		December 31, 2022	December 31, 2021
Geographic region^(a)			
California	\$	28,154	\$ 23,030
Texas		19,171	15,879
New York		15,046	12,652
Florida		12,905	10,412
Illinois		10,089	8,530
New Jersey		7,643	6,367
Ohio		5,792	4,923
Pennsylvania		5,517	4,708
Colorado		5,493	4,573
Arizona		4,487	3,668
All other		70,878	59,554
Total retained loans	\$	185,175	\$ 154,296
Percentage of portfolio based on carrying value with estimated refreshed FICO scores			
Equal to or greater than 660		86.8 %	88.5 %
Less than 660		13.0	11.3
No FICO available		0.2	0.2

(a) The geographic regions presented in the table are ordered based on the magnitude of the corresponding loan balances at December 31, 2022.

Loan modifications

The Firm may offer loan modification programs granting concessions to credit card borrowers who are experiencing financial difficulty. The Firm grants concessions for most of the credit card loans under long-term programs. These modifications involve placing the customer on a fixed payment plan, generally for 60 months, and typically include reducing the interest rate on the credit card. Substantially all modifications under the Firm's long-term programs are considered to be TDRs. Loans with short-term or other insignificant modifications that are not considered concessions are not TDRs.

If the cardholder does not comply with the modified payment terms, then the credit card loan continues to age and will ultimately be charged-off in accordance with the Firm's standard charge-off policy. In most cases, the Firm does not reinstate the borrower's line of credit.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the concessions granted on credit card loans modified in TDRs and redefaults for the periods presented. For all periods disclosed, new enrollments were less than 1% of total retained credit card loans.

Year ended December 31, (in millions, except weighted-average data)	2022	2021	2020
Balance of new TDRs ^(a)	\$ 418	\$ 393	\$ 818
Weighted-average interest rate of loans - before TDR	19.86 %	17.75 %	18.04 %
Weighted-average interest rate of loans - after TDR	4.13	5.14	4.64
Balance of loans that redefaulted within one year of modification ^(b)	\$ 34	\$ 57	\$ 110

(a) Represents the outstanding balance prior to modification.

(b) Represents loans modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The amounts presented represent the balance of such loans as of the end of the quarter in which they defaulted.

For credit card loans modified in TDRs, payment default is deemed to have occurred when the borrower misses two consecutive contractual payments. Defaulted modified credit card loans remain in the modification program and continue to be charged off in accordance with the Firm's standard charge-off policy.

Wholesale loan portfolio

Wholesale loans include loans made to a variety of clients, ranging from large corporate and institutional clients to high-net-worth individuals.

The primary credit quality indicator for wholesale loans is the internal risk rating assigned to each loan. Risk ratings are used to identify the credit quality of loans and differentiate risk within the portfolio. Risk ratings on loans consider the PD and the LGD. The PD is the likelihood that a loan will default. The LGD is the estimated loss on the loan that would be realized upon the default of the borrower and takes into consideration collateral and structural support for each credit facility.

Management considers several factors to determine an appropriate internal risk rating, including the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. The Firm's internal risk ratings generally align with the qualitative characteristics (e.g., borrower capacity to meet financial commitments and vulnerability to changes in the economic environment) defined by S&P and Moody's, however the quantitative characteristics (e.g., PD and LGD) may differ as they reflect internal historical experiences and assumptions. The Firm generally considers internal ratings with qualitative characteristics equivalent to BBB-/Baa3 or higher as investment grade, and these ratings have a lower PD and/or lower LGD than non-investment grade ratings.

Noninvestment-grade ratings are further classified as noncriticized and criticized, and the criticized portion is further subdivided into performing and nonaccrual loans, representing management's assessment of the collectibility of principal and interest. Criticized loans have a higher PD than noncriticized loans. The Firm's definition of criticized aligns with the U.S. banking regulatory definition of criticized exposures, which consist of special mention, substandard and doubtful categories.

Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information affecting the obligor's ability to fulfill its obligations.

As noted above, the risk rating of a loan considers the industry in which the obligor conducts its operations. As part of the overall credit risk management framework, the Firm focuses on the management and diversification of its industry and client exposures, with particular attention paid to industries with an actual or potential credit concern. Refer to Note 4 for further detail on industry concentrations.

The following tables provide information on internal risk rating, which is the primary credit quality indicator for retained wholesale loans.

December 31, (in millions, except ratios)	Secured by real estate		Commercial and industrial		Other ^(b)		Total retained loans	
	2022	2021	2022	2021	2022	2021	2022	2021
Loans by risk ratings								
Investment-grade	\$ 99,552	\$ 92,369	\$ 76,275	\$ 75,783	\$ 249,585	\$ 241,859	\$ 425,412	\$ 410,011
Noninvestment-grade:								
Noncriticized	23,272	22,495	81,393	62,039	57,888	52,440	162,553	136,974
Criticized performing	3,662	3,645	8,974	6,900	1,106	770	13,742	11,315
Criticized nonaccrual ^(a)	246	326	1,018	969	699	759	1,963	2,054
Total noninvestment-grade	27,180	26,466	91,385	69,908	59,693	53,969	178,258	150,343
Total retained loans	\$ 126,732	\$ 118,835	\$ 167,660	\$ 145,691	\$ 309,278	\$ 295,828	\$ 603,670	\$ 560,354
% of investment-grade to total retained loans	78.55 %	77.73 %	45.49 %	52.02 %	80.70 %	81.76 %	70.47 %	73.17 %
% of total criticized to total retained loans	3.08	3.34	5.96	5.40	0.58	0.52	2.60	2.39
% of criticized nonaccrual to total retained loans	0.19	0.27	0.61	0.67	0.23	0.26	0.33	0.37

- (a) At December 31, 2021 nonaccrual loans excluded \$127 million of PPP loans 90 or more days past due and guaranteed by the SBA, predominantly in commercial and industrial. At December 31, 2022 the amount excluded was not material.
- (b) Includes loans to financial institutions, states and political subdivisions, SPEs, nonprofits, personal investment companies and trusts, as well as loans to individuals and individual entities (predominantly Global Private Bank clients within AWM and J.P. Morgan Wealth Management within CCB). Refer to Note 14 for more information on SPEs.

(in millions)	Secured by real estate								
	Term loans by origination year						Revolving loans		
	2022	2021	2020	2019	2018	Prior to 2018	Within the revolving period	Converted to term loans	Total
Loans by risk ratings									
Investment-grade	\$ 24,134	\$ 22,407	\$ 14,773	\$ 14,666	\$ 5,277	\$ 17,289	\$ 1,006	\$ -	\$ 99,552
Noninvestment-grade	6,072	5,602	3,032	3,498	2,395	5,659	920	2	27,180
Total retained loans	\$ 30,206	\$ 28,009	\$ 17,805	\$ 18,164	\$ 7,672	\$ 22,948	\$ 1,926	2	\$ 126,732
Secured by real estate									
December 31, 2021									
(in millions)	Term loans by origination year						Revolving loans		
	2021	2020	2019	2018	2017	Prior to 2017	Within the revolving period	Converted to term loans	Total
	23,346	\$ 16,030	\$ 17,265	\$ 8,103	\$ 7,325	\$ 19,066	\$ 1,226	8	\$ 92,369
Loans by risk ratings									
Investment-grade	\$ 23,346	\$ 16,030	\$ 17,265	\$ 8,103	\$ 7,325	\$ 19,066	\$ 1,226	8	\$ 92,369
Noninvestment-grade	5,364	3,826	4,564	3,806	2,834	5,613	458	1	26,466
Total retained loans	\$ 28,710	\$ 19,856	\$ 21,829	\$ 11,909	\$ 10,159	\$ 24,679	\$ 1,684	9	\$ 118,835

Notes to consolidated financial statements

Commercial and industrial										
December 31, 2022										
(in millions)	Term loans by origination year						Revolving loans			
	2022	2021	2020	2019	2018	Prior to 2018	Within the revolving period	Converted to term loans		
Loans by risk ratings										
Investment-grade	\$ 21,072	\$ 8,338	\$ 3,045	\$ 1,995	\$ 748	\$ 989	\$ 40,087	1	\$ 76,275	(a)
Noninvestment-grade	24,088	12,444	3,459	2,506	525	1,014	47,267	82	91,385	
Total retained loans	\$ 45,160	\$ 20,782	\$ 6,504	\$ 4,501	\$ 1,273	\$ 2,003	\$ 87,354	83	\$ 167,660	

Commercial and industrial										
December 31, 2021										
(in millions)	Term loans by origination year						Revolving loans			
	2021	2020	2019	2018	2017	Prior to 2017	Within the revolving period	Converted to term loans		
Loans by risk ratings										
Investment-grade	\$ 21,342	\$ 6,268	\$ 3,609	\$ 1,269	\$ 1,108	\$ 819	\$ 41,367	1	\$ 75,783	(b)
Noninvestment-grade	19,314	7,112	4,559	2,177	930	430	35,312	74	69,908	
Total retained loans	\$ 40,656	\$ 13,380	\$ 8,168	\$ 3,446	\$ 2,038	\$ 1,249	\$ 76,679	75	\$ 145,691	

- (a) At December 31, 2022, \$139 million of the \$140 million total PPP loans in the wholesale portfolio were commercial and industrial. Of the \$139 million, \$58 million were originated in 2021, and \$81 million were originated in 2020. PPP loans are guaranteed by the SBA and considered investment-grade. Other than in certain limited circumstances, the Firm typically does not recognize charge-offs, classify as nonaccrual nor record an allowance for loan losses on these loans.
- (b) At December 31, 2021, \$1.1 billion of the \$1.3 billion total PPP loans in the wholesale portfolio were commercial and industrial. Of the \$1.1 billion, \$698 million were originated in 2021 and \$396 million were originated in 2020.

Other ^(a)										
December 31, 2022										
(in millions)	Term loans by origination year						Revolving loans			
	2022	2021	2020	2019	2018	Prior to 2018	Within the revolving period	Converted to term loans		
Loans by risk ratings										
Investment-grade	\$ 32,121	\$ 15,864	\$ 13,015	\$ 4,529	\$ 2,159	\$ 7,251	\$ 171,049	\$ 3,597	\$ 249,585	
Noninvestment-grade	16,829	7,096	1,821	699	451	475	32,240	82	59,693	
Total retained loans	\$ 48,950	\$ 22,960	\$ 14,836	\$ 5,228	\$ 2,610	\$ 7,726	\$ 203,289	\$ 3,679	\$ 309,278	

Other ^(a)										
December 31, 2021										
(in millions)	Term loans by origination year						Revolving loans			
	2021	2020	2019	2018	2017	Prior to 2017	Within the revolving period	Converted to term loans		
Loans by risk ratings										
Investment-grade	\$ 26,782	\$ 17,829	\$ 6,125	\$ 2,885	\$ 3,868	\$ 7,651	\$ 176,118	601	\$ 241,859	
Noninvestment-grade	16,905	2,399	1,455	935	218	467	31,585	5	53,969	
Total retained loans	\$ 43,687	\$ 20,228	\$ 7,580	\$ 3,820	\$ 4,086	\$ 8,118	\$ 207,703	606	\$ 295,828	

- (a) Includes loans to financial institutions, states and political subdivisions, SPEs, nonprofits, personal investment companies and trusts, as well as loans to individuals and individual entities (predominantly Global Private Bank clients within AWM and J.P. Morgan Wealth Management within CCB). Refer to Note 14 for more information on SPEs.

The following table presents additional information on retained loans secured by real estate within the Wholesale portfolio, which consists of loans secured wholly or substantially by a lien or liens on real property at origination. Multifamily lending includes financing for acquisition, leasing and construction of apartment buildings. Other commercial lending largely includes financing for acquisition, leasing and construction, largely for office, retail and industrial real estate. Included in secured by real estate loans is \$6.4 billion and \$5.7 billion as of December 31, 2022 and 2021, respectively, of construction and development loans made to finance land development and on-site construction of commercial, industrial, residential, or farm buildings.

	Multifamily		Other Commercial		Total retained loans secured by real estate	
	2022	2021	2022	2021	2022	2021
December 31, (in millions, except ratios)						
Retained loans secured by real estate	\$ 79,139	\$ 73,801	\$ 47,593	\$ 45,034	\$ 126,732	\$ 118,835
Criticized	1,916	1,671	1,992	2,300	3,908	3,971
% of criticized to total retained loans secured by real estate	2.42 %	2.26 %	4.19 %	5.11 %	3.08 %	3.34 %
Criticized nonaccrual	\$ 51	\$ 91	\$ 195	\$ 235	\$ 246	\$ 326
% of criticized nonaccrual loans to total retained loans secured by real estate	0.06 %	0.12 %	0.41 %	0.52 %	0.19 %	0.27 %

Geographic distribution and delinquency

The following table provides information on the geographic distribution and delinquency for retained wholesale loans.

December 31, (in millions)	Secured by real estate		Commercial and industrial		Other		Total retained loans	
	2022	2021	2022	2021	2022	2021	2022	2021
Loans by geographic distribution^(a)								
Total U.S.	\$ 123,740	\$ 115,732	\$ 125,324	\$ 106,449	\$ 230,525	\$ 215,750	\$ 479,589	\$ 437,931
Total non-U.S.	2,992	3,103	42,336	39,242	78,753	80,078	124,081	122,423
Total retained loans	\$ 126,732	\$ 118,835	\$ 167,660	\$ 145,691	\$ 309,278	\$ 295,828	\$ 603,670	\$ 560,354
Loan delinquency								
Current and less than 30 days past due and still accruing	\$ 126,083	\$ 118,163	\$ 165,415	\$ 143,459	\$ 307,511	\$ 293,358	\$ 599,009	\$ 554,980
30-89 days past due and still accruing	402	331	1,127	1,193	1,015	1,590	2,544	3,114
90 or more days past due and still accruing ^(b)	1	15	100	70	53	121	154	206
Criticized nonaccrual ^(c)	246	326	1,018	969	699	759	1,963	2,054
Total retained loans	\$ 126,732	\$ 118,835	\$ 167,660	\$ 145,691	\$ 309,278	\$ 295,828	\$ 603,670	\$ 560,354

(a) The U.S. and non-U.S. distribution is determined based predominantly on the domicile of the borrower.

(b) Represents loans that are considered well-collateralized and therefore still accruing interest.

(c) At December 31, 2021 nonaccrual loans excluded \$127 million of PPP loans 90 or more days past due and guaranteed by the SBA, predominantly in commercial and industrial. At December 31, 2022 the amount excluded was not material.

Nonaccrual loans

The following table provides information on retained wholesale nonaccrual loans.

December 31, (in millions)	Secured by real estate		Commercial and industrial		Other		Total retained loans	
	2022	2021	2022	2021	2022	2021	2022	2021
Nonaccrual loans								
With an allowance	\$ 172	\$ 254	\$ 686	\$ 604	\$ 487	\$ 286	\$ 1,345	\$ 1,144
Without an allowance ^(a)	74	72	332	365	212	473	618	910
Total nonaccrual loans^(b)	\$ 246	\$ 326	\$ 1,018	\$ 969	\$ 699	\$ 759	\$ 1,963	\$ 2,054

(a) When the discounted cash flows or collateral value equals or exceeds the amortized cost of the loan, the loan does not require an allowance. This typically occurs when the loans have been partially charged off and/or there have been interest payments received and applied to the loan balance.

(b) Interest income on nonaccrual loans recognized on a cash basis were not material for the years ended December 31, 2022 and 2021.

Loan modifications

Certain loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. Loans with short-term or other insignificant modifications that are not considered concessions are not TDRs nor are loans for which the Firm has elected to suspend TDR accounting guidance under the option provided by the CARES Act. New TDRs during the years ended December 31, 2022, 2021 and 2020 were \$801 million, \$881 million and \$734 million, respectively. New TDRs during the years ended December 31, 2022, 2021 and 2020 reflected the extension of maturity dates, covenant waivers, receipt of assets in partial satisfaction of the loan and deferral of principal and interest payments, predominantly in the Commercial and Industrial and Other loan classes. The impact of these modifications resulting in new TDRs was not material to the Firm for the years ended December 31, 2022, 2021 and 2020.

The carrying value of TDRs was \$936 million and \$607 million as of December 31, 2022 and 2021, respectively.

Note 13 – Allowance for credit losses

The Firm's allowance for credit losses represents management's estimate of expected credit losses over the remaining expected life of the Firm's financial assets measured at amortized cost and certain off-balance sheet lending-related commitments. The allowance for credit losses comprises:

- the allowance for loan losses, which covers the Firm's retained loan portfolios (scored and risk-rated) and is presented separately on the Consolidated balance sheets,
- the allowance for lending-related commitments, which is presented on the Consolidated balance sheets in accounts payable and other liabilities, and
- the allowance for credit losses on investment securities, which is reflected in investment securities on the Consolidated balance sheets.

The income statement effect of all changes in the allowance for credit losses is recognized in the provision for credit losses.

Determining the appropriateness of the allowance for credit losses is complex and requires significant judgment by management about the effect of matters that are inherently uncertain. At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm. Subsequent evaluations of credit exposures, considering the macroeconomic conditions, forecasts and other factors then prevailing, may result in significant changes in the allowance for credit losses in future periods.

The Firm's policies used to determine its allowance for loan losses and its allowance for lending-related commitments are described in the following paragraphs. Refer to Note 10 for a description of the policies used to determine the allowance for credit losses on investment securities.

Methodology for allowances for loan losses and lending-related commitments

The allowance for loan losses and allowance for lending-related commitments represents expected credit losses over the remaining expected life of retained loans and lending-related commitments that are not unconditionally cancellable. The Firm does not record an allowance for future draws on unconditionally cancellable lending-related commitments (e.g., credit cards). Expected losses related to accrued interest on credit card loans are considered in the Firm's allowance for loan losses. However, the Firm does not record an allowance on other accrued interest receivables, due to its policy to write these receivables off no later than 90 days past due by reversing interest income.

The expected life of each instrument is determined by considering its contractual term, expected prepayments, cancellation features, and certain extension and call options. The expected life of funded credit card loans is generally estimated by considering expected future payments on the credit card account, and determining how much of those amounts should be allocated to repayments of the funded loan balance (as of the balance sheet date)

versus other account activity. This allocation is made using an approach that incorporates the payment application requirements of the Credit Card Accountability Responsibility and Disclosure Act of 2009, generally paying down the highest interest rate balances first.

The estimate of expected credit losses includes expected recoveries of amounts previously charged off or expected to be charged off, even if such recoveries result in a negative allowance.

Collective and Individual Assessments

When calculating the allowance for loan losses and the allowance for lending-related commitments, the Firm assesses whether exposures share similar risk characteristics. If similar risk characteristics exist, the Firm estimates expected credit losses collectively, considering the risk associated with a particular pool and the probability that the exposures within the pool will deteriorate or default. The assessment of risk characteristics is subject to significant management judgment. Emphasizing one characteristic over another or considering additional characteristics could affect the allowance.

- Relevant risk characteristics for the consumer portfolio include product type, delinquency status, current FICO scores, geographic distribution, and, for collateralized loans, current LTV ratios.
- Relevant risk characteristics for the wholesale portfolio include risk rating, delinquency status, tenor, level and type of collateral, LOB, geography, industry, credit enhancement, product type, facility purpose, and payment terms.

The majority of the Firm's credit exposures share risk characteristics with other similar exposures, and as a result are collectively assessed for impairment ("portfolio-based component"). The portfolio-based component covers consumer loans, performing risk-rated loans and certain lending-related commitments.

If an exposure does not share risk characteristics with other exposures, the Firm generally estimates expected credit losses on an individual basis, considering expected repayment and conditions impacting that individual exposure ("asset-specific component"). The asset-specific component covers modified PCD loans, loans modified or reasonably expected to be modified in a TDR, collateral-dependent loans, as well as, risk-rated loans that have been placed on nonaccrual status.

Portfolio-based component

The portfolio-based component begins with a quantitative calculation that considers the likelihood of the borrower changing delinquency status or moving from one risk rating to another. The quantitative calculation covers expected credit losses over an instrument's expected life and is estimated by applying credit loss factors to the Firm's estimated exposure at default. The credit loss factors incorporate the probability of borrower default as well as loss severity in the event of default. They are derived using

a weighted average of five internally developed macroeconomic scenarios over an eight-quarter forecast period, followed by a single year straight-line interpolation to revert to long run historical information for periods beyond the eight-quarter forecast period. The five macroeconomic scenarios consist of a central, relative adverse, extreme adverse, relative upside and extreme upside scenario, and are updated by the Firm's central forecasting team. The scenarios take into consideration the Firm's macroeconomic outlook, internal perspectives from subject matter experts across the Firm, and market consensus and involve a governed process that incorporates feedback from senior management across LOBs, Corporate Finance and Risk Management.

The quantitative calculation is adjusted to take into consideration model imprecision, emerging risk assessments, trends and other subjective factors that are not yet reflected in the calculation. These adjustments are accomplished in part by analyzing the historical loss experience, including during stressed periods, for each major product or model. Management applies judgment in making this adjustment, including taking into account uncertainties associated with the economic and political conditions, quality of underwriting standards, borrower behavior, credit concentrations or deterioration within an industry, product or portfolio, as well as other relevant internal and external factors affecting the credit quality of the portfolio. In certain instances, the interrelationships between these factors create further uncertainties.

The application of different inputs into the quantitative calculation, and the assumptions used by management to adjust the quantitative calculation, are subject to significant management judgment, and emphasizing one input or assumption over another, or considering other inputs or assumptions, could affect the estimate of the allowance for loan losses and the allowance for lending-related commitments.

Asset-specific component

To determine the asset-specific component of the allowance, collateral-dependent loans (including those loans for which foreclosure is probable) and larger, nonaccrual risk-rated loans in the wholesale portfolio segment are generally evaluated individually, while smaller loans (both scored and risk-rated) are aggregated for evaluation using factors relevant for the respective class of assets.

The Firm generally measures the asset-specific allowance as the difference between the amortized cost of the loan and the present value of the cash flows expected to be collected, discounted at the loan's original effective interest rate. Subsequent changes in impairment are generally recognized as an adjustment to the allowance for loan losses. For collateral-dependent loans, the fair value of collateral less estimated costs to sell is used to determine the charge-off amount for declines in value (to reduce the amortized cost of the loan to the fair value of collateral) or the amount of negative allowance that should be

recognized (for recoveries of prior charge-offs associated with improvements in the fair value of collateral).

The asset-specific component of the allowance for loans that have been or are expected to be modified in TDRs incorporates the effect of the modification on the loan's expected cash flows (including forgone interest, principal forgiveness, as well as other concessions), and also the potential for redefault. For residential real estate loans modified in or expected to be modified in TDRs, the Firm develops product-specific probability of default estimates, which are applied at a loan level to compute expected losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about housing prices and unemployment, based upon industry-wide data. The Firm also considers its own historical loss experience to-date based on actual redefaulted modified loans. For credit card loans modified in or expected to be modified in TDRs, expected losses incorporate projected delinquencies and charge-offs based on the Firm's historical experience by type of modification program. For wholesale loans modified or expected to be modified in TDRs, expected losses incorporate management's expectation of the borrower's ability to repay under the modified terms.

Estimating the timing and amounts of future cash flows is highly judgmental as these cash flow projections rely upon estimates such as loss severities, asset valuations, default rates (including redefault rates on modified loans), the amounts and timing of interest or principal payments (including any expected prepayments) or other factors that are reflective of current and expected market conditions. These estimates are, in turn, dependent on factors such as the duration of current overall economic conditions, industry, portfolio, or borrower-specific factors, the expected outcome of insolvency proceedings as well as, in certain circumstances, other economic factors. All of these estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

Notes to consolidated financial statements

Allowance for credit losses and related information

The table below summarizes information about the allowances for credit losses, and includes a breakdown of loans and lending-related commitments by impairment methodology. Refer to Note 10 for further information on the allowance for credit losses on investment securities.

(Table continued on next page)

Year ended December 31, (in millions)	2022				
	Consumer, excluding credit card	Credit card	Wholesale	Total	
Allowance for loan losses					
Beginning balance at January 1,	\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386	
Cumulative effect of a change in accounting principle ^(a)	NA	NA	NA	NA	
Gross charge-offs	812	3,192	322	4,326	
Gross recoveries collected	(543)	(789)	(141)	(1,473)	
Net charge-offs	269	2,403	181	2,853	
Provision for loan losses	543	3,353	2,293	6,189	
Other	1	—	3	4	
Ending balance at December 31,	\$ 2,040	\$ 11,200	\$ 6,486	\$ 19,726	
Allowance for lending-related commitments					
Beginning balance at January 1,	\$ 113	\$ —	\$ 2,148	\$ 2,261	
Cumulative effect of a change in accounting principle ^(a)	NA	NA	NA	NA	
Provision for lending-related commitments	(37)	—	157	120	
Other	—	—	1	1	
Ending balance at December 31,	\$ 76	\$ —	\$ 2,306	\$ 2,382	
Total allowance for investment securities	NA	NA	NA	\$ 96	
Total allowance for credit losses^(b)	\$ 2,116	\$ 11,200	\$ 8,792	\$ 22,204	
Allowance for loan losses by impairment methodology					
Asset-specific ^(c)	\$ (624)	\$ 223	\$ 467	\$ 66	
Portfolio-based	2,664	10,977	6,019	19,660	
Total allowance for loan losses	\$ 2,040	\$ 11,200	\$ 6,486	\$ 19,726	
Loans by impairment methodology					
Asset-specific ^(c)	\$ 11,978	\$ 796	\$ 2,189	\$ 14,963	
Portfolio-based	288,775	184,379	601,481	1,074,635	
Total retained loans	\$ 300,753	\$ 185,175	\$ 603,670	\$ 1,089,598	
Collateral-dependent loans					
Net charge-offs	\$ (33)	\$ —	\$ 16	\$ (17)	
Loans measured at fair value of collateral less cost to sell	3,585	—	464	4,049	
Allowance for lending-related commitments by impairment methodology					
Asset-specific	\$ —	\$ —	\$ 90	\$ 90	
Portfolio-based	76	—	2,216	2,292	
Total allowance for lending-related commitments^(d)	\$ 76	\$ —	\$ 2,306	\$ 2,382	
Lending-related commitments by impairment methodology					
Asset-specific	\$ —	\$ —	\$ 455	\$ 455	
Portfolio-based ^(e)	20,423	—	461,688	482,111	
Total lending-related commitments	\$ 20,423	\$ —	\$ 462,143	\$ 482,566	

(a) Represents the impact to allowance for credit losses upon the adoption of CECL on January 1, 2020. Refer to Note 1 for further information.

(b) At December 31, 2022 excludes an allowance for credit losses associated with certain accounts receivable in CIB of \$21 million.

(c) Includes collateral dependent loans, including those considered TDRs and those for which foreclosure is deemed probable, modified PCD loans and non-collateral dependent loans that have been modified or are reasonably expected to be modified in a TDR. Also includes risk-rated loans that have been placed on nonaccrual status for the wholesale portfolio segment. The asset-specific credit card allowance for loans modified, or reasonably expected to be modified, in a TDR is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(d) The allowance for lending-related commitments is reported in accounts payable and other liabilities on the Consolidated balance sheets.

(e) At December 31, 2022, 2021 and 2020, lending-related commitments excluded \$13.1 billion, \$15.7 billion and \$19.5 billion, respectively, for the consumer, excluding credit card portfolio segment; \$821.3 billion, \$730.5 billion and \$658.5 billion, respectively, for the credit card portfolio segment; and \$9.8 billion, \$32.1 billion and \$25.3 billion, respectively, for the wholesale portfolio segment, which were not subject to the allowance for lending-

related commitments. Prior-period amount for wholesale lending-related commitments, including the amount not subject to allowance, has been revised to conform with the current presentation.

(table continued from previous page)

	2021						2020					
Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total					
\$ 3,636	\$ 17,800	\$ 6,892	\$ 28,328	\$ 2,538	\$ 5,683	\$ 4,902	\$ 13,123					
NA	NA	NA	NA	297	5,517	(1,642)	4,172					
630	3,651	283	4,564	805	5,077	954	6,836					
(619)	(939)	(141)	(1,699)	(631)	(791)	(155)	(1,577)					
11	2,712	142	2,865	174	4,286	799	5,259					
(1,858)	(4,838)	(2,375)	(9,071)	974	10,886	4,431	16,291					
(2)	—	(4)	(6)	1	—	—	1					
\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386	\$ 3,636	\$ 17,800	\$ 6,892	\$ 28,328					
\$ 187	\$ —	\$ 2,222	\$ 2,409	\$ 12	\$ —	\$ 1,179	\$ 1,191					
NA	NA	NA	NA	133	—	(35)	98					
(75)	—	(74)	(149)	42	—	1,079	1,121					
1	—	—	1	—	—	(1)	(1)					
\$ 113	\$ —	\$ 2,148	\$ 2,261	\$ 187	\$ —	\$ 2,222	\$ 2,409					
NA	NA	NA	NA	NA	NA	NA	78					
\$ 1,878	\$ 10,250	\$ 6,519	\$ 18,689	\$ 3,823	\$ 17,800	\$ 9,114	\$ 30,815					
\$ (665)	\$ 313	\$ 263	\$ (89)	\$ (7)	\$ 633	\$ 682	\$ 1,308					
2,430	9,937	4,108	16,475	3,643	17,167	6,210	27,020					
\$ 1,765	\$ 10,250	\$ 4,371	\$ 16,386	\$ 3,636	\$ 17,800	\$ 6,892	\$ 28,328					
\$ 13,919	\$ 987	\$ 2,255	\$ 17,161	\$ 16,648	\$ 1,375	\$ 3,606	\$ 21,629					
281,637	153,309	558,099	993,045	285,479	142,057	511,341	938,877					
\$ 295,556	\$ 154,296	\$ 560,354	\$ 1,010,206	\$ 302,127	\$ 143,432	\$ 514,947	\$ 960,506					
\$ 33	\$ —	\$ 38	\$ 71	\$ 133	\$ —	\$ 76	\$ 209					
4,472	—	617	5,089	4,956	—	188	5,144					
\$ —	\$ —	\$ 167	\$ 167	\$ —	\$ —	\$ 114	\$ 114					
113	—	1,981	2,094	187	—	2,108	2,295					
\$ 113	\$ —	\$ 2,148	\$ 2,261	\$ 187	\$ —	\$ 2,222	\$ 2,409					
\$ —	\$ —	\$ 764	\$ 764	\$ —	\$ —	\$ 577	\$ 577					
29,588	—	453,571	483,159	37,783	—	423,993	461,776					
\$ 29,588	\$ —	\$ 454,335	\$ 483,923	\$ 37,783	\$ —	\$ 424,570	\$ 462,353					

Notes to consolidated financial statements

Discussion of changes in the allowance

The allowance for credit losses as of December 31, 2022 was \$22.2 billion, reflecting a net addition of \$3.5 billion from December 31, 2021, consisting of:

- \$2.3 billion in wholesale, driven by deterioration in the Firm's macroeconomic outlook and loan growth, predominantly in CB and CIB, and
- \$1.2 billion in consumer, predominantly driven by Card Services, reflecting higher outstanding balances and deterioration in the Firm's macroeconomic outlook, partially offset by a reduction in the allowance related to a decrease in uncertainty associated with borrower behavior as the effects of the pandemic gradually recede.

Deterioration in the Firm's macroeconomic outlook included both updates to the central scenario in the fourth quarter of 2022, which now reflects a mild recession, as well as the impact of the increased weight placed on the adverse scenarios beginning in the first quarter of 2022 due to the effects associated with higher inflation, changes in monetary policy, and geopolitical risks, including the war in Ukraine.

The Firm's allowance for credit losses is estimated using a weighted average of five internally developed macroeconomic scenarios. The adverse scenarios incorporate more punitive macroeconomic factors than the central case assumptions provided in the table below, resulting in a weighted average U.S. unemployment rate peaking at 5.6% in the second quarter of 2024, and a 1.2% lower U.S. real GDP exiting the second quarter of 2024.

The Firm's central case assumptions reflected U.S. unemployment rates and U.S. real GDP as follows:

	Assumptions at December 31, 2022		
	2Q23	4Q23	2Q24
U.S. unemployment rate ^(a)	3.8 %	4.3 %	5.0 %
YoY growth in U.S. real GDP ^(b)	1.5 %	0.4 %	– %

	Assumptions at December 31, 2021		
	2Q22	4Q22	2Q23
U.S. unemployment rate ^(a)	4.2 %	4.0 %	3.9 %
YoY growth in U.S. real GDP ^(b)	3.1 %	2.8 %	2.1 %

(a) Reflects quarterly average of forecasted U.S. unemployment rate.

(b) The year over year growth in U.S. real GDP in the forecast horizon of the central scenario is calculated as the percentage change in U.S. real GDP levels from the prior year.

Subsequent changes to this forecast and related estimates will be reflected in the provision for credit losses in future periods.

Refer to Critical Accounting Estimates Used by the Firm on pages 149-152 for further information on the allowance for credit losses and related management judgments.

Refer to Consumer Credit Portfolio on pages 110-115, Wholesale Credit Portfolio on pages 116-126 for additional information on the consumer and wholesale credit portfolios.

Note 14 – Variable interest entities

Refer to Note 1 on page 164 for a further description of JPMorgan Chase's accounting policies regarding consolidation of VIEs.

The following table summarizes the most significant types of Firm-sponsored VIEs by business segment. The Firm considers a "Firm-sponsored" VIE to include any entity where: (1) JPMorgan Chase is the primary beneficiary of the structure; (2) the VIE is used by JPMorgan Chase to securitize Firm assets; (3) the VIE issues financial instruments with the JPMorgan Chase name; or (4) the entity is a JPMorgan Chase-administered asset-backed commercial paper conduit.

Line of Business	Transaction Type	Activity	2022 Form 10-K page references
CCB	Credit card securitization trusts	Securitization of originated credit card receivables	pages 247-248
	Mortgage securitization trusts	Servicing and securitization of both originated and purchased residential mortgages	pages 248-250
CIB	Mortgage and other securitization trusts	Securitization of both originated and purchased residential and commercial mortgages, and other consumer loans	pages 248-250
	Multi-seller conduits	Assisting clients in accessing the financial markets in a cost-efficient manner and structuring transactions to meet investor needs	page 250
	Municipal bond vehicles	Financing of municipal bond investments	pages 250-251

The Firm's other business segments are also involved with VIEs (both third-party and Firm-sponsored), but to a lesser extent, as follows:

- Asset & Wealth Management: AWM sponsors and manages certain funds that are deemed VIEs. As asset manager of the funds, AWM earns a fee based on assets managed; the fee varies with each fund's investment objective and is competitively priced. For fund entities that qualify as VIEs, AWM's interests are, in certain cases, considered to be significant variable interests that result in consolidation of the financial results of these entities.
- Commercial Banking: CB provides financing and lending-related services to a wide spectrum of clients, including certain third-party-sponsored entities that may meet the definition of a VIE. CB does not control the activities of these entities and does not consolidate these entities. CB's maximum loss exposure, regardless of whether the entity is a VIE, is generally limited to loans and lending-related commitments which are reported and disclosed in the same manner as any other third-party transaction.
- Corporate: Corporate is involved with entities that may meet the definition of VIEs; however these entities are generally subject to specialized investment company accounting, which does not require the consolidation of investments, including VIEs. In addition, Treasury and CIO invest in securities generally issued by third parties which may meet the definition of VIEs (e.g., issuers of asset-backed securities). In general, the Firm does not have the power to direct the significant activities of these entities and therefore does not consolidate these entities. Refer to Note 10 for further information on the Firm's investment securities portfolio.

In addition, CIB also invests in and provides financing and other services to VIEs sponsored by third parties. Refer to pages 251-252 of this Note for more information on consolidated VIE assets and liabilities as well as the VIEs sponsored by third parties.

Significant Firm-sponsored variable interest entities

Credit card securitizations

CCB's Card Services business may securitize originated credit card loans, primarily through the Chase Issuance Trust (the "Trust"). The Firm's continuing involvement in credit card securitizations includes servicing the receivables, retaining an undivided seller's interest in the receivables, retaining certain senior and subordinated securities and maintaining escrow accounts.

The Firm consolidates the assets and liabilities of its sponsored credit card trusts as it is considered to be the primary beneficiary of these securitization trusts based on the Firm's ability to direct the activities of these VIEs through its servicing responsibilities and other duties, including making decisions as to the receivables that are transferred into those trusts and as to any related modifications and workouts. Additionally, the nature and extent of the Firm's other continuing involvement with the

trusts, as indicated above, obligates the Firm to absorb losses and gives the Firm the right to receive certain benefits from these VIEs that could potentially be significant.

The underlying securitized credit card receivables and other assets of the securitization trusts are available only for payment of the beneficial interests issued by the securitization trusts; they are not available to pay the Firm's other obligations or the claims of the Firm's creditors.

The agreements with the credit card securitization trusts require the Firm to maintain a minimum undivided interest in the credit card trusts (generally 5%). As of December 31, 2022 and 2021, the Firm held undivided interests in Firm-sponsored credit card securitization trusts of \$6.1 billion and \$7.1 billion, respectively. The Firm maintained an average undivided interest in principal

Notes to consolidated financial statements

receivables owned by those trusts of approximately 62% and 57% for the years ended December 31, 2022 and 2021, respectively. The Firm did not retain any senior securities and retained \$1.5 billion of subordinated securities in certain of its credit card securitization trusts at both December 31, 2022 and 2021. The Firm's undivided interests in the credit card trusts and securities retained are eliminated in consolidation.

The following tables present the total unpaid principal amount of assets held in Firm-sponsored private-label securitization entities, including those in which the Firm has continuing involvement, and those that are consolidated by the Firm. Continuing involvement includes servicing the loans, holding senior interests or subordinated interests (including amounts required to be held pursuant to credit risk retention rules), recourse or guarantee arrangements, and derivative contracts. In certain instances, the Firm's only continuing involvement is servicing the loans. The Firm's maximum loss exposure from retained and purchased interests is the carrying value of these interests.

December 31, 2022 (in millions)	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs ^{(c)(d)(e)}				Total interests held by JPMorgan Chase	
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	Investment securities	Other financial assets			
Securitization-related^(a)									
Residential mortgage:									
Prime/Alt-A and option ARMs	\$ 55,362	\$ 754	\$ 37,058	\$ 744	\$ 1,918	\$ —	\$ 2,662		
Subprime	9,709	—	1,743	10	—	—	—	10	
Commercial and other ^(b)	164,915	—	127,037	888	5,373	670	6,931		
Total	\$ 229,986	\$ 754	\$ 165,838	\$ 1,642	\$ 7,291	\$ 670	\$ 9,603		

December 31, 2021 (in millions)	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs ^{(c)(d)(e)}				Total interests held by JPMorgan Chase	
	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	Investment securities	Other financial assets			
Securitization-related^(a)									
Residential mortgage:									
Prime/Alt-A and option ARMs	\$ 55,085	\$ 942	\$ 42,522 ^(f)	\$ 974	\$ 684	\$ 95	\$ 1,753		
Subprime	10,966	27	10,115	2	—	—	—	2	
Commercial and other ^(b)	150,694	—	93,698	671	3,274	506	4,451		
Total	\$ 216,745	\$ 969	\$ 146,335	\$ 1,647	\$ 3,958	\$ 601	\$ 6,206		

(a) Excludes U.S. GSEs and government agency securitizations and re-securitizations, which are not Firm-sponsored.

(b) Consists of securities backed by commercial real estate loans and non-mortgage-related consumer receivables.

(c) Excludes the following: retained servicing; securities retained from loan sales and securitization activity related to U.S. GSEs and government agencies; interest rate and foreign exchange derivatives primarily used to manage interest rate and foreign exchange risks of securitization entities; senior securities of \$134 million and \$145 million at December 31, 2022 and 2021, respectively, and subordinated securities which were not material at both December 31, 2022 and 2021, which the Firm purchased in connection with CIB's secondary market-making activities.

(d) Includes interests held in re-securitization transactions.

(e) As of December 31, 2022 and 2021, 84% and 79%, respectively, of the Firm's retained securitization interests, which are predominantly carried at fair value and include amounts required to be held pursuant to credit risk retention rules, were risk-rated "A" or better, on an S&P-equivalent basis. The retained interests in prime residential mortgages consisted of \$2.6 billion and \$1.6 billion of investment-grade retained interests at December 31, 2022 and 2021, respectively, and \$131 million of noninvestment-grade retained interests at December 31, 2021; noninvestment-grade retained interests were not material at December 31, 2022. The retained interests in commercial and other securitization trusts consisted of \$5.8 billion and \$3.5 billion of investment-grade retained interests, and \$1.1 billion and \$929 million of noninvestment-grade retained interests at December 31, 2022 and 2021, respectively.

(f) Prior-period amount has been revised to conform with the current presentation.

Firm-sponsored mortgage and other securitization trusts

The Firm securitizes (or has securitized) originated and purchased residential mortgages, commercial mortgages and other consumer loans primarily in its CCB and CIB businesses. Depending on the particular transaction, as well as the respective business involved, the Firm may act as the servicer of the loans and/or retain certain beneficial interests in the securitization trusts.

Residential mortgage

The Firm securitizes residential mortgage loans originated by CCB, as well as residential mortgage loans purchased from third parties by either CCB or CIB. CCB generally retains servicing for all residential mortgage loans it originated or purchased, and for certain mortgage loans purchased by CIB. For securitizations of loans serviced by CCB, the Firm has the power to direct the significant activities of the VIE because it is responsible for decisions related to loan modifications and workouts. CCB may also retain an interest upon securitization.

In addition, CIB engages in underwriting and trading activities involving securities issued by Firm-sponsored securitization trusts. As a result, CIB at times retains senior and/or subordinated interests (including residual interests and amounts required to be held pursuant to credit risk retention rules) in residential mortgage securitizations at the time of securitization, and/or reacquires positions in the secondary market in the normal course of business. In certain instances, as a result of the positions retained or reacquired by CIB or held by Treasury and CIO or CCB, when considered together with the servicing arrangements entered into by CCB, the Firm is deemed to be the primary beneficiary of certain securitization trusts.

The Firm does not consolidate residential mortgage securitizations (Firm-sponsored or third-party-sponsored) when it is not the servicer (and therefore does not have the power to direct the most significant activities of the trust) or does not hold a beneficial interest in the trust that could potentially be significant to the trust.

Commercial mortgages and other consumer securitizations
 CIB originates and securitizes commercial mortgage loans, and engages in underwriting and trading activities involving the securities issued by securitization trusts. CIB may retain unsold senior and/or subordinated interests (including amounts required to be held pursuant to credit risk retention rules) in commercial mortgage securitizations at the time of securitization but, generally, the Firm does not service commercial loan securitizations. Treasury and CIO may choose to invest in these securitizations as well. For commercial mortgage securitizations the power to direct the significant activities of the VIE generally is held by the servicer or investors in a specified class of securities (“controlling class”). The Firm generally does not retain an interest in the controlling class in its sponsored commercial mortgage securitization transactions.

Re-securitizations

The Firm engages in certain re-securitization transactions in which debt securities are transferred to a VIE in exchange for new beneficial interests. These transfers occur in connection with both U.S. GSEs and government agency sponsored VIEs, which are backed by residential mortgages. The Firm’s consolidation analysis is largely dependent on the Firm’s role and interest in the re-securitization trusts.

The following table presents the principal amount of securities transferred to re-securitization VIEs.

Year ended December 31, (in millions)	2022	2021	2020
Transfers of securities to VIEs			
U.S. GSEs and government agencies	\$ 16,128	\$ 53,923	\$ 46,123

Most re-securitizations with which the Firm is involved are client-driven transactions in which a specific client or group of clients is seeking a specific return or risk profile. For these transactions, the Firm has concluded that the decision-making power of the entity is shared between the Firm and its clients, considering the joint effort and decisions in establishing the re-securitization trust and its assets, as well as the significant economic interest the client holds in the re-securitization trust; therefore the Firm does not consolidate the re-securitization VIE.

The Firm did not transfer any private label securities to re-securitization VIEs during 2022, 2021 and 2020, and retained interests in any such Firm-sponsored VIEs as of December 31, 2022 and 2021 were not material.

Additionally, the Firm may invest in beneficial interests of third-party-sponsored re-securitizations and generally purchases these interests in the secondary market. In these circumstances, the Firm does not have the unilateral ability to direct the most significant activities of the re-securitization trust, either because it was not involved in the initial design of the trust, or the Firm was involved with an independent third-party sponsor and demonstrated shared power over the creation of the trust; therefore, the Firm does not consolidate the re-securitization VIE.

Notes to consolidated financial statements

The following table presents information on the Firm's interests in nonconsolidated re-securitization VIEs.

	Nonconsolidated re-securitization VIEs	
December 31, (in millions)	2022	2021
U.S. GSEs and government agencies		
Interest in VIEs	\$ 2,580	\$ 1,947

As of December 31, 2022 and 2021, the Firm did not consolidate any U.S. GSE and government agency re-securitization VIEs or any Firm-sponsored private-label re-securitization VIEs.

Multi-seller conduits

Multi-seller conduit entities are separate bankruptcy remote entities that provide secured financing, collateralized by pools of receivables and other financial assets, to customers of the Firm. The conduits fund their financing facilities through the issuance of highly rated commercial paper. The primary source of repayment of the commercial paper is the cash flows from the pools of assets. In most instances, the assets are structured with deal-specific credit enhancements provided to the conduits by the customers (i.e., sellers) or other third parties. Deal-specific credit enhancements are generally structured to cover a multiple of historical losses expected on the pool of assets, and are typically in the form of overcollateralization provided by the seller. The deal-specific credit enhancements mitigate the Firm's potential losses on its agreements with the conduits.

To ensure timely repayment of the commercial paper, and to provide the conduits with funding to provide financing to customers in the event that the conduits do not obtain funding in the commercial paper market, each asset pool financed by the conduits has a minimum 100% deal-specific liquidity facility associated with it provided by JPMorgan Chase Bank, N.A. JPMorgan Chase Bank, N.A. also provides the multi-seller conduit vehicles with uncommitted program-wide liquidity facilities and program-wide credit enhancement in the form of standby letters of credit. The amount of program-wide credit enhancement required is based upon commercial paper issuance and approximates 10% of the outstanding balance of commercial paper.

The Firm consolidates its Firm-administered multi-seller conduits, as the Firm has both the power to direct the significant activities of the conduits and a potentially significant economic interest in the conduits. As administrative agent and in its role in structuring transactions, the Firm makes decisions regarding asset types and credit quality, and manages the commercial paper funding needs of the conduits. The Firm's interests that could potentially be significant to the VIEs include the fees received as administrative agent and liquidity and program-wide credit enhancement provider, as well as the potential exposure created by the liquidity and credit enhancement facilities provided to the conduits.

In the normal course of business, JPMorgan Chase makes markets in and invests in commercial paper issued by the Firm-administered multi-seller conduits. The Firm held \$13.8 billion and \$13.7 billion of the commercial paper issued by the Firm-administered multi-seller conduits at December 31, 2022 and 2021, respectively, which have been eliminated in consolidation. The Firm's investments reflect the Firm's funding needs and capacity and were not driven by market illiquidity. Other than the amounts required to be held pursuant to credit risk retention rules, the Firm is not obligated under any agreement to purchase the commercial paper issued by the Firm-administered multi-seller conduits.

Deal-specific liquidity facilities, program-wide liquidity and credit enhancement provided by the Firm have been eliminated in consolidation. The Firm or the Firm-administered multi-seller conduits provide lending-related commitments to certain clients of the Firm-administered multi-seller conduits. The unfunded commitments were \$10.6 billion and \$13.4 billion at December 31, 2022 and 2021, respectively, and are reported as off-balance sheet lending-related commitments in other unfunded commitments to extend credit. Refer to Note 28 for more information on off-balance sheet lending-related commitments.

Municipal bond vehicles

Municipal bond vehicles or tender option bond ("TOB") trusts allow institutions to finance their municipal bond investments at short-term rates. In a typical TOB transaction, the trust purchases highly rated municipal bond(s) of a single issuer and funds the purchase by issuing two types of securities: (1) puttable floating-rate certificates ("floaters") and (2) inverse floating-rate residual interests ("residuals"). The floaters are typically purchased by money market funds or other short-term investors and may be tendered, with requisite notice, to the TOB trust. The residuals are retained by the investor seeking to finance its municipal bond investment. TOB transactions where the residual is held by a third-party investor are typically known as customer TOB trusts, and non-customer TOB trusts are transactions where the Residual is retained by the Firm. Customer TOB trusts are sponsored by a third party. The Firm serves as sponsor for all non-customer TOB transactions. The Firm may provide various services to a TOB trust, including remarketing agent, liquidity or tender option provider, and/or sponsor.

J.P. Morgan Securities LLC may serve as a remarketing agent on the floaters for TOB trusts. The remarketing agent is responsible for establishing the periodic variable rate on the floaters, conducting the initial placement and remarketing tendered floaters. The remarketing agent may, but is not obligated to, make markets in floaters. Floaters held by the Firm were not material during 2022 and 2021.

JPMorgan Chase Bank, N.A. or J.P. Morgan Securities LLC often serves as the sole liquidity or tender option provider for the TOB trusts. The liquidity provider's obligation to perform is conditional and is limited by certain events

(“Termination Events”), which include bankruptcy or failure to pay by the municipal bond issuer or credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. In addition, the liquidity provider’s exposure is typically further limited by the high credit quality of the underlying municipal bonds, the excess collateralization in the vehicle, or, in certain transactions, the reimbursement agreements with the Residual holders. Holders of the floaters may “put,” or tender, their floaters to the TOB trust. If the remarketing agent cannot successfully remarket the floaters to another investor, the

liquidity provider either provides a loan to the TOB trust for the TOB trust’s purchase of the floaters, or it directly purchases the tendered floaters.

TOB trusts are considered to be variable interest entities. The Firm consolidates non-customer TOB trusts because as the Residual holder, the Firm has the right to make decisions that significantly impact the economic performance of the municipal bond vehicle, and it has the right to receive benefits and bear losses that could potentially be significant to the municipal bond vehicle.

Consolidated VIE assets and liabilities

The following table presents information on assets and liabilities related to VIEs consolidated by the Firm as of December 31, 2022 and 2021.

December 31, 2022 (in millions)	Assets				Liabilities			
	Trading assets	Loans	Other ^(c)	Total assets ^(d)	Beneficial interests in VIE assets ^(e)	Other ^(f)	Total liabilities	
VIE program type								
Firm-sponsored credit card trusts	\$ —	\$ 9,699	\$ 100	\$ 9,799	\$ 1,999	\$ 2	\$ 2,001	
Firm-administered multi-seller conduits	—	22,819	170	22,989	9,236	39	9,275	
Municipal bond vehicles	2,089	—	7	2,096	1,232	10	1,242	
Mortgage securitization entities ^(a)	—	781	10	791	143	67	210	
Other	62	1,112 ^(b)	263	1,437	—	161	161	
Total	\$ 2,151	\$ 34,411	\$ 550	\$ 37,112	\$ 12,610	\$ 279	\$ 12,889	

December 31, 2021 (in millions)	Assets				Liabilities			
	Trading assets	Loans	Other ^(c)	Total assets ^(d)	Beneficial interests in VIE assets ^(e)	Other ^(f)	Total liabilities	
VIE program type								
Firm-sponsored credit card trusts	\$ —	\$ 11,108	\$ 102	\$ 11,210	\$ 2,397	\$ 1	\$ 2,398	
Firm-administered multi-seller conduits	1	19,883	71	19,955	6,198	41	6,239	
Municipal bond vehicles	2,009	—	2	2,011	1,976	—	1,976	
Mortgage securitization entities ^(a)	—	955	32	987	179	85	264	
Other	—	1,078 ^(b)	283	1,361	—	118	118	
Total	\$ 2,010	\$ 33,024	\$ 490	\$ 35,524	\$ 10,750	\$ 245	\$ 10,995	

(a) Includes residential mortgage securitizations.

(b) Primarily includes purchased supply chain finance receivables and purchased auto loan securitizations in CIB.

(c) Includes assets classified as cash and other assets on the Consolidated balance sheets.

(d) The assets of the consolidated VIEs included in the program types above are used to settle the liabilities of those entities. The assets and liabilities include third-party assets and liabilities of consolidated VIEs and exclude intercompany balances that eliminate in consolidation.

(e) The interest-bearing beneficial interest liabilities issued by consolidated VIEs are classified in the line item on the Consolidated balance sheets titled, “Beneficial interests issued by consolidated VIEs”. The holders of these beneficial interests generally do not have recourse to the general credit of JPMorgan Chase. Included in beneficial interests in VIE assets are long-term beneficial interests of \$2.1 billion and \$2.6 billion at December 31, 2022 and 2021, respectively.

(f) Includes liabilities classified as accounts payable and other liabilities on the Consolidated balance sheets.

Notes to consolidated financial statements

VIEs sponsored by third parties

The Firm enters into transactions with VIEs structured by other parties. These include, for example, acting as a derivative counterparty, liquidity provider, investor, underwriter, placement agent, remarketing agent, trustee or custodian. These transactions are conducted at arm's-length, and individual credit decisions are based on the analysis of the specific VIE, taking into consideration the quality of the underlying assets. Where the Firm does not have the power to direct the activities of the VIE that most significantly impact the VIE's economic performance, or a variable interest that could potentially be significant, the Firm generally does not consolidate the VIE, but it records and reports these positions on its Consolidated balance sheets in the same manner it would record and report positions in respect of any other third-party transaction.

Tax credit vehicles

The Firm holds investments in unconsolidated tax credit vehicles, which are limited partnerships and similar entities that own and operate affordable housing, energy, and other projects. These entities are primarily considered VIEs. A third party is typically the general partner or managing member and has control over the significant activities of the tax credit vehicles, and accordingly the Firm does not consolidate tax credit vehicles. The Firm generally invests in these partnerships as a limited partner and earns a return primarily through the receipt of tax credits allocated to the projects. The maximum loss exposure, represented by equity investments and funding commitments, was \$30.2 billion and \$26.8 billion, of which \$10.6 billion and \$9.4 billion was unfunded at December 31, 2022 and 2021, respectively. The Firm assesses each project and to reduce the risk of loss, may withhold varying amounts of its capital investment until the project qualifies for tax credits. Refer to Note 25 for further information on affordable housing tax credits and Note 28 for more information on off-balance sheet lending-related commitments.

Customer municipal bond vehicles (TOB trusts)

The Firm may provide various services to customer TOB trusts, including remarketing agent, liquidity or tender option provider. In certain customer TOB transactions, the Firm, as liquidity provider, has entered into a reimbursement agreement with the Residual holder. In those transactions, upon the termination of the vehicle, the Firm has recourse to the third-party Residual holders for any shortfall. The Firm does not have any intent to protect Residual holders from potential losses on any of the underlying municipal bonds. The Firm does not consolidate customer TOB trusts, since the Firm does not have the power to make decisions that significantly impact the economic performance of the municipal bond vehicle.

The Firm's maximum exposure as a liquidity provider to customer TOB trusts at December 31, 2022 and 2021, was \$5.8 billion and \$6.8 billion, respectively. The fair value of assets held by such VIEs at December 31, 2022 and 2021 was \$8.2 billion and \$10.5 billion respectively.

Loan securitizations

The Firm has securitized and sold a variety of loans, including residential mortgages, credit card receivables, commercial mortgages and other consumer loans. The purposes of these securitization transactions were to satisfy investor demand and to generate liquidity for the Firm.

For loan securitizations in which the Firm is not required to consolidate the trust, the Firm records the transfer of the loan receivable to the trust as a sale when all of the following accounting criteria for a sale are met: (1) the transferred financial assets are legally isolated from the Firm's creditors; (2) the transferee or beneficial interest holder can pledge or exchange the transferred financial assets; and (3) the Firm does not maintain effective control over the transferred financial assets (e.g., the Firm cannot repurchase the transferred assets before their maturity and it does not have the ability to unilaterally cause the holder to return the transferred assets).

For loan securitizations accounted for as a sale, the Firm recognizes a gain or loss based on the difference between the value of proceeds received (including cash, beneficial interests, or servicing assets received) and the carrying value of the assets sold. Gains and losses on securitizations are reported in noninterest revenue.

Securitization activity

The following table provides information related to the Firm's securitization activities for the years ended December 31, 2022, 2021 and 2020, related to assets held in Firm-sponsored securitization entities that were not consolidated by the Firm, and where sale accounting was achieved at the time of the securitization.

Year ended December 31, (in millions)	2022		2021		2020	
	Residential mortgage ^(d)	Commercial and other ^(e)	Residential mortgage ^(d)	Commercial and other ^(e)	Residential mortgage ^(d)	Commercial and other ^(e)
Principal securitized	\$ 10,218	\$ 9,036	\$ 23,876	\$ 14,917	\$ 7,103	\$ 6,624
All cash flows during the period:^(a)						
Proceeds received from loan sales as financial instruments ^{(b)(c)}	\$ 9,783	\$ 8,921	\$ 24,450	\$ 15,044	\$ 7,321	\$ 6,865
Servicing fees collected	62	2	153	1	211	1
Cash flows received on interests	489	285	578	273	801	239

(a) Excludes re-securitization transactions.

(b) Predominantly includes Level 2 assets.

(c) The carrying value of the loans accounted for at fair value approximated the proceeds received upon loan sale.

(d) Represents prime mortgages. Excludes loan securitization activity related to U.S. GSEs and government agencies.

(e) Includes commercial mortgage and other consumer loans.

Key assumptions used to value retained interests originated during the year are shown in the table below.

Year ended December 31,	2022	2021	2020
Residential mortgage retained interest:			
Weighted-average life (in years)	10.8	3.9	4.7
Weighted-average discount rate	4.0 %	3.3 %	8.2 %
Commercial mortgage retained interest:			
Weighted-average life (in years)	5.9	6.0	6.9
Weighted-average discount rate	2.9 %	1.2 %	3.0 %

Loans and excess MSRs sold to U.S. government-sponsored enterprises and loans in securitization transactions pursuant to Ginnie Mae guidelines

In addition to the amounts reported in the securitization activity tables above, the Firm, in the normal course of business, sells originated and purchased mortgage loans and certain originated excess MSRs on a nonrecourse basis, predominantly to U.S. GSEs. These loans and excess MSRs are sold primarily for the purpose of securitization by the U.S. GSEs, who provide certain guarantee provisions (e.g., credit enhancement of the loans). The Firm also sells loans into securitization transactions pursuant to Ginnie Mae guidelines; these loans are typically insured or guaranteed by another U.S. government agency. The Firm does not consolidate the securitization vehicles underlying these transactions as it is not the primary beneficiary. For a limited number of loan sales, the Firm is obligated to share a portion of the credit risk associated with the sold loans with the purchaser. Refer to Note 28 for additional information about the Firm's loan sales- and securitization-related indemnifications and Note 15 for additional information about the impact of the Firm's sale of certain excess MSRs.

Notes to consolidated financial statements

The following table summarizes the activities related to loans sold to the U.S. GSEs, and loans in securitization transactions pursuant to Ginnie Mae guidelines.

Year ended December 31, (in millions)	2022	2021	2020
Carrying value of loans sold	\$ 48,891	\$ 105,035	\$ 81,153
Proceeds received from loan sales as cash	\$ 22	\$ 161	\$ 45
Proceeds from loan sales as securities ^{(a)(b)}	48,096	103,286	80,186
Total proceeds received from loan sales^(c)	\$ 48,118	\$ 103,447	\$ 80,231
Gains/(losses) on loan sales ^{(d)(e)}	\$ (25)	\$ 9	\$ 6

- (a) Includes securities from U.S. GSEs and Ginnie Mae that are generally sold shortly after receipt or retained as part of the Firm's investment securities portfolio.
- (b) Included in level 2 assets.
- (c) Excludes the value of MSRs retained upon the sale of loans.
- (d) Gains/(losses) on loan sales include the value of MSRs.
- (e) The carrying value of the loans accounted for at fair value approximated the proceeds received upon loan sale.

Options to repurchase delinquent loans

In addition to the Firm's obligation to repurchase certain loans due to material breaches of representations and warranties as discussed in Note 28, the Firm also has the option to repurchase delinquent loans that it services for Ginnie Mae loan pools, as well as for other U.S. government agencies under certain arrangements. The Firm typically

Loan delinquencies and liquidation losses

The table below includes information about components of and delinquencies related to nonconsolidated securitized financial assets held in Firm-sponsored private-label securitization entities, in which the Firm has continuing involvement as of December 31, 2022 and 2021.

As of or for the year ended December 31, (in millions)	Securitized assets		90 days past due		Net liquidation losses / (recoveries)	
	2022	2021	2022	2021	2022	2021
Securitized loans						
Residential mortgage:						
Prime/ Alt-A & option ARMs	\$ 37,058	\$ 42,522	^(a) \$ 511	\$ 1,937	^(a) \$ (29)	\$ 16 ^(a)
Subprime	1,743	10,115	212	1,609	(1)	16
Commercial and other	127,037	93,698	948	1,456	50	288
Total loans securitized	\$ 165,838	\$ 146,335	\$ 1,671	\$ 5,002	\$ 20	\$ 320

(a) Prior-period amounts have been revised to conform with the current presentation.

elects to repurchase delinquent loans from Ginnie Mae loan pools as it continues to service them and/or manage the foreclosure process in accordance with the applicable requirements, and such loans continue to be insured or guaranteed. When the Firm's repurchase option becomes exercisable, such loans must be reported on the Consolidated balance sheets as a loan with a corresponding liability. Refer to Note 12 for additional information.

The following table presents loans the Firm repurchased or had an option to repurchase, real estate owned, and foreclosed government-guaranteed residential mortgage loans recognized on the Firm's Consolidated balance sheets as of December 31, 2022 and 2021. Substantially all of these loans and real estate are insured or guaranteed by U.S. government agencies.

December 31, (in millions)	2022	2021
Loans repurchased or option to repurchase ^(a)	\$ 839	\$ 1,022
Real estate owned	10	5
Foreclosed government-guaranteed residential mortgage loans ^(b)	27	36

- (a) Predominantly all of these amounts relate to loans that have been repurchased from Ginnie Mae loan pools.
- (b) Relates to voluntary repurchases of loans, which are included in accrued interest and accounts receivable.

Note 15 – Goodwill and Mortgage servicing rights

Goodwill

Goodwill is recorded upon completion of a business combination as the difference between the purchase price and the fair value of the net assets acquired, and can be adjusted up to one year from the acquisition date as more information is obtained about the fair value of assets acquired and liabilities assumed. Subsequent to initial recognition, goodwill is not amortized but is tested for impairment during the fourth quarter of each fiscal year, or more often if events or circumstances, such as adverse changes in the business climate, indicate that there may be an impairment.

The goodwill associated with each business combination is allocated to the related reporting units, which are generally determined based on how the Firm's businesses are managed and how they are reviewed. The following table presents goodwill attributed to the reportable business segments and Corporate.

December 31, (in millions)	2022	2021	2020
Consumer & Community Banking	\$ 32,121	\$ 31,474	\$ 31,311
Corporate & Investment Bank	8,008	7,906	7,913
Commercial Banking	2,985	2,986	2,985
Asset & Wealth Management	7,902	7,222	7,039
Corporate ^(a)	646	727	–
Total goodwill	\$ 51,662	\$ 50,315	\$ 49,248

(a) For goodwill in Corporate acquired in the third quarter of 2021, the Firm elected to perform a qualitative impairment assessment, as permitted under U.S. GAAP.

The following table presents changes in the carrying amount of goodwill.

Year ended December 31, (in millions)	2022	2021	2020
Balance at beginning of period	\$ 50,315	\$ 49,248	\$ 47,823
Changes during the period from:			
Business combinations ^(a)	1,426	1,073 ^(c)	1,412
Other ^(b)	(79)	(6) ^(c)	13
Balance at December 31,	\$ 51,662	\$ 50,315	\$ 49,248

(a) For 2022, represents estimated goodwill associated with the acquisitions of Global Shares PLC in AWM, Frosch Travel Group, LLC and Figg, Inc. in CCB, and Renovite Technologies, Inc. and Volkswagen Payments S.A. in CIB. For 2021, represents goodwill associated with the acquisitions of Nutmeg in Corporate, OpenInvest and Campbell Global in AWM, and Frank and The Infatuation in CCB. For 2020, represents goodwill associated with the acquisitions of cxLoyalty in CCB and 55ip in AWM.

(b) Predominantly foreign currency adjustments.

(c) Prior-period amounts have been revised to conform with the current presentation.

Goodwill impairment testing

The Firm's goodwill was not impaired at December 31, 2022, 2021 and 2020.

The goodwill impairment test is generally performed by comparing the current fair value of each reporting unit with its carrying value. If the fair value is in excess of the carrying value, then the reporting unit's goodwill is considered not to be impaired. If the fair value is less than the carrying value, then an impairment charge is recognized

for the amount by which the reporting unit's carrying value exceeds its fair value, up to the amount of goodwill allocated to that reporting unit.

The Firm uses the reporting units' allocated capital plus goodwill and other intangible assets as a proxy for the carrying values of equity for the reporting units in the goodwill impairment testing. Reporting unit equity is determined on a similar basis as the allocation of capital to the LOBs which takes into consideration a variety of factors including capital levels of similarly rated peers and applicable regulatory capital requirements. Proposed LOB capital levels are incorporated into the Firm's annual budget process, which is reviewed by the Firm's Board of Directors and Operating Committee. Allocated capital is further reviewed at least annually and updated as needed.

The primary method the Firm uses to estimate the fair value of its reporting units is the income approach. This approach projects cash flows for the forecast period and uses the perpetuity growth method to calculate terminal values. These cash flows and terminal values, which are based on the reporting units' annual budgets and forecasts are then discounted using an appropriate discount rate. The discount rate used for each reporting unit represents an estimate of the cost of equity for that reporting unit and is determined considering the Firm's overall estimated cost of equity (estimated using the Capital Asset Pricing Model), as adjusted for the risk characteristics specific to each reporting unit (for example, for higher levels of risk or uncertainty associated with the business or management's forecasts and assumptions). To assess the reasonableness of the discount rates used for each reporting unit, management compares the discount rate to the estimated cost of equity for publicly traded institutions with similar businesses and risk characteristics. In addition, the weighted average cost of equity (aggregating the various reporting units) is compared with the Firm's overall estimated cost of equity to ensure reasonableness. The valuations derived from the discounted cash flow analysis are then compared with market-based trading and transaction multiples for relevant competitors. Trading and transaction comparables are used as general indicators to assess the overall reasonableness of the estimated fair values, although precise conclusions generally cannot be drawn due to the differences that naturally exist between the Firm's businesses and competitor institutions.

The Firm also takes into consideration a comparison between the aggregate fair values of the Firm's reporting units and JPMorgan Chase's market capitalization. In evaluating this comparison, the Firm considers several factors, including (i) a control premium that would exist in a market transaction, (ii) factors related to the level of execution risk that would exist at the Firmwide level that do not exist at the reporting unit level and (iii) short-term market volatility and other factors that do not directly affect the value of individual reporting units.

Notes to consolidated financial statements

Unanticipated declines in business performance, increases in credit losses, increases in capital requirements, as well as deterioration in economic or market conditions, adverse regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

Mortgage servicing rights

MSRs represent the fair value of expected future cash flows for performing servicing activities for others. The fair value considers estimated future servicing fees and ancillary revenue, offset by estimated costs to service the loans, and generally declines over time as net servicing cash flows are received, effectively amortizing the MSR asset against contractual servicing and ancillary fee income. MSRs are either purchased from third parties or recognized upon sale or securitization of mortgage loans if servicing is retained.

As permitted by U.S. GAAP, the Firm has elected to account for its MSRs at fair value. The Firm treats its MSRs as a single class of servicing assets based on the availability of market inputs used to measure the fair value of its MSR asset and its treatment of MSRs as one aggregate pool for risk management purposes. The Firm estimates the fair value of MSRs using an option-adjusted spread ("OAS") model, which projects MSR cash flows over multiple interest rate scenarios in conjunction with the Firm's prepayment model, and then discounts these cash flows at risk-adjusted rates. The model considers portfolio characteristics, contractually specified servicing fees, prepayment assumptions, delinquency rates, costs to service, late charges and other ancillary revenue, and other economic factors. The Firm compares fair value estimates and assumptions to observable market data where available, and also considers recent market activity and actual portfolio experience.

The fair value of MSRs is sensitive to changes in interest rates, including their effect on prepayment speeds. MSRs typically decrease in value when interest rates decline because declining interest rates tend to increase prepayments and therefore reduce the expected life of the net servicing cash flows that comprise the MSR asset. Conversely, securities (e.g., mortgage-backed securities), and certain derivatives (e.g., those for which the Firm

receives fixed-rate interest payments) increase in value when interest rates decline. JPMorgan Chase uses combinations of derivatives and securities to manage the risk of changes in the fair value of MSRs. The intent is to offset any interest-rate related changes in the fair value of MSRs with changes in the fair value of the related risk management instruments.

The following table summarizes MSR activity for the years ended December 31, 2022, 2021 and 2020.

As of or for the year ended December 31, (in millions, except where otherwise noted)	2022	2021	2020
Fair value at beginning of period	\$ 5,494	\$ 3,276	\$ 4,699
MSR activity:			
Originations of MSRs	798	1,659	944
Purchase of MSRs	1,400	1,363	248
Disposition of MSRs ^(a)	(822)	(114)	(176)
Net additions/(dispositions)	1,376	2,908	1,016
Changes due to collection/realization of expected cash flows	(936)	(788)	(899)
Changes in valuation due to inputs and assumptions:			
Changes due to market interest rates and other ^(b)	2,022	404	(1,568)
Changes in valuation due to other inputs and assumptions:			
Projected cash flows (e.g., cost to service)	14	109	(54)
Discount rates	—	—	199
Prepayment model changes and other ^(c)	3	(415)	(117)
Total changes in valuation due to other inputs and assumptions	17	(306)	28
Total changes in valuation due to inputs and assumptions	2,039	98	(1,540)
Fair value at December 31,	\$ 7,973	\$ 5,494	\$ 3,276
Change in unrealized gains/(losses) included in income related to MSRs held at December 31,	\$ 2,039	\$ 98	\$ (1,540)
Contractual service fees, late fees and other ancillary fees included in income	1,535	1,298	1,325
Third-party mortgage loans serviced at December 31, (in billions)	584	520	448
Servicer advances, net of an allowance for uncollectible amounts, at December 31, (in billions) ^(d)	0.8	1.6	1.8

(a) Includes excess MSRs transferred to agency-sponsored trusts in exchange for stripped mortgage backed securities ("SMBS") for the years ended December 31, 2022 and 2020. In each transaction, a portion of the SMBS was acquired by third parties at the transaction date; the Firm acquired the remaining balance of those SMBS as trading securities.

(b) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.

(c) Represents changes in prepayments other than those attributable to changes in market interest rates.

(d) Represents amounts the Firm pays as the servicer (e.g., scheduled principal and interest, taxes and insurance), which will generally be reimbursed within a short period of time after the advance from future cash flows from the trust or the underlying loans. The Firm's credit risk associated with these servicer advances is minimal because reimbursement of the advances is typically senior to all cash payments to investors. In addition, the Firm maintains the right to stop payment to investors if the collateral is insufficient to cover the advance. However, certain of these servicer advances may not be recoverable if they were not made in accordance with applicable rules and agreements.

Notes to consolidated financial statements

The following table presents the components of mortgage fees and related income (including the impact of MSR risk management activities) for the years ended December 31, 2022, 2021 and 2020.

Year ended December 31, (in millions)	2022	2021	2020
CCB mortgage fees and related income			
Production revenue	\$ 497	\$ 2,215	\$ 2,629
Net mortgage servicing revenue:			
Operating revenue:			
Loan servicing revenue	1,582	1,257	1,367
Changes in MSR asset fair value due to collection/realization of expected cash flows	(936)	(788)	(899)
Total operating revenue	646	469	468
Risk management:			
Changes in MSR asset fair value due to market interest rates and other ^(a)	2,022	404	(1,568)
Other changes in MSR asset fair value due to other inputs and assumptions in model ^(b)	17	(306)	28
Change in derivative fair value and other	(1,946)	(623)	1,522
Total risk management	93	(525)	(18)
Total net mortgage servicing revenue	739	(56)	450
Total CCB mortgage fees and related income	1,236	2,159	3,079
All other	14	11	12
Mortgage fees and related income	\$ 1,250	\$ 2,170	\$ 3,091

- (a) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.
- (b) Represents the aggregate impact of changes in model inputs and assumptions such as projected cash flows (e.g., cost to service), discount rates and changes in prepayments other than those attributable to changes in market interest rates (e.g., changes in prepayments due to changes in home prices).

Changes in fair value based on variations in assumptions generally cannot be easily extrapolated, because the relationship of the change in the assumptions to the change in fair value are often highly interrelated and may not be linear. In the following table, the effect that a change in a particular assumption may have on the fair value is calculated without changing any other assumption. In reality, changes in one factor may result in changes in another, which would either magnify or counteract the impact of the initial change.

The table below outlines the key economic assumptions used to determine the fair value of the Firm's MSRs at December 31, 2022 and 2021, and outlines the sensitivities of those fair values to immediate adverse changes in those assumptions, as defined below.

December 31, (in millions, except rates)	2022	2021
Weighted-average prepayment speed assumption (constant prepayment rate)	6.12 %	9.90 %
Impact on fair value of 10% adverse change	\$ (183)	\$ (210)
Impact on fair value of 20% adverse change	(356)	(404)
Weighted-average option adjusted spread ^(a)	5.77 %	6.44 %
Impact on fair value of 100 basis points adverse change	\$ (341)	\$ (225)
Impact on fair value of 200 basis points adverse change	(655)	(433)

(a) Includes the impact of operational risk and regulatory capital.

Note 16 – Premises and equipment

Premises and equipment, including leasehold improvements, are carried at cost less accumulated depreciation and amortization. JPMorgan Chase computes depreciation using the straight-line method over the estimated useful life of an asset. For leasehold improvements, the Firm uses the straight-line method computed over the lesser of the remainder of the lease term, or estimated useful life of the improvements.

JPMorgan Chase capitalizes certain costs associated with the acquisition or development of internal-use software. Once the software is ready for its intended use, these costs are amortized on a straight-line basis over the software's expected useful life.

Impairment is assessed periodically when events or changes in circumstances indicate that the carrying value of an asset may not be fully recoverable.

Note 17 – Deposits

At December 31, 2022 and 2021, noninterest-bearing and interest-bearing deposits were as follows.

December 31, (in millions)	2022	2021
U.S. offices		
Noninterest-bearing (included \$26,363 and \$8,115 at fair value) ^(a)	\$ 644,902	\$ 711,525 (b)
Interest-bearing (included \$586 and \$629 at fair value) ^(a)	1,276,346	1,359,932 (b)
Total deposits in U.S. offices	1,921,248	2,071,457
Non-U.S. offices		
Noninterest-bearing (included \$1,398 and \$2,420 at fair value) ^(a)	27,005	26,229
Interest-bearing (included \$273 and \$169 at fair value) ^(a)	391,926	364,617
Total deposits in non-U.S. offices	418,931	390,846
Total deposits	\$2,340,179	\$2,462,303

- (a) Includes structured notes classified as deposits for which the fair value option has been elected. Refer to Note 3 for further discussion.
(b) Prior-period amounts have been revised to conform with the current presentation.

At December 31, 2022 and 2021, time deposits in denominations that met or exceeded the insured limit were as follows.

December 31, (in millions)	2022	2021
U.S. offices	\$ 64,622	\$ 38,970
Non-U.S. offices ^(a)	77,907	54,535
Total	\$142,529	\$ 93,505

- (a) Represents all time deposits in non-U.S. offices as these deposits typically exceed the insured limit.

At December 31, 2022, the remaining maturities of interest-bearing time deposits were as follows.

December 31, 2022 (in millions)	U.S.	Non-U.S.	Total
2023	\$ 75,606	\$ 75,088	\$ 150,694
2024	1,335	358	1,693
2025	300	17	317
2026	178	30	208
2027	131	897	1,028
After 5 years	572	109	681
Total	\$ 78,122	\$ 76,499	\$ 154,621

Notes to consolidated financial statements

Note 18 - Leases

Firm as lessee

At December 31, 2022, JPMorgan Chase and its subsidiaries were obligated under a number of noncancellable leases, predominantly operating leases for premises and equipment used primarily for business purposes. These leases generally have terms of 20 years or less, determined based on the contractual maturity of the lease, and include periods covered by options to extend or terminate the lease when the Firm is reasonably certain that it will exercise those options. All leases with lease terms greater than twelve months are reported as a lease liability with a corresponding right-of-use ("ROU") asset. None of these lease agreements impose restrictions on the Firm's ability to pay dividends, engage in debt or equity financing transactions or enter into further lease agreements. Certain of these leases contain escalation clauses that will increase rental payments based on maintenance, utility and tax increases, which are non-lease components. The Firm elected not to separate lease and non-lease components of a contract for its real estate leases. As such, real estate lease payments represent payments on both lease and non-lease components.

Operating lease liabilities and ROU assets are recognized at the lease commencement date based on the present value of the future minimum lease payments over the lease term. The future lease payments are discounted at a rate that estimates the Firm's collateralized borrowing rate for financing instruments of a similar term and are included in accounts payable and other liabilities. The operating lease ROU asset, included in premises and equipment, also includes any lease prepayments made, plus initial direct costs incurred, less any lease incentives received. Rental expense associated with operating leases is recognized on a straight-line basis over the lease term, and generally included in occupancy expense in the Consolidated statements of income.

The following tables provide information related to the Firm's operating leases:

December 31, (in millions, except where otherwise noted)	2022	2021
Right-of-use assets	\$ 7,782	\$ 7,888
Lease liabilities	8,183	8,328

Weighted average remaining lease term (in years)	8.4	8.5
Weighted average discount rate	3.55 %	3.40 %

Supplemental cash flow information

Cash paid for amounts included in the measurement of lease liabilities - operating cash flows	\$ 1,613	\$ 1,656
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Supplemental non-cash information

Right-of-use assets obtained in exchange for operating lease obligations	\$ 1,435	\$ 1,167
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Year ended December 31, (in millions)	2022	2021
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Rental expense	2022	2021
Gross rental expense	\$ 2,079	\$ 2,086
Sublease rental income	(119)	(129)
Net rental expense	\$ 1,960	\$ 1,957

The following table presents future payments under operating leases as of December 31, 2022:

Year ended December 31, (in millions)	
2023	\$ 1,572
2024	1,433
2025	1,273
2026	1,034
2027	887
After 2027	3,382
Total future minimum lease payments	9,581
Less: Imputed interest	(1,398)
Total	\$ 8,183

In addition to the table above, as of December 31, 2022, the Firm had additional future operating lease commitments of \$588 million that were signed but had not yet commenced. These operating leases will commence between 2023 and 2026 with lease terms up to 21 years.

Firm as lessor

The Firm provides auto and equipment lease financing to its customers through lease arrangements with lease terms that may contain renewal, termination and/or purchase options. The Firm's lease financings are predominantly auto operating leases. These assets subject to operating leases are recognized in other assets on the Firm's Consolidated balance sheets and are depreciated on a straight-line basis over the lease term to reduce the asset to its estimated residual value. Depreciation expense is included in technology, communications and equipment expense in the Consolidated statements of income. The Firm's lease income is generally recognized on a straight-line basis over the lease term and is included in other income in the Consolidated statements of income.

On a periodic basis, the Firm assesses leased assets for impairment, and if the carrying amount of the leased asset exceeds the undiscounted cash flows from the lease payments and the estimated residual value upon disposition of the leased asset, an impairment loss is recognized.

The risk of loss on auto and equipment leased assets relating to the residual value of the leased assets is monitored through projections of the asset residual values at lease origination and periodic review of residual values, and is mitigated through arrangements with certain manufacturers or lessees.

The following table presents the carrying value of assets subject to leases reported on the Consolidated balance sheets:

December 31, (in millions)	2022	2021
Carrying value of assets subject to operating leases, net of accumulated depreciation	\$ 12,302	\$ 17,553
Accumulated depreciation	4,282	5,737

The following table presents the Firm's operating lease income and the related depreciation expense on the Consolidated statements of income:

Year ended December 31, (in millions)	2022	2021	2020
Operating lease income	\$ 3,654	\$ 4,914	\$ 5,539
Depreciation expense	2,475	3,380	4,257

The following table presents future receipts under operating leases as of December 31, 2022:

Year ended December 31, (in millions)
2023 \$ 2,172
2024 1,181
2025 389
2026 39
2027 10
After 2027 15
Total future minimum lease receipts \$ 3,806

Notes to consolidated financial statements

Note 19 – Accounts payable and other liabilities

Accounts payable and other liabilities consist of brokerage payables, which include payables to customers and payables related to security purchases that did not settle, as well as other accrued expenses, such as compensation accruals, credit card rewards liability, operating lease liabilities, income tax payables, and litigation reserves.

The following table details the components of accounts payable and other liabilities.

December 31, (in millions)	2022	2021
Brokerage payables	\$ 188,692	\$ 169,172
Other payables and liabilities ^(a)	111,449	93,583
Total accounts payable and other liabilities	\$ 300,141	\$ 262,755

(a) Includes credit card rewards liability of \$11.3 billion and \$9.8 billion at December 31, 2022 and 2021, respectively.

Note 20 – Long-term debt

JPMorgan Chase issues long-term debt denominated in various currencies, predominantly U.S. dollars, with both fixed and variable interest rates. Included in senior and subordinated debt below are various equity-linked or other indexed instruments, which the Firm has elected to measure at fair value. Changes in fair value are recorded in principal transactions revenue in the Consolidated statements of income, except for unrealized gains/(losses) due to DVA which are recorded in OCI. The following table is a summary of long-term debt carrying values (including unamortized premiums and discounts, issuance costs, valuation adjustments and fair value adjustments, where applicable) by remaining contractual maturity as of December 31, 2022.

By remaining maturity at December 31, (in millions, except rates)	2022					2021	
	Under 1 year		1-5 years	After 5 years	Total	Total	
Parent company							
Senior debt:	Fixed rate	\$ 6,770	\$ 78,821	\$ 108,924	\$ 194,515	\$ 202,370	
	Variable rate	604	8,053	2,908	11,565	13,343	
	Interest rates ^(e)	2.64 %	2.67 %	3.41 %	3.06 %	2.67 %	
Subordinated debt:	Fixed rate	\$ 1,982	\$ 8,809	\$ 8,902	\$ 19,693	\$ 18,269	
	Variable rate	–	–	–	–	–	
	Interest rates ^(e)	3.38 %	4.54 %	4.69 %	4.50 %	4.24 %	
	Subtotal	\$ 9,356	\$ 95,683	\$ 120,734	\$ 225,773	\$ 233,982	
Subsidiaries							
Federal Home Loan Banks advances:	Fixed rate	\$ 4	\$ 43	\$ 46	\$ 93	\$ 110	
	Variable rate	7,000	4,000	–	11,000	11,000	
	Interest rates ^(e)	4.36 %	4.22 %	6.08 %	4.32 %	0.23 %	
Senior debt:	Fixed rate	\$ 2,358	\$ 6,743	\$ 6,282	\$ 15,383	\$ 15,504	
	Variable rate	13,445	22,562	5,499	41,506	38,147	
	Interest rates ^(e)	4.12 %	4.85%	1.63 %	2.02 %	2.09 %	
Subordinated debt:	Fixed rate	\$ –	\$ 262	\$ –	\$ 262	\$ 287	
	Variable rate	–	–	–	–	–	
	Interest rates ^(e)	– %	8.25 %	– %	8.25 %	8.25 %	
	Subtotal	\$ 22,807	\$ 33,610	\$ 11,827	\$ 68,244	\$ 65,048	
Junior subordinated debt:	Fixed rate	\$ –	\$ –	\$ 550	\$ 550	\$ 678	
	Variable rate	–	373	925	1,298	1,297	
	Interest rates ^(e)	– %	5.03 %	6.67 %	6.33 %	3.20 %	
	Subtotal	\$ –	\$ 373	\$ 1,475	\$ 1,848	\$ 1,975	
Total long-term debt^{(a)(b)(c)}		\$ 32,163	\$ 129,666	\$ 134,036	\$ 295,865	^{(f)(g)} \$ 301,005	
Long-term beneficial interests:							
	Fixed rate	\$ 1,000	\$ 999	\$ –	\$ 1,999	\$ 1,747	
	Variable rate	–	–	143	143	829	
	Interest rates ^(e)	1.53 %	3.97 %	3.60 %	2.81 %	1.57 %	
Total long-term beneficial interests^(d)		\$ 1,000	\$ 999	\$ 143	\$ 2,142	\$ 2,576	

- (a) Included long-term debt of \$13.8 billion and \$14.1 billion secured by assets totaling \$208.3 billion and \$170.6 billion at December 31, 2022 and 2021, respectively. The amount of long-term debt secured by assets does not include amounts related to hybrid instruments.
- (b) Included \$72.3 billion and \$74.9 billion of long-term debt accounted for at fair value at December 31, 2022 and 2021, respectively.
- (c) Included \$10.3 billion and \$15.8 billion of outstanding zero-coupon notes at December 31, 2022 and 2021, respectively. The aggregate principal amount of these notes at their respective maturities is \$45.3 billion and \$46.4 billion, respectively. The aggregate principal amount reflects the contractual principal payment at maturity, which may exceed the contractual principal payment at the Firm's next call date, if applicable.
- (d) Included on the Consolidated balance sheets in beneficial interests issued by consolidated VIEs. Also included \$5 million and \$12 million accounted for at fair value at December 31, 2022 and 2021, respectively. Excluded short-term commercial paper and other short-term beneficial interests of \$10.5 billion and \$8.2 billion at December 31, 2022 and 2021, respectively.
- (e) The interest rates shown are the weighted average of contractual rates in effect at December 31, 2022 and 2021, respectively, including non-U.S. dollar fixed- and variable-rate issuances, which excludes the effects of the associated derivative instruments used in hedge accounting relationships, if applicable. The interest rates shown exclude structured notes accounted for at fair value.
- (f) At December 31, 2022, long-term debt in the aggregate of \$194.9 billion was redeemable at the option of JPMorgan Chase, in whole or in part, prior to maturity, based on the terms specified in the respective instruments.
- (g) The aggregate carrying values of debt that matures in each of the five years subsequent to 2022 is \$32.2 billion in 2023, \$40.1 billion in 2024, \$34.3 billion in 2025, \$32.5 billion in 2026 and \$22.8 billion in 2027.

Notes to consolidated financial statements

The weighted-average contractual interest rates for total long-term debt excluding structured notes accounted for at fair value were 3.26% and 2.67% as of December 31, 2022 and 2021, respectively. In order to modify exposure to interest rate and currency exchange rate movements, JPMorgan Chase utilizes derivative instruments, primarily interest rate and cross-currency interest rate swaps, in conjunction with some of its debt issuances. The use of these instruments modifies the Firm's interest expense on the associated debt. The modified weighted-average interest rates for total long-term debt, including the effects of related derivative instruments, were 4.89% and 1.43% as of December 31, 2022 and 2021, respectively.

JPMorgan Chase & Co. has guaranteed certain long-term debt of its subsidiaries, including structured notes. These guarantees rank on parity with the Firm's other unsecured and unsubordinated indebtedness. The amount of such guaranteed long-term debt and structured notes was \$28.2 billion and \$16.4 billion at December 31, 2022 and 2021, respectively.

The Firm's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings or stock price.

Note 21 – Preferred stock

At December 31, 2022 and 2021, JPMorgan Chase was authorized to issue 200 million shares of preferred stock, in one or more series, with a par value of \$1 per share. In the event of a liquidation or dissolution of the Firm, JPMorgan Chase's preferred stock then outstanding takes precedence over the Firm's common stock with respect to the payment of dividends and the distribution of assets.

The following is a summary of JPMorgan Chase's non-cumulative preferred stock outstanding as of December 31, 2022 and 2021, and the quarterly dividend declarations for the years ended December 31, 2022, 2021 and 2020.

	Shares ^(a)		Carrying value (in millions)		Issue date	Contractual rate in effect at December 31, 2022	Earliest redemption date ^(b)	Floating annualized rate ^(c)	Dividend declared per share ^(d)						
	December 31,		December 31,						Year ended December 31,						
	2022	2021	2022	2021					2022	2021	2020				
Fixed-rate:															
Series Y	–	–	\$ –	\$ –	2/12/2015	– %	3/1/2020	NA	\$ –	\$ –	\$ 153.13				
Series AA	–	–	–	–	6/4/2015	–	9/1/2020	NA	–	305.00	610.00				
Series BB	–	–	–	–	7/29/2015	–	9/1/2020	NA	–	307.50	615.00				
Series DD	169,625	169,625	1,696	1,696	9/21/2018	5.750	12/1/2023	NA	575.00	575.00	575.00				
Series EE	185,000	185,000	1,850	1,850	1/24/2019	6.000	3/1/2024	NA	600.00	600.00	600.00				
Series GG	90,000	90,000	900	900	11/7/2019	4.750	12/1/2024	NA	475.00	475.00	506.67 ^(e)				
Series JJ	150,000	150,000	1,500	1,500	3/17/2021	4.550	6/1/2026	NA	455.00	321.03	NA ^(e)				
Series LL	185,000	185,000	1,850	1,850	5/20/2021	4.625	6/1/2026	NA	462.52	245.39	NA ^(e)				
Series MM	200,000	200,000	2,000	2,000	7/29/2021	4.200	9/1/2026	NA	420.00	142.33	NA ^(e)				
Fixed-to-floating-rate:															
Series I	–	293,375	\$ –	\$ 2,934	4/23/2008	–	4/30/2018	LIBOR + 3.47%	\$ 375.03	\$ 370.38	\$ 428.03				
Series Q	150,000	150,000	1,500	1,500	4/23/2013	5.150	5/1/2023	LIBOR + 3.25	515.00	515.00	515.00				
Series R	150,000	150,000	1,500	1,500	7/29/2013	6.000	8/1/2023	LIBOR + 3.30	600.00	600.00	600.00				
Series S	200,000	200,000	2,000	2,000	1/22/2014	6.750	2/1/2024	LIBOR + 3.78	675.00	675.00	675.00				
Series U	100,000	100,000	1,000	1,000	3/10/2014	6.125	4/30/2024	LIBOR + 3.33	612.50	612.50	612.50				
Series V	–	250,000	–	2,500	6/9/2014	–	7/1/2019	LIBOR + 3.32	340.91	353.65	436.85				
Series X	160,000	160,000	1,600	1,600	9/23/2014	6.100	10/1/2024	LIBOR + 3.33	610.00	610.00	610.00				
Series Z	–	200,000	–	2,000	4/21/2015	–	5/1/2020	LIBOR + 3.80	–	401.44	453.52				
Series CC	125,750	125,750	1,258	1,258	10/20/2017	LIBOR + 2.58	11/1/2022	LIBOR + 2.58	526.27	462.50	462.50 ^(f)				
Series FF	225,000	225,000	2,250	2,250	7/31/2019	5.000	8/1/2024	SOFR + 3.38	500.00	500.00	500.00				
Series HH	300,000	300,000	3,000	3,000	1/23/2020	4.600	2/1/2025	SOFR + 3.125	460.00	460.00	470.22 ^(e)				
Series II	150,000	150,000	1,500	1,500	2/24/2020	4.000	4/1/2025	SOFR + 2.745	400.00	400.00	341.11 ^(e)				
Series KK	200,000	200,000	2,000	2,000	5/12/2021	3.650	6/1/2026	CMT + 2.85	365.00	201.76	NA ^(e)				
Total preferred stock	2,740,375	3,483,750	\$ 27,404	\$ 34,838											

(a) Represented by depositary shares.

(b) Fixed-to-floating rate notes convert to a floating rate at the earliest redemption date.

(c) Floating annualized rate includes three-month LIBOR, three-month term SOFR or five-year Constant Maturity Treasury ("CMT") rate, as applicable, plus the spreads noted above.

(d) Dividends on preferred stock are discretionary and non-cumulative. When declared, dividends are declared quarterly. Dividends are payable quarterly on fixed-rate preferred stock. Dividends are payable semiannually on fixed-to-floating-rate preferred stock while at a fixed rate, and payable quarterly after converting to a floating rate.

(e) The initial dividend declared is prorated based on the number of days outstanding for the period. Dividends were declared quarterly thereafter at the contractual rate.

(f) The dividend rate for Series CC preferred stock became floating and payable quarterly starting on November 1, 2022; prior to which the dividend rate was fixed at 4.625% or \$231.25 per share payable semiannually.

Each series of preferred stock has a liquidation value and redemption price per share of \$10,000, plus accrued but unpaid dividends. The aggregate liquidation value was \$27.7 billion at December 31, 2022.

Notes to consolidated financial statements

Redemptions

On October 31, 2022, the Firm redeemed all \$2.93 billion of its fixed to floating rate non-cumulative perpetual preferred stock, Series I.

On October 3, 2022, the Firm redeemed all \$2.5 billion of its fixed-to-floating rate non-cumulative preferred stock, Series V.

On February 1, 2022, the Firm redeemed all \$2.0 billion of its fixed-to-floating rate non-cumulative preferred stock, Series Z.

On June 1, 2021, the Firm redeemed all \$1.43 billion of its 6.10% non-cumulative preferred stock, Series AA and all \$1.15 billion of its 6.15% non-cumulative preferred stock, Series BB.

Redemption rights

Each series of the Firm's preferred stock may be redeemed on any dividend payment date on or after the earliest redemption date for that series. All outstanding preferred stock series may also be redeemed following a "capital treatment event," as described in the terms of each series. Any redemption of the Firm's preferred stock is subject to non-objection from the Board of Governors of the Federal Reserve System (the "Federal Reserve").

Note 22 – Common stock

At December 31, 2022 and 2021, JPMorgan Chase was authorized to issue 9.0 billion shares of common stock with a par value of \$1 per share.

Common shares issued (reissuances from treasury) by JPMorgan Chase during the years ended December 31, 2022, 2021 and 2020 were as follows.

Year ended December 31, (in millions)	2022	2021	2020
Total issued - balance at January 1	4,104.9	4,104.9	4,104.9
Treasury - balance at January 1	(1,160.8)	(1,055.5)	(1,020.9)
Repurchase	(23.1)	(119.7)	(50.0)
Reissuance:			
Employee benefits and compensation plans	12.0	13.5	14.2
Employee stock purchase plans	1.2	0.9	1.2
Total reissuance	13.2	14.4	15.4
Total treasury - balance at December 31	(1,170.7)	(1,160.8)	(1,055.5)
Outstanding at December 31	2,934.2	2,944.1	3,049.4

Effective May 1, 2022, the Firm is authorized to purchase up to \$30 billion of common shares under its common share repurchase program, which superseded the previously approved repurchase program under which the Firm was authorized to purchase up to \$30 billion of common shares. In the second half of 2022, as a result of the expected increases in regulatory capital requirements, the Firm temporarily suspended share repurchases. In the first quarter of 2023, the Firm resumed repurchasing shares under its common share repurchase program.

The following table sets forth the Firm's repurchases of common stock for the years ended December 31, 2022, 2021 and 2020.

Year ended December 31, (in millions)	2022	2021 ^(a)	2020 ^(b)
Total number of shares of common stock repurchased	23.1	119.7	50.0
Aggregate purchase price of common stock repurchases	\$3,122	\$18,448	\$6,397

- (a) As directed by the Federal Reserve, total net repurchases and common stock dividends in the first and second quarter of 2021 were restricted and could not exceed the average of the Firm's net income for the four preceding calendar quarters. Effective July 1, 2021, the Firm became subject to the normal capital distribution restrictions provided under the regulatory capital framework.
- (b) On March 15, 2020, in response to the economic disruptions caused by the COVID-19 pandemic, the Firm temporarily suspended repurchases of its common stock. Subsequently, the Federal Reserve directed all large banks, including the Firm, to discontinue net share repurchases through the end of 2020.

The Board of Directors' authorization to repurchase common shares is utilized at management's discretion, and the timing of purchases and the exact amount of common shares that may be repurchased is subject to various factors, including market conditions; legal and regulatory considerations affecting the amount and timing of repurchase activity; the Firm's capital position (taking into account goodwill and intangibles); internal capital generation; and alternative investment opportunities. The \$30 billion common share repurchase program approved by the Board does not establish specific price targets or timetables. The repurchase program may be suspended by management at any time; and may be executed through open market purchases or privately negotiated transactions, or utilizing Rule 10b5-1 plans, which are written trading plans that the Firm may enter into from time to time under Rule 10b5-1 of the Securities Exchange Act of 1934 and which allow the Firm to repurchase its common shares during periods when it may otherwise not be repurchasing common shares – for example, during internal trading blackout periods.

As of December 31, 2022, approximately 58.9 million shares of common stock were reserved for issuance under various employee incentive, compensation, option and stock purchase plans, and directors' compensation plans.

Notes to consolidated financial statements

Note 23 – Earnings per share

Basic earnings per share (“EPS”) is calculated using the two-class method. Under the two-class method, all earnings (distributed and undistributed) are allocated to common stock and participating securities. JPMorgan Chase grants RSUs under its share-based compensation programs, predominantly all of which entitle recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to dividends paid to holders of the Firm’s common stock. These unvested RSUs meet the definition of participating securities based on their respective rights to receive nonforfeitable dividends, and they are treated as a separate class of securities in computing basic EPS.

Participating securities are not included as incremental shares in computing diluted EPS; refer to Note 9 for additional information.

Diluted EPS incorporates the potential impact of contingently issuable shares, including awards which require future service as a condition of delivery of the underlying common stock. Diluted EPS is calculated under both the two-class and treasury stock methods, and the more dilutive amount is reported. For each of the periods presented in the table below, diluted EPS calculated under the two-class method was more dilutive.

The following table presents the calculation of net income applicable to common stockholders and basic and diluted EPS for the years ended December 31, 2022, 2021 and 2020.

Year ended December 31, (in millions, except per share amounts)	2022	2021	2020
Basic earnings per share			
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Less: Preferred stock dividends	1,595	1,600	1,583
Net income applicable to common equity	36,081	46,734	27,548
Less: Dividends and undistributed earnings allocated to participating securities	189	231	138
Net income applicable to common stockholders	\$ 35,892	\$ 46,503	\$ 27,410
Total weighted-average basic shares outstanding	2,965.8	3,021.5	3,082.4
Net income per share	\$ 12.10	\$ 15.39	\$ 8.89
Diluted earnings per share			
Net income applicable to common stockholders	\$ 35,892	\$ 46,503	\$ 27,410
Total weighted-average basic shares outstanding	2,965.8	3,021.5	3,082.4
Add: Dilutive impact of SARs and employee stock options, unvested PSUs and nondividend-earning RSUs	4.2	5.1	5.0
Total weighted-average diluted shares outstanding	2,970.0	3,026.6	3,087.4
Net income per share	\$ 12.09	\$ 15.36	\$ 8.88

Note 24 – Accumulated other comprehensive income/(loss)

AOCI includes the after-tax change in unrealized gains and losses on investment securities, foreign currency translation adjustments (including the impact of related derivatives), fair value changes of excluded components on fair value hedges, cash flow hedging activities, net gain/(loss) related to the Firm's defined benefit pension and OPEB plans, and fair value option-elected liabilities arising from changes in the Firm's own credit risk (DVA).

Year ended December 31, (in millions)	Unrealized gains/(losses) on investment securities	Translation adjustments , net of hedges	Fair value hedges	Cash flow hedges	Defined benefit pension and OPEB plans	DVA on fair value option elected liabilities	Accumulated other comprehensive income/(loss)
Balance at December 31, 2019	\$ 4,057	\$ (707)	\$ (131)	\$ 63	\$ (1,344)	\$ (369)	\$ 1,569
Net change	4,123	234	19	2,320	212	(491)	6,417
Balance at December 31, 2020	\$ 8,180 ^(a)	\$ (473)	\$ (112)	\$ 2,383	\$ (1,132)	\$ (860)	\$ 7,986
Net change	(5,540)	(461)	(19)	(2,679)	922	(293)	(8,070)
Balance at December 31, 2021	\$ 2,640 ^(a)	\$ (934)	\$ (131)	\$ (296)	\$ (210)	\$ (1,153)	\$ (84)
Net change	(11,764)	(611)	98	(5,360)	(1,241)	1,621	(17,257)
Balance at December 31, 2022	\$ (9,124) ^(a)	\$ (1,545)	\$ (33)	\$ (5,656)	\$ (1,451)	\$ 468	\$ (17,341)

(a) Includes after-tax net unamortized unrealized gains/(losses) of \$(1.3) billion, \$2.4 billion, and \$3.3 billion related to AFS securities that have been transferred to HTM for the years ended 2022, 2021 and 2020, respectively. Refer to Note 10 for further information.

The following table presents the pre-tax and after-tax changes in the components of OCI.

Year ended December 31, (in millions)	2022			2021			2020		
	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax
Unrealized gains/(losses) on investment securities									
Net unrealized gains/(losses) arising during the period	\$ (17,862)	\$ 4,290	\$ (13,572)	\$ (7,634)	\$ 1,832	\$ (5,802)	\$ 6,228	\$ (1,495)	\$ 4,733
Reclassification adjustment for realized (gains)/losses included in net income ^(a)	2,380	(572)	1,808	345	(83)	262	(802)	192	(610)
Net change	(15,482)	3,718	(11,764)	(7,289)	1,749	(5,540)	5,426	(1,303)	4,123
Translation adjustments^(b)									
Translation	(3,574)	265	(3,309)	(2,447)	125	(2,322)	1,407	(103)	1,304
Hedges	3,553	(855)	2,698	2,452	(591)	1,861	(1,411)	341	(1,070)
Net change	(21)	(590)	(611)	5	(466)	(461)	(4)	238	234
Fair value hedges, net change^(c)	130	(32)	98	(26)	7	(19)	25	(6)	19
Cash flow hedges									
Net unrealized gains/(losses) arising during the period	(7,473)	1,794	(5,679)	(2,303)	553	(1,750)	3,623	(870)	2,753
Reclassification adjustment for realized (gains)/losses included in net income ^(d)	420	(101)	319	(1,222)	293	(929)	(570)	137	(433)
Net change	(7,053)	1,693	(5,360)	(3,525)	846	(2,679)	3,053	(733)	2,320
Defined benefit pension and OPEB plans, net change^(e)	(1,459)	218	(1,241)	1,129	(207)	922	214	(2)	212
DVA on fair value option elected liabilities, net change	2,141	(520)	1,621	(393)	100	(293)	(648)	157	(491)
Total other comprehensive income/(loss)	\$ (21,744)	\$ 4,487	\$ (17,257)	\$ (10,099)	\$ 2,029	\$ (8,070)	\$ 8,066	\$ (1,649)	\$ 6,417

- (a) The pre-tax amount is reported in Investment securities gains/(losses) in the Consolidated statements of income.
- (b) Reclassifications of pre-tax realized gains/(losses) on translation adjustments and related hedges are reported in other income/expense in the Consolidated statements of income. During the year ended December 31, 2022, the Firm reclassified a net pre-tax loss of \$8 million to other expense and other revenue related to the liquidation of certain legal entities, \$38 million related to the net investment hedge gains and \$46 million loss related to cumulative translation adjustment. During the year ended December 31, 2021, the Firm reclassified a net pre-tax loss of \$7 million. During the year ended December 31, 2020, the Firm reclassified net pre-tax gain of \$6 million.
- (c) Represents changes in fair value of cross-currency swaps attributable to changes in cross-currency basis spreads, which are excluded from the assessment of hedge effectiveness and recorded in other comprehensive income. The initial cost of cross-currency basis spreads is recognized in earnings as part of the accrual of interest on the cross-currency swap.
- (d) The pre-tax amounts are primarily recorded in noninterest revenue, net interest income and compensation expense in the Consolidated statements of income.
- (e) During the year ended December 31, 2022, a remeasurement of the Firm's U.S. principal defined benefit plan in the third quarter, was required as a result of a pension settlement. The remeasurement resulted in a net decrease of \$1.4 billion in pre-tax AOCI. Refer to Note 8 for further information.

Notes to consolidated financial statements

Note 25 – Income taxes

JPMorgan Chase and its eligible subsidiaries file a consolidated U.S. federal income tax return. JPMorgan Chase uses the asset and liability method to provide for income taxes on all transactions recorded in the Consolidated Financial Statements. This method requires that income taxes reflect the expected future tax consequences of temporary differences between the carrying amounts of assets or liabilities for book and tax purposes. Accordingly, a deferred tax asset or liability for each temporary difference is determined based on the tax rates that the Firm expects to be in effect when the underlying items of income and expense are realized. JPMorgan Chase's expense for income taxes includes the current and deferred portions of that expense. A valuation allowance is established to reduce deferred tax assets to the amount the Firm expects to realize.

Due to the inherent complexities arising from the nature of the Firm's businesses, and from conducting business and being taxed in a substantial number of jurisdictions, significant judgments and estimates are required to be made. Agreement of tax liabilities between JPMorgan Chase and the many tax jurisdictions in which the Firm files tax returns may not be finalized for several years. Thus, the Firm's final tax-related assets and liabilities may ultimately be different from those currently reported.

Effective tax rate and expense

The following table presents a reconciliation of the applicable statutory U.S. federal income tax rate to the effective tax rate.

Effective tax rate

Year ended December 31,	2022	2021	2020
Statutory U.S. federal tax rate	21.0 %	21.0 %	21.0 %
Increase/(decrease) in tax rate resulting from:			
U.S. state and local income taxes, net of U.S. federal income tax benefit	3.5	3.0	2.5
Tax-exempt income	(0.9)	(0.9)	(1.6)
Non-U.S. earnings	0.4	0.1	1.4
Business tax credits	(5.4)	(4.2)	(5.4)
Other, net	(0.2)	(0.1)	0.8
Effective tax rate	18.4 %	18.9 %	18.7 %

The following table reflects the components of income tax expense/(benefit) included in the Consolidated statements of income.

Income tax expense/(benefit)

Year ended December 31, (in millions)	2022	2021	2020
Current income tax expense/(benefit)			
U.S. federal	\$ 5,606	\$ 2,865	\$ 5,759
Non-U.S.	2,992	2,718	2,705
U.S. state and local	2,630	1,897	1,793
Total current income tax expense/(benefit)	11,228	7,480	10,257
Deferred income tax expense/(benefit)			
U.S. federal	(2,004)	3,460	(2,776)
Non-U.S.	(154)	(101)	(126)
U.S. state and local	(580)	389	(671)
Total deferred income tax expense/(benefit)	(2,738)	3,748	(3,573)
Total income tax expense	\$ 8,490	\$ 11,228	\$ 6,684

Total income tax expense includes \$331 million of tax benefits in 2022, \$69 million of tax expenses in 2021, and \$72 million of tax benefits in 2020, resulting from the resolution of tax audits.

Tax effect of items recorded in stockholders' equity

The preceding table does not reflect the tax effect of certain items that are recorded each period directly in stockholders' equity. The tax effect of all items recorded directly to stockholders' equity resulted in a decrease of \$4.5 billion in 2022, an increase of \$2.0 billion in 2021, and a decrease of \$827 million in 2020.

Results from U.S. and non-U.S. earnings

The following table presents the U.S. and non-U.S. components of income before income tax expense.

Year ended December 31, (in millions)	2022	2021	2020
U.S.	\$ 34,626	\$ 50,126	\$ 27,312
Non-U.S. ^(a)	11,540	9,436	8,503
Income before income tax expense	\$ 46,166	\$ 59,562	\$ 35,815

(a) For purposes of this table, non-U.S. income is defined as income generated from operations located outside the U.S.

The Firm will recognize any U.S. income tax expense it may incur on global intangible low tax income as income tax expense in the period in which the tax is incurred. At December 31, 2022 the income tax expense incurred was not material.

Affordable housing tax credits

The Firm recognized \$1.8 billion of tax credits and other tax benefits associated with investments in affordable housing projects within income tax expense for the year ended 2022, and \$1.7 billion and \$1.5 billion for the years ended 2021 and 2020, respectively. The amount of amortization of such investments reported in income tax expense was \$1.4 billion, \$1.3 billion and \$1.2 billion, respectively. The carrying value of these investments, which are reported in other assets on the Firm's Consolidated balance sheets, was \$12.1 billion and \$10.8 billion at December 31, 2022 and 2021, respectively. The amount of commitments related to these investments, which are reported in accounts payable and other liabilities on the Firm's Consolidated balance sheets, was \$5.4 billion and \$4.6 billion at December 31, 2022 and 2021, respectively.

Deferred taxes

Deferred income tax expense/(benefit) results from differences between assets and liabilities measured for financial reporting purposes versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. If a deferred tax asset is determined to be unrealizable, a valuation allowance is established. The significant components of deferred tax assets and liabilities are reflected in the following table.

December 31, (in millions)	2022	2021
Deferred tax assets		
Allowance for loan losses	\$ 5,193	\$ 4,345
Employee benefits	1,342	987
Accrued expenses and other	8,577	3,955
Non-U.S. operations	1,148	900
Tax attribute carryforwards	365	615
Gross deferred tax assets	16,625	10,802
Valuation allowance	(198)	(378)
Deferred tax assets, net of valuation allowance	\$ 16,427	\$ 10,424
Deferred tax liabilities		
Depreciation and amortization	\$ 2,044	\$ 3,289
Mortgage servicing rights, net of hedges	1,864	2,049
Leasing transactions	2,843	4,227
Other, net	3,801	4,459
Gross deferred tax liabilities	10,552	14,024
Net deferred tax (liabilities)/assets	\$ 5,875	\$ (3,600)

JPMorgan Chase has recorded deferred tax assets of \$365 million at December 31, 2022, in connection with U.S. federal and non-U.S. NOL carryforwards and other tax attributes, FTC carryforwards, and state and local capital loss carryforwards. At December 31, 2022, total U.S. federal NOL carryforwards were \$648 million, non-U.S. NOL carryforwards were \$308 million, FTC carryforwards were \$81 million, state and local capital loss carryforwards were \$1.0 billion, and other U.S. federal tax attributes were \$256 million. If not utilized, a portion of the U.S. federal NOL carryforwards and other U.S. federal tax attributes will expire between 2026 and 2037 whereas others have an unlimited carryforward period. Similarly, certain non-U.S. NOL carryforwards will expire between 2026 and 2039 whereas others have an unlimited carryforward period. The FTC carryforwards will expire between 2029 and 2030, and the state and local capital loss carryforwards will expire in 2026.

The valuation allowance at December 31, 2022, was due to the state and local capital loss carryforwards, FTC carryforwards, and certain non-U.S. deferred tax assets, including NOL carryforwards.

Notes to consolidated financial statements

Unrecognized tax benefits

At December 31, 2022, 2021 and 2020, JPMorgan Chase's unrecognized tax benefits, excluding related interest expense and penalties, were \$5.0 billion, \$4.6 billion and \$4.3 billion, respectively, of which \$3.8 billion, \$3.4 billion and \$3.1 billion, respectively, if recognized, would reduce the annual effective tax rate. Included in the amount of unrecognized tax benefits are certain items that would not affect the effective tax rate if they were recognized in the Consolidated statements of income. These unrecognized items include the tax effect of certain temporary differences, the portion of gross state and local unrecognized tax benefits that would be offset by the benefit from associated U.S. federal income tax deductions, and the portion of gross non-U.S. unrecognized tax benefits that would have offsets in other jurisdictions. JPMorgan Chase evaluates the need for changes in unrecognized tax benefits based on its anticipated tax return filing positions as part of its U.S. federal and state and local tax returns. In addition, the Firm is presently under audit by a number of taxing authorities, most notably by the Internal Revenue Service, as summarized in the Tax examination status table below. The evaluation of unrecognized tax benefits as well as the potential for audit settlements make it reasonably possible that over the next 12 months the gross balance of unrecognized tax benefits may increase or decrease by as much as approximately \$1.0 billion. The change in the unrecognized tax benefit would result in a payment or income statement recognition.

The following table presents a reconciliation of the beginning and ending amount of unrecognized tax benefits.

Year ended December 31, (in millions)	2022	2021	2020
Balance at January 1,	\$ 4,636	\$ 4,250	\$ 4,024
Increases based on tax positions related to the current period	1,234	798	685
Increases based on tax positions related to prior periods	123	393	362
Decreases based on tax positions related to prior periods	(824)	(657)	(705)
Decreases related to cash settlements with taxing authorities	(126)	(148)	(116)
Balance at December 31,	\$ 5,043	\$ 4,636	\$ 4,250

After-tax interest expense/(benefit) and penalties related to income tax liabilities recognized in income tax expense were \$141 million, \$174 million and \$147 million in 2022, 2021 and 2020, respectively.

At December 31, 2022 and 2021, in addition to the liability for unrecognized tax benefits, the Firm had accrued \$1.3 billion and \$1.1 billion, respectively, for income tax-related interest and penalties.

Tax examination status

JPMorgan Chase is continually under examination by the Internal Revenue Service, by taxing authorities throughout the world, and by many state and local jurisdictions throughout the U.S. The following table summarizes the status of significant income tax examinations of JPMorgan Chase and its consolidated subsidiaries as of December 31, 2022.

	Periods under examination	Status
JPMorgan Chase - U.S.	2011 - 2013	Field examination of amended returns
JPMorgan Chase - U.S.	2014 - 2018	Field examination of original and amended returns
JPMorgan Chase - New York State	2012 - 2014	Field Examination
JPMorgan Chase - New York City	2015 - 2017	Field Examination
JPMorgan Chase - U.K.	2011 - 2020	Field examination of certain select entities

Note 26 – Restricted cash, other restricted assets and intercompany funds transfers

Restricted cash and other restricted assets

Certain of the Firm's cash and other assets are restricted as to withdrawal or usage. These restrictions are imposed by various regulatory authorities based on the particular activities of the Firm's subsidiaries.

The business of JPMorgan Chase Bank, N.A. is subject to examination and regulation by the OCC. The Bank is a member of the U.S. Federal Reserve System, and its deposits in the U.S. are insured by the FDIC, subject to applicable limits.

The Firm is required to maintain cash reserves at certain non-US central banks.

The Firm is also subject to rules and regulations established by other U.S. and non U.S. regulators. As part of its compliance with the respective regulatory requirements, the Firm's broker-dealer activities are subject to certain restrictions on cash and other assets.

The following table presents the components of the Firm's restricted cash:

December 31, (in billions)	2022	2021
Segregated for the benefit of securities and cleared derivative customers	18.7	14.6
Cash reserves at non-U.S. central banks and held for other general purposes	8.1	5.1
Total restricted cash^(a)	\$ 26.8	\$ 19.7

(a) Comprises \$25.4 billion and \$18.4 billion in deposits with banks, and \$1.4 billion and \$1.3 billion in cash and due from banks on the Consolidated balance sheets as of December 31, 2022 and 2021, respectively.

Also, as of December 31, 2022 and 2021, the Firm had the following other restricted assets:

- Cash and securities pledged with clearing organizations for the benefit of customers of \$42.4 billion and \$47.5 billion, respectively.
- Securities with a fair value of \$31.7 billion and \$30.0 billion, respectively, were also restricted in relation to customer activity.

Intercompany funds transfers

Restrictions imposed by U.S. federal law prohibit JPMorgan Chase Bank, N.A., and its subsidiaries, from lending to JPMorgan Chase & Co. ("Parent Company") and certain of its affiliates unless the loans are secured in specified amounts. Such secured loans provided by any banking subsidiary to the Parent Company or to any particular affiliate, together with certain other transactions with such affiliate (collectively referred to as "covered transactions"), must be made on terms and conditions that are consistent with safe and sound banking practices. In addition, unless collateralized with cash or US Government debt obligations, covered transactions are generally limited to 10% of the banking subsidiary's total capital, as determined by the risk-based capital guidelines; the aggregate amount of covered transactions between any banking subsidiary and all of its affiliates is limited to 20% of the banking subsidiary's total capital.

The Parent Company's two principal subsidiaries are JPMorgan Chase Bank, N.A. and JPMorgan Chase Holdings LLC, an intermediate holding company (the "IHC"). The IHC generally holds the stock of JPMorgan Chase's subsidiaries other than JPMorgan Chase Bank, N.A. and its subsidiaries. The IHC also owns other assets and provides intercompany loans to the Parent Company. The Parent Company is obligated to contribute to the IHC substantially all the net proceeds received from securities issuances (including issuances of senior and subordinated debt securities and of preferred and common stock).

The principal sources of income and funding for the Parent Company are dividends from JPMorgan Chase Bank, N.A. and dividends and extensions of credit from the IHC. In addition to dividend restrictions set forth in statutes and regulations, the Federal Reserve, the OCC and the FDIC have authority under the Financial Institutions Supervisory Act to prohibit or to limit the payment of dividends by the banking organizations they supervise, including the Parent Company and its subsidiaries that are banks or bank holding companies, if, in the banking regulator's opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization. The IHC is prohibited from paying dividends or extending credit to the Parent Company if certain capital or liquidity "thresholds" are breached or if limits are otherwise imposed by the Parent Company's management or Board of Directors.

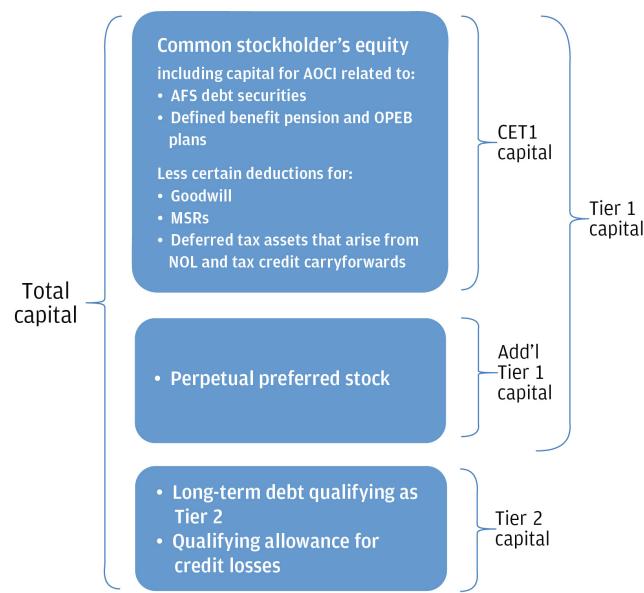
At January 1, 2023, the Parent Company's banking subsidiaries could pay, in the aggregate, approximately \$34 billion in dividends to their respective bank holding companies without the prior approval of their relevant banking regulators. The capacity to pay dividends in 2023 will be supplemented by the banking subsidiaries' earnings during the year.

Note 27 – Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized requirements, for the consolidated financial holding company. The Office of the Comptroller of the Currency (“OCC”) establishes similar minimum capital requirements and standards for the Firm’s principal IDI subsidiary, JPMorgan Chase Bank, N.A.

The capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its IDI subsidiaries, including JPMorgan Chase Bank, N.A. Two comprehensive approaches are prescribed for calculating RWA: a standardized approach (“Basel III Standardized”), and an advanced approach (“Basel III Advanced”). For each of the risk-based capital ratios, the capital adequacy of the Firm and JPMorgan Chase Bank, N.A. is evaluated against the lower of the Standardized or Advanced approaches compared to their respective regulatory capital ratio requirements.

The three components of regulatory capital under the Basel III rules are as illustrated below:



Under the risk-based capital and leverage-based guidelines of the Federal Reserve, JPMorgan Chase is required to maintain minimum ratios for CET1 capital, Tier 1 capital, Total capital, Tier 1 leverage and the SLR. Failure to meet these minimum requirements could cause the Federal Reserve to take action. IDI subsidiaries are also subject to these capital requirements established by their respective primary regulators.

The following table presents the risk-based regulatory capital ratio requirements and well-capitalized ratios to which the Firm and its IDI subsidiaries were subject as of December 31, 2022 and 2021.

	Standardized capital ratio requirements		Advanced capital ratio requirements		Well-capitalized ratios	
	BHC ^{(a)(b)}	IDI ^(c)	BHC ^(a)	IDI ^(c)	BHC ^(d)	IDI ^(e)
Risk-based capital ratios						
CET1 capital	12.0 %	7.0 %	10.5 %	7.0 %	NA	6.5 %
Tier 1 capital	13.5	8.5	12.0	8.5	6.0 %	8.0
Total capital	15.5	10.5	14.0	10.5	10.0	10.0

Note: The table above is as defined by the regulations issued by the Federal Reserve, OCC and FDIC and to which the Firm and its IDI subsidiaries are subject.

- (a) Represents the regulatory capital ratio requirements applicable to the Firm. The CET1, Tier 1 and Total capital ratio requirements each include a respective minimum requirement plus a GSIB surcharge of 3.5% as calculated under Method 2; plus a 4.0% SCB for Basel III Standardized ratios and a fixed 2.5% capital conservation buffer for Basel III Advanced ratios. The countercyclical buffer is currently set to 0% by the federal banking agencies.
- (b) For the period ended December 31, 2021, the CET1, Tier 1, and Total capital ratio requirements under Basel III Standardized applicable to the Firm were 11.2%, 12.7% and 14.7%, respectively. SCB for Basel III Standardized ratio for 2021 was 3.2%.
- (c) Represents requirements for JPMorgan Chase’s IDI subsidiaries. The CET1, Tier 1 and Total capital ratio requirements include a fixed capital conservation buffer requirement of 2.5% that is applicable to the IDI subsidiaries. The IDI subsidiaries are not subject to the GSIB surcharge.
- (d) Represents requirements for bank holding companies pursuant to regulations issued by the Federal Reserve.
- (e) Represents requirements for IDI subsidiaries pursuant to regulations issued under the FDIC Improvement Act.

The following table presents the leverage-based regulatory capital ratio requirements and well-capitalized ratios to which the Firm and its IDI subsidiaries were subject as of December 31, 2022 and 2021.

	Capital ratio requirements ^(a)		Well-capitalized ratios	
	BHC	IDI	BHC ^(b)	IDI
Leverage-based capital ratios				
Tier 1 leverage	4.0 %	4.0 %	NA	5.0 %
SLR	5.0	6.0	NA	6.0

Note: The table above is as defined by the regulations issued by the Federal Reserve, OCC and FDIC and to which the Firm and its IDI subsidiaries are subject.

- (a) Represents minimum SLR requirement of 3.0%, as well as supplementary leverage buffer requirements of 2.0% and 3.0% for BHC and IDI subsidiaries, respectively.
- (b) The Federal Reserve's regulations do not establish well-capitalized thresholds for these measures for BHCs.

CECL regulatory capital transition

Until December 31, 2021, the Firm's capital reflected a two year delay of the effects of CECL provided by the Federal Reserve Board in response to the COVID-19 pandemic.

Beginning January 1, 2022, the \$2.9 billion CECL capital benefit is being phased out at 25% per year over a three-year period. As of December 31, 2022, the Firm's CET1 capital reflected the remaining \$2.2 billion benefit associated with the CECL capital transition provisions.

The following tables present risk-based capital metrics under both the Basel III Standardized and Basel III Advanced approaches and leverage-based capital metrics for JPMorgan Chase and JPMorgan Chase Bank, N.A. As of December 31, 2022 and 2021, JPMorgan Chase and JPMorgan Chase Bank, N.A. were well-capitalized and met all capital requirements to which each was subject.

December 31, 2022 (in millions, except ratios)	Basel III Standardized		Basel III Advanced	
	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.
Risk-based capital metrics:^(a)				
CET1 capital	\$ 218,934	\$ 269,668	\$ 218,934	\$ 269,668
Tier 1 capital	245,631	269,672	245,631	269,672
Total capital	277,769	288,433	264,583	275,255
Risk-weighted assets	1,653,538	1,597,072	1,609,773	1,475,602
CET1 capital ratio	13.2 %	16.9 %	13.6 %	18.3 %
Tier 1 capital ratio	14.9	16.9	15.3	18.3
Total capital ratio	16.8	18.1	16.4	18.7
December 31, 2021 (in millions, except ratios)	Basel III Standardized		Basel III Advanced	
	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.
Risk-based capital metrics:^(a)				
CET1 capital	\$ 213,942	\$ 266,907	\$ 213,942	\$ 266,907
Tier 1 capital	246,162	266,910	246,162	266,910
Total capital	274,900	281,826	265,796	272,299
Risk-weighted assets	1,638,900	1,582,280	1,547,920	1,392,847
CET1 capital ratio	13.1 %	16.9 %	13.8 %	19.2 %
Tier 1 capital ratio	15.0	16.9	15.9	19.2
Total capital ratio	16.8	17.8	17.2	19.5

(a) The capital metrics reflect the CECL capital transition provisions.

Three months ended (in millions, except ratios)	December 31, 2022		December 31, 2021	
	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.	JPMorgan Chase & Co.	JPMorgan Chase Bank, N.A.
Leverage-based capital metrics:^(a)				
Adjusted average assets ^(b)	\$ 3,703,873	\$ 3,249,912	\$ 3,782,035	\$ 3,334,925
Tier 1 leverage ratio	6.6 %	8.3 %	6.5 %	8.0 %
Total leverage exposure	\$ 4,367,092	\$ 3,925,502	\$ 4,571,789	\$ 4,119,286
SLR	5.6 %	6.9 %	5.4 %	6.5 %

(a) The capital metrics reflect the CECL capital transition provisions.

(b) Adjusted average assets, for purposes of calculating the leverage ratios, includes quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill, inclusive of estimated equity method goodwill, and other intangible assets.

Additionally, effective January 1, 2022, the Firm phased out 25% of the other CECL capital transition provisions which impacted Tier 2 capital, adjusted average assets, total leverage exposure and RWA, as applicable.

Refer to Note 1 for further information on the CECL accounting guidance.

Note 28 – Off-balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to address the financing needs of its customers and clients. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the customer or client draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the customer or client subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees have historically been refinanced, extended, cancelled, or expired without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its expected future credit exposure or funding requirements.

To provide for expected credit losses in wholesale and certain consumer lending-related commitments, an allowance for credit losses on lending-related commitments is maintained. Refer to Note 13 for further information regarding the allowance for credit losses on lending-related commitments. The following table summarizes the contractual amounts and carrying values of off-balance sheet lending-related financial instruments, guarantees and other commitments at December 31, 2022 and 2021. The amounts in the table below for credit card and home equity lending-related commitments represent the total available credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit for these products will be utilized at the same time. The Firm can reduce or cancel credit card lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. In addition, the Firm typically closes credit card lines when the borrower is 60 days or more past due. The Firm may reduce or close HELOCs when there are significant decreases in the value of the underlying property, or when there has been a demonstrable decline in the creditworthiness of the borrower.

Off-balance sheet lending-related financial instruments, guarantees and other commitments

	Contractual amount						Carrying value ⁽ⁱ⁾	
	2022				2021		2022	2021
	Expires in 1 year or less	Expires after 1 year through 3 years	Expires after 3 years through 5 years	Expires after 5 years	Total	Total		
By remaining maturity at December 31, (in millions)								
Lending-related								
Consumer, excluding credit card:								
Residential Real Estate ^(a)	\$ 5,156	\$ 3,500	\$ 6,542	\$ 6,089	\$ 21,287	\$ 32,996	75	100
Auto and other	10,642	1	—	1,588	12,231	12,338	—	2
Total consumer, excluding credit card	15,798	3,501	6,542	7,677	33,518	45,334	75	102
Credit card ^(b)	821,284	—	—	—	821,284	730,534	—	—
Total consumer^(c)	837,082	3,501	6,542	7,677	854,802	775,868	75	102
Wholesale:								
Other unfunded commitments to extend credit ^(d)	83,832	132,237	201,921	22,417	440,407	453,467	2,328 ^(h)	2,037
Standby letters of credit and other financial guarantees ^(d)	13,559	8,272	4,585	1,023	27,439	28,530	408	476
Other letters of credit ^(d)	3,692	343	98	1	4,134	4,448	6	9
Total wholesale^(c)	101,083	140,852	206,604	23,441	471,980	486,445	2,742	2,522
Total lending-related	\$ 938,165	\$ 144,353	\$ 213,146	\$ 31,118	\$ 1,326,782	\$ 1,262,313	\$ 2,817	\$ 2,624
Other guarantees and commitments								
Securities lending indemnification agreements and guarantees ^(e)	\$ 283,386	\$ —	\$ —	\$ —	\$ 283,386	\$ 337,770	\$ —	\$ —
Derivatives qualifying as guarantees	5,082	466	12,632	41,000	59,180	55,730	649	475
Unsettled resale and securities borrowed agreements	116,260	715	—	—	116,975	103,681	(2)	1
Unsettled repurchase and securities loaned agreements	65,873	534	—	—	66,407	74,263	(7)	—
Loan sale and securitization-related indemnifications:								
Mortgage repurchase liability	NA	NA	NA	NA	NA	NA	76	61
Loans sold with recourse	NA	NA	NA	NA	820	827	28	19
Exchange & clearing house guarantees and commitments ^(f)	191,068	—	—	—	191,068	182,701	—	—
Other guarantees and commitments ^(g)	4,856	723	209	2,846	8,634	10,490	53	69

(a) Includes certain commitments to purchase loans from correspondents.

(b) Also includes commercial card lending-related commitments primarily in CB and CIB.

(c) Predominantly all consumer and wholesale lending-related commitments are in the U.S.

(d) At December 31, 2022 and 2021, reflected the contractual amount net of risk participations totaling \$71 million and \$44 million, respectively, for other unfunded commitments to extend credit; \$8.2 billion and \$7.9 billion, respectively, for standby letters of credit and other financial guarantees; and \$512 million and \$451 million, respectively, for other letters of credit. In regulatory filings with the Federal Reserve these commitments are shown gross of risk participations.

(e) At December 31, 2022 and 2021, collateral held by the Firm in support of securities lending indemnification agreements was \$298.5 billion and \$357.4 billion, respectively. Securities lending collateral primarily consists of cash, G7 government securities, and securities issued by U.S. GSEs and government agencies.

(f) At December 31, 2022 and 2021, includes guarantees to the Fixed Income Clearing Corporation under the sponsored member repo program and commitments and guarantees associated with the Firm's membership in certain clearing houses.

(g) At December 31, 2022 and 2021, primarily includes unfunded commitments related to certain tax-oriented equity investments, unfunded commitments to purchase secondary market loans, and other equity investment commitments.

(h) At December 31, 2022, includes net markdowns on held-for-sale positions related to unfunded commitments in the bridge financing portfolio.

(i) For lending-related products, the carrying value represents the allowance for lending-related commitments and the guarantee liability; for derivative-related products, and lending-related commitments for which the fair value option was elected, the carrying value represents the fair value.

Notes to consolidated financial statements

Other unfunded commitments to extend credit

Other unfunded commitments to extend credit generally consist of commitments for working capital and general corporate purposes, extensions of credit to support commercial paper facilities and bond financings in the event that those obligations cannot be remarketed to new investors, as well as committed liquidity facilities to clearing organizations. The Firm also issues commitments under multipurpose facilities which could be drawn upon in several forms, including the issuance of a standby letter of credit.

Guarantees

U.S. GAAP requires that a guarantor recognize, at the inception of a guarantee, a liability in an amount equal to the fair value of the obligation undertaken in issuing the guarantee. U.S. GAAP defines a guarantee as a contract that contingently requires the guarantor to pay a guaranteed party based upon: (a) changes in an underlying asset, liability or equity security of the guaranteed party; or (b) a third party's failure to perform under a specified agreement. The Firm considers the following off-balance sheet arrangements to be guarantees under U.S. GAAP: standby letters of credit and other financial guarantees, securities lending indemnifications, certain indemnification agreements included within third-party contractual arrangements, certain derivative contracts and the guarantees under the sponsored member repo program.

As required by U.S. GAAP, the Firm initially records guarantees at the inception date fair value of the non-contingent obligation assumed (e.g., the amount of consideration received or the net present value of the premium receivable). For these obligations, the Firm records this fair value amount in other liabilities with an offsetting entry recorded in cash (for premiums received),

The following table summarizes the contractual amount and carrying value of standby letters of credit and other financial guarantees and other letters of credit arrangements as of December 31, 2022 and 2021.

Standby letters of credit, other financial guarantees and other letters of credit

December 31, (in millions)	2022		2021	
	Standby letters of credit and other financial guarantees	Other letters of credit	Standby letters of credit and other financial guarantees	Other letters of credit
Investment-grade ^(a)	\$ 19,205	\$ 3,040	\$ 19,998	\$ 3,087
Noninvestment-grade ^(a)	8,234	1,094	8,532	1,361
Total contractual amount	\$ 27,439	\$ 4,134	\$ 28,530	\$ 4,448
Allowance for lending-related commitments	\$ 82	\$ 6	\$ 123	\$ 9
Guarantee liability	326	—	353	—
Total carrying value	\$ 408	\$ 6	\$ 476	\$ 9
Commitments with collateral	\$ 15,296	\$ 795	\$ 14,511	\$ 999

(a) The ratings scale is based on the Firm's internal risk ratings. Refer to Note 12 for further information on internal risk ratings.

or other assets (for premiums receivable). Any premium receivable recorded in other assets is reduced as cash is received under the contract, and the fair value of the liability recorded at inception is amortized into income as lending and deposit-related fees over the life of the guarantee contract. The lending-related contingent obligation is recognized based on expected credit losses in addition to, and separate from, any non-contingent obligation.

Non-lending-related contingent obligations are recognized when the liability becomes probable and reasonably estimable. These obligations are not recognized if the estimated amount is less than the carrying amount of any non-contingent liability recognized at inception (adjusted for any amortization). Examples of non-lending-related contingent obligations include indemnifications provided in sales agreements, where a portion of the sale proceeds is allocated to the guarantee, which adjusts the gain or loss that would otherwise result from the transaction. For these indemnifications, the initial liability is amortized to income as the Firm's risk is reduced (i.e., over time or when the indemnification expires).

The contractual amount and carrying value of guarantees and indemnifications are included in the table on page 277.

For additional information on the guarantees, see below.

Standby letters of credit and other financial guarantees

Standby letters of credit and other financial guarantees are conditional lending commitments issued by the Firm to guarantee the performance of a client or customer to a third party under certain arrangements, such as commercial paper facilities, bond financings, acquisition financings, trade financings and similar transactions.

Securities lending indemnifications

Through the Firm's securities lending program, counterparties' securities, via custodial and non-custodial arrangements, may be lent to third parties. As part of this program, the Firm provides an indemnification in the lending agreements which protects the lender against the failure of the borrower to return the lent securities. To minimize its liability under these indemnification agreements, the Firm obtains cash or other highly liquid collateral with a market value exceeding 100% of the value of the securities on loan from the borrower. Collateral is marked to market daily to help assure that collateralization is adequate. Additional collateral is called from the borrower if a shortfall exists, or collateral may be released to the borrower in the event of overcollateralization. If a borrower defaults, the Firm would use the collateral held to purchase replacement securities in the market or to credit the lending client or counterparty with the cash equivalent thereof.

The cash collateral held by the Firm may be invested on behalf of the client in indemnified resale agreements, whereby the Firm indemnifies the client against the loss of principal invested. To minimize its liability under these agreements, the Firm obtains collateral with a market value exceeding 100% of the principal invested.

Derivatives qualifying as guarantees

The Firm transacts in certain derivative contracts that have the characteristics of a guarantee under U.S. GAAP. These contracts include written put options that require the Firm to purchase assets upon exercise by the option holder at a specified price by a specified date in the future. The Firm may enter into written put option contracts in order to meet client needs, or for other trading purposes. The terms of written put options are typically five years or less.

Derivatives deemed to be guarantees also includes stable value contracts, commonly referred to as "stable value products", that require the Firm to make a payment of the difference between the market value and the book value of a counterparty's reference portfolio of assets in the event that market value is less than book value and certain other conditions have been met. Stable value products are transacted in order to allow investors to realize investment returns with less volatility than an unprotected portfolio. These contracts are typically longer-term or may have no stated maturity, but allow the Firm to elect to terminate the contract under certain conditions.

The notional value of derivative guarantees generally represents the Firm's maximum exposure. However, exposure to certain stable value products is contractually limited to a substantially lower percentage of the notional amount.

The fair value of derivative guarantees reflects the probability, in the Firm's view, of whether the Firm will be required to perform under the contract. The Firm reduces exposures to these contracts by entering into offsetting transactions, or by entering into contracts that hedge the market risk related to the derivative guarantees.

The following table summarizes the derivatives qualifying as guarantees as of December 31, 2022 and 2021.

(in millions)	December 31, 2022	December 31, 2021
Notional amounts		
Derivative guarantees	\$ 59,180	\$ 55,730
Stable value contracts with contractually limited exposure	31,820	29,778
Maximum exposure of stable value contracts with contractually limited exposure	2,063	2,882
Fair value		
Derivative payables	649	475

In addition to derivative contracts that meet the characteristics of a guarantee, the Firm is both a purchaser and seller of credit protection in the credit derivatives market. Refer to Note 5 for a further discussion of credit derivatives.

Unsettled securities financing agreements

In the normal course of business, the Firm enters into resale and securities borrowed agreements. At settlement, these commitments result in the Firm advancing cash to and receiving securities collateral from the counterparty. The Firm also enters into repurchase and securities loaned agreements. At settlement, these commitments result in the Firm receiving cash from and providing securities collateral to the counterparty. Such agreements settle at a future date. These agreements generally do not meet the definition of a derivative, and therefore, are not recorded on the Consolidated balance sheets until settlement date. These agreements predominantly have regular-way settlement terms. Refer to Note 11 for a further discussion of securities financing agreements.

Loan sales- and securitization-related indemnifications

Mortgage repurchase liability

In connection with the Firm's mortgage loan sale and securitization activities with U.S. GSEs the Firm has made representations and warranties that the loans sold meet certain requirements, and that may require the Firm to repurchase mortgage loans and/or indemnify the loan purchaser if such representations and warranties are breached by the Firm.

Private label securitizations

The liability related to repurchase demands associated with private label securitizations is separately evaluated by the Firm in establishing its litigation reserves.

Refer to Note 30 for additional information regarding litigation.

Loans sold with recourse

The Firm provides servicing for mortgages and certain commercial lending products on both a recourse and nonrecourse basis. In nonrecourse servicing, the principal credit risk to the Firm is the cost of temporary servicing advances of funds (i.e., normal servicing advances). In recourse servicing, the servicer agrees to share credit risk with the owner of the mortgage loans, such as Fannie Mae

Notes to consolidated financial statements

or Freddie Mac or a private investor, insurer or guarantor. Losses on recourse servicing predominantly occur when foreclosure sales proceeds of the property underlying a defaulted loan are less than the sum of the outstanding principal balance, plus accrued interest on the loan and the cost of holding and disposing of the underlying property. The Firm's securitizations are predominantly nonrecourse, thereby effectively transferring the risk of future credit losses to the purchaser of the mortgage-backed securities issued by the trust. The unpaid principal balance of loans sold with recourse as well as the carrying value of the related liability that the Firm has recorded in accounts payable and other liabilities on the Consolidated balance sheets, which is representative of the Firm's view of the likelihood it will have to perform under its recourse obligations, are disclosed in the table on page 277.

Other off-balance sheet arrangements

Indemnification agreements - general

In connection with issuing securities to investors outside the U.S., the Firm may agree to pay additional amounts to the holders of the securities in the event that, due to a change in tax law, certain types of withholding taxes are imposed on payments on the securities. The terms of the securities may also give the Firm the right to redeem the securities if such additional amounts are payable. The Firm may also enter into indemnification clauses in connection with the licensing of software to clients ("software licensees") or when it sells a business or assets to a third party ("third-party purchasers"), pursuant to which it indemnifies software licensees for claims of liability or damages that may occur subsequent to the licensing of the software, or third-party purchasers for losses they may incur due to actions taken by the Firm prior to the sale of the business or assets. It is difficult to estimate the Firm's maximum exposure under these indemnification arrangements, since this would require an assessment of future changes in tax law and future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Merchant charge-backs

Under the rules of payment networks, in its role as a merchant acquirer, the Firm's Merchant Services business in CIB Payments, retains a contingent liability for disputed processed credit and debit card transactions that result in a charge-back to the merchant. If a dispute is resolved in the cardholder's favor, the Firm will (through the cardholder's issuing bank) credit or refund the amount to the cardholder and will charge back the transaction to the merchant. If the Firm is unable to collect the amount from the merchant, the Firm will bear the loss for the amount credited or refunded to the cardholder. The Firm mitigates this risk by withholding future settlements, retaining cash reserve accounts or obtaining other collateral. In addition, the Firm recognizes a valuation allowance that covers the payment or performance risk related to charge-backs.

For the years ended December 31, 2022, 2021 and 2020, the Firm processed an aggregate volume of \$2,158.4 billion, \$1,886.7 billion, and \$1,597.3 billion, respectively.

Clearing Services - Client Credit Risk

The Firm provides clearing services for clients by entering into securities purchases and sales and derivative contracts with CCPs, including ETDs such as futures and options, as well as OTC-cleared derivative contracts. As a clearing member, the Firm stands behind the performance of its clients, collects cash and securities collateral (margin) as well as any settlement amounts due from or to clients, and remits them to the relevant CCP or client in whole or part. There are two types of margin: variation margin is posted on a daily basis based on the value of clients' derivative contracts and initial margin is posted at inception of a derivative contract, generally on the basis of the potential changes in the variation margin requirement for the contract.

As a clearing member, the Firm is exposed to the risk of nonperformance by its clients, but is not liable to clients for the performance of the CCPs. Where possible, the Firm seeks to mitigate its risk to the client through the collection of appropriate amounts of margin at inception and throughout the life of the transactions. The Firm can also cease providing clearing services if clients do not adhere to their obligations under the clearing agreement. In the event of nonperformance by a client, the Firm would close out the client's positions and access available margin. The CCP would utilize any margin it holds to make itself whole, with any remaining shortfalls required to be paid by the Firm as a clearing member.

The Firm reflects its exposure to nonperformance risk of the client through the recognition of margin receivables from clients and margin payables to CCPs; the clients' underlying securities or derivative contracts are not reflected in the Firm's Consolidated Financial Statements.

It is difficult to estimate the Firm's maximum possible exposure through its role as a clearing member, as this would require an assessment of transactions that clients may execute in the future. However, based upon historical experience, and the credit risk mitigants available to the Firm, management believes it is unlikely that the Firm will have to make any material payments under these arrangements and the risk of loss is expected to be remote.

Refer to Note 5 for information on the derivatives that the Firm executes for its own account and records in its Consolidated Financial Statements.

Exchange & Clearing House Memberships

The Firm is a member of several securities and derivative exchanges and clearing houses, both in the U.S. and other countries, and it provides clearing services to its clients. Membership in some of these organizations requires the Firm to pay a pro rata share of the losses incurred by the organization as a result of the default of another member. Such obligations vary with different organizations. These obligations may be limited to the amount (or a multiple of the amount) of the Firm's contribution to the guarantee fund maintained by a clearing house or exchange as part of the resources available to cover any losses in the event of a member default. Alternatively, these obligations may also include a pro rata share of the residual losses after applying the guarantee fund. Additionally, certain clearing houses require the Firm as a member to pay a pro rata share of losses that may result from the clearing house's investment of guarantee fund contributions and initial margin, unrelated to and independent of the default of another member. Generally a payment would only be required should such losses exceed the resources of the clearing house or exchange that are contractually required to absorb the losses in the first instance. In certain cases, it is difficult to estimate the Firm's maximum possible exposure under these membership agreements, since this would require an assessment of future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to the Firm to be remote. Where the Firm's maximum possible exposure can be estimated, the amount is disclosed in the table on page 277, in the Exchange & clearing house guarantees and commitments line.

Sponsored member repo program

The Firm acts as a sponsoring member to clear eligible overnight and term resale and repurchase agreements through the Government Securities Division of the Fixed Income Clearing Corporation ("FICC") on behalf of clients that become sponsored members under the FICC's rules. The Firm also guarantees to the FICC the prompt and full payment and performance of its sponsored member clients' respective obligations under the FICC's rules. The Firm minimizes its liability under these guarantees by obtaining a security interest in the cash or high-quality securities collateral that the clients place with the clearing house; therefore, the Firm expects the risk of loss to be remote. The Firm's maximum possible exposure, without taking into consideration the associated collateral, is included in the Exchange & clearing house guarantees and commitments line on page 277. Refer to Note 11 for additional information on credit risk mitigation practices on resale agreements and the types of collateral pledged under repurchase agreements.

Guarantees of subsidiaries

In the normal course of business, the Parent Company may provide counterparties with guarantees of certain of the trading and other obligations of its subsidiaries on a contract-by-contract basis, as negotiated with the Firm's

counterparties. The obligations of the subsidiaries are included on the Firm's Consolidated balance sheets or are reflected as off-balance sheet commitments; therefore, the Parent Company has not recognized a separate liability for these guarantees. The Firm believes that the occurrence of any event that would trigger payments by the Parent Company under these guarantees is remote.

The Parent Company has guaranteed certain long-term debt and structured notes of its subsidiaries, including JPMorgan Chase Financial Company LLC ("JPMFC"), a 100%-owned finance subsidiary. All securities issued by JPMFC are fully and unconditionally guaranteed by the Parent Company and no other subsidiary of the parent company guarantees these securities. These guarantees, which rank on a parity with the Firm's unsecured and unsubordinated indebtedness, are not included in the table on page 277 of this Note. Refer to Note 20 for additional information.

Note 29 – Pledged assets and collateral

Pledged assets

The Firm pledges financial assets that it owns to maintain potential borrowing capacity at discount windows with Federal Reserve banks, various other central banks and FHLBs. Additionally, the Firm pledges assets for other purposes, including to collateralize repurchase and other securities financing agreements, to cover short sales and to collateralize derivative contracts and deposits. Certain of these pledged assets may be sold or repledged or otherwise used by the secured parties and are parenthetically identified on the Consolidated balance sheets as assets pledged.

The following table presents the Firm's pledged assets.

December 31, (in billions)	2022	2021
Assets that may be sold or repledged or otherwise used by secured parties	\$ 110.8	\$ 126.3
Assets that may not be sold or repledged or otherwise used by secured parties	114.8	112.0
Assets pledged at Federal Reserve banks and FHLBs	567.6	476.4
Total pledged assets	\$ 793.2	\$ 714.7

Total pledged assets do not include assets of consolidated VIEs; these assets are used to settle the liabilities of those entities. Refer to Note 14 for additional information on assets and liabilities of consolidated VIEs. Refer to Note 11 for additional information on the Firm's securities financing activities. Refer to Note 20 for additional information on the Firm's long-term debt. The significant components of the Firm's pledged assets were as follows.

December 31, (in billions)	2022	2021
Investment securities	\$ 104.4	\$ 80.1
Loans	485.9	428.5
Trading assets and other	202.9	206.1
Total pledged assets	\$ 793.2	\$ 714.7

Collateral

The Firm accepts financial assets as collateral that it is permitted to sell or repledge, deliver or otherwise use. This collateral is generally obtained under resale and other securities financing agreements, prime brokerage-related held-for-investment customer receivables and derivative contracts. Collateral is generally used under repurchase and other securities financing agreements, to cover short sales, and to collateralize derivative contracts and deposits.

The following table presents the fair value of collateral accepted.

December 31, (in billions)	2022	2021
Collateral permitted to be sold or repledged, delivered, or otherwise used	\$ 1,346.9	\$ 1,471.3
Collateral sold, repledged, delivered or otherwise used	1,019.4	1,111.0

Note 30 – Litigation

Contingencies

As of December 31, 2022, the Firm and its subsidiaries and affiliates are defendants or respondents in numerous legal proceedings, including private, civil litigations, government investigations or regulatory enforcement matters. The litigations range from individual actions involving a single plaintiff to class action lawsuits with potentially millions of class members. Investigations and regulatory enforcement matters involve both formal and informal proceedings, by both governmental agencies and self-regulatory organizations. These legal proceedings are at varying stages of adjudication, arbitration or investigation, and involve each of the Firm's lines of business and several geographies and a wide variety of claims (including common law tort and contract claims and statutory antitrust, securities and consumer protection claims), some of which present novel legal theories.

The Firm believes the estimate of the aggregate range of reasonably possible losses, in excess of reserves established, for its legal proceedings is from \$0 to approximately \$1.2 billion at December 31, 2022. This estimated aggregate range of reasonably possible losses was based upon information available as of that date for those proceedings in which the Firm believes that an estimate of reasonably possible loss can be made. For certain matters, the Firm does not believe that such an estimate can be made, as of that date. The Firm's estimate of the aggregate range of reasonably possible losses involves significant judgment, given:

- the number, variety and varying stages of the proceedings, including the fact that many are in preliminary stages,
- the existence in many such proceedings of multiple defendants, including the Firm, whose share of liability (if any) has yet to be determined,
- the numerous yet-unresolved issues in many of the proceedings, including issues regarding class certification and the scope of many of the claims, and
- the uncertainty of the various potential outcomes of such proceedings, including where the Firm has made assumptions concerning future rulings by the court or other adjudicator, or about the behavior or incentives of adverse parties or regulatory authorities, and those assumptions prove to be incorrect.

In addition, the outcome of a particular proceeding may be a result which the Firm did not take into account in its estimate because the Firm had deemed the likelihood of that outcome to be remote. Accordingly, the Firm's estimate of the aggregate range of reasonably possible losses will change from time to time, and actual losses may vary significantly.

Set forth below are descriptions of the Firm's material legal proceedings.

1MDB Litigation. J.P. Morgan (Suisse) SA was named as a defendant in a civil litigation filed in May 2021 in Malaysia by 1Malaysia Development Berhad (“1MDB”), a Malaysian state-owned and controlled investment fund. J.P. Morgan (Suisse) SA was served in August 2022. The claim alleges “dishonest assistance” against J.P. Morgan (Suisse) SA in relation to payments of \$300 million and \$500 million, from 2009 and 2010, respectively, received from 1MDB and paid into an account at J.P. Morgan Suisse (SA) held by 1MDB PetroSaudi Limited, a joint venture company between 1MDB and PetroSaudi Holdings (Cayman) Limited. In September 2022, the Firm filed an application challenging the validity of service and the Malaysian court's jurisdiction to hear the claim.

Amrapali. India's Enforcement Directorate (“ED”) is investigating J.P. Morgan India Private Limited in connection with investments made in 2010 and 2012 by two offshore funds formerly managed by JPMorgan Chase entities into residential housing projects developed by the Amrapali Group (“Amrapali”). In 2017, numerous creditors filed civil claims against Amrapali, including petitions brought by home buyers relating to delays in delivering or failure to deliver residential units. The home buyers' petitions have been overseen by the Supreme Court of India and are ongoing. In August 2021, the ED issued an order fining J.P. Morgan India Private Limited approximately \$31.5 million. The Firm is appealing the order and the fine. Relatedly, in July 2019, the Supreme Court of India issued an order making preliminary findings that Amrapali and other parties, including unspecified JPMorgan Chase entities and the offshore funds that had invested in the projects, violated certain currency control and money laundering provisions, and ordering the ED to conduct a further inquiry under India's Prevention of Money Laundering Act (“PMLA”) and Foreign Exchange Management Act (“FEMA”). In May 2020, the ED attached approximately \$25 million from J.P. Morgan India Private Limited in connection with the criminal PMLA investigation. The Firm is responding to and cooperating with the PMLA investigation.

Federal Republic of Nigeria Litigation. JPMorgan Chase Bank, N.A. operated an escrow and depository account for the Federal Government of Nigeria (“FGN”) and two major international oil companies. The account held approximately \$1.1 billion in connection with a dispute among the clients over rights to an oil field. Following the settlement of the dispute, JPMorgan Chase Bank, N.A. paid out the monies in the account in 2011 and 2013 in accordance with directions received from its clients. In November 2017, the Federal Republic of Nigeria (“FRN”) commenced a claim in the English High Court for approximately \$875 million in payments made out of the accounts. The FRN alleged that the payments were

Notes to consolidated financial statements

instructed as part of a complex fraud not involving JPMorgan Chase Bank, N.A., but that JPMorgan Chase Bank, N.A. was or should have been on notice that the payments may be fraudulent. A trial was held between February and April 2022. In June 2022, the Court decided the case in favor of JPMorgan Chase Bank, N.A. and dismissed it in full. In November 2022, the Court refused permission to the FRN to appeal the dismissal, and the matter was concluded.

Foreign Exchange Investigations and Litigation. The Firm previously reported settlements with certain government authorities relating to its foreign exchange (“FX”) sales and trading activities and controls related to those activities. Among those resolutions, in May 2015, the Firm pleaded guilty to a single violation of federal antitrust law. The Department of Labor (“DOL”) granted the Firm exemptions that permit the Firm and its affiliates to continue to rely on the Qualified Professional Asset Manager exemption under the Employee Retirement Income Security Act (“ERISA”) through the ten-year disqualification period following the antitrust plea. The only remaining FX-related governmental inquiry is a South Africa Competition Commission matter which is currently pending before the South Africa Competition Tribunal.

With respect to civil litigation matters, in August 2018, the United States District Court for the Southern District of New York granted final approval to the Firm’s settlement of a consolidated class action brought by U.S.-based plaintiffs, which principally alleged violations of federal antitrust laws based on an alleged conspiracy to manipulate foreign exchange rates and also sought damages on behalf of persons who transacted in FX futures and options on futures. Although certain members of the settlement class filed requests to the Court to be excluded from the class, an agreement to resolve their claims was reached in December 2022. A putative class action remains pending against the Firm and other foreign exchange dealers on behalf of certain consumers who purchased foreign currencies at allegedly inflated rates. In addition, some FX-related individual and putative class actions based on similar alleged underlying conduct have been filed outside the U.S., including in the U.K., Israel, the Netherlands, Brazil and Australia. An agreement to resolve one of the UK actions was reached in December 2022. In a putative class action pending before the U.K. Competition Appeal Tribunal, proposed class representatives have appealed the tribunal’s denial of a request for class certification on an opt-out basis. In Israel, a settlement in principle has been reached in the putative class action, which remains subject to court approval.

Interchange Litigation. Groups of merchants and retail associations filed a series of class action complaints alleging that Visa and Mastercard, as well as certain banks, conspired to set the price of credit and debit card interchange fees and enacted related rules in violation of antitrust laws. In 2012, the parties initially settled the cases for a cash payment, but that settlement was reversed on

appeal and remanded to the United States District Court for the Eastern District of New York.

The original class action was divided into two separate actions, one seeking primarily monetary relief and the other seeking primarily injunctive relief. In September 2018, the parties to the monetary class action finalized an agreement which amends and supersedes the prior settlement agreement. Pursuant to this settlement, the defendants collectively contributed an additional \$900 million to the approximately \$5.3 billion previously held in escrow from the original settlement. In December 2019, the amended settlement agreement was approved by the District Court. Certain merchants appealed the District Court’s approval order, and those appeals are pending. Based on the percentage of merchants that opted out of the amended class settlement, \$700 million has been returned to the defendants from the settlement escrow in accordance with the settlement agreement. The injunctive class action continues separately, and in September 2021, the District Court granted plaintiffs’ motion for class certification in part, and denied the motion in part.

Of the merchants who opted out of the amended damages class settlement, certain merchants filed individual actions raising similar allegations against Visa and Mastercard, as well as against the Firm and other banks. While some of those actions remain pending, the defendants have reached settlements with the merchants who opted out representing over half of the combined Mastercard-branded and Visa-branded payment card sales volume.

Jeffrey Epstein Litigation. JPMorgan Chase Bank, N.A. is named as a defendant in two lawsuits filed in the United States District Court for the Southern District of New York which allege that JPMorgan Chase Bank, N.A. knowingly facilitated Jeffrey Epstein’s sex trafficking and other unlawful conduct by providing banking services to Epstein until 2013. One case, which was filed in November 2022, is a putative class action filed by an alleged sex-trafficking victim of Epstein, and the other case, which was filed in December 2022, was brought on behalf of the government of the United States Virgin Islands and also alleges certain Virgin Islands statutory claims. JPMorgan Chase Bank, N.A. has moved to dismiss both complaints.

LIBOR and Other Benchmark Rate Investigations and Litigation. JPMorgan Chase has responded to inquiries from various governmental agencies and entities around the world relating primarily to the British Bankers Association’s (“BBA”) London Interbank Offered Rate (“LIBOR”) for various currencies and the European Banking Federation’s Euro Interbank Offered Rate (“EURIBOR”). The Swiss Competition Commission’s investigation relating to EURIBOR, to which the Firm and one other bank remain subject, continues. In December 2016, the European Commission issued a decision against the Firm and other banks finding an infringement of European antitrust rules relating to EURIBOR. The Firm has filed an appeal of that

decision with the European General Court, and that appeal is pending.

In addition, the Firm has been named as a defendant along with other banks in various individual and putative class actions related to benchmark rates, including U.S. dollar LIBOR. In actions related to U.S. dollar LIBOR during the period that it was administered by the BBA, the Firm has obtained dismissal of certain actions and resolved certain other actions, and others are in various stages of litigation. The United States District Court for the Southern District of New York has granted class certification of antitrust claims related to bonds and interest rate swaps sold directly by the defendants, including the Firm. A consolidated putative class action related to the period that U.S. dollar LIBOR was administered by ICE Benchmark Administration has been dismissed. In addition, a group of individual plaintiffs filed a lawsuit asserting antitrust claims, alleging that the Firm and other defendants were engaged in an unlawful agreement to set U.S. dollar LIBOR and conspired to monopolize the market for LIBOR-based consumer loans and credit cards. In September 2022, the Court dismissed plaintiffs' complaint in its entirety, and plaintiffs filed an amended complaint asserting similar antitrust claims, which defendants have moved to dismiss. The Firm's settlements of putative class actions related to the Singapore Interbank Offered Rate and the Singapore Swap Offer Rate, and the Australian Bank Bill Swap Reference Rate received final court approval in November 2022, while the settlement related to Swiss franc LIBOR remains subject to court approval.

Securities Lending Antitrust Litigation. JPMorgan Chase Bank, N.A., J.P. Morgan Securities LLC, J.P. Morgan Prime, Inc., and J.P. Morgan Strategic Securities Lending Corp. are named as defendants in a putative class action filed in the United States District Court for the Southern District of New York. The complaint asserts violations of federal antitrust law and New York State common law in connection with an alleged conspiracy to prevent the emergence of anonymous exchange trading for securities lending transactions. Defendants' motion to dismiss the complaint was denied. Plaintiffs have moved to certify a class in this action, which defendants are opposing.

Shareholder Litigation. Several shareholder putative class actions, as well as shareholder derivative actions purporting to act on behalf of the Firm, have been filed against the Firm, its Board of Directors and certain of its current and former officers.

Certain of these shareholder suits relate to historical trading practices by former employees in the precious metals and U.S. treasuries markets and related conduct which were the subject of the Firm's resolutions with the DOJ, CFTC and SEC in September 2020, and fiduciary activities that were separately the subject of a resolution between JPMorgan Chase Bank, N.A. and the OCC in November 2020. One of these shareholder derivative suits was filed in the Supreme Court of the State of New York in May 2022, asserting breach of fiduciary duty and unjust

enrichment claims relating to the historical trading practices and related conduct and fiduciary activities which were the subject of the resolutions described above. In December 2022, the court granted defendants' motion to dismiss this action in full. A second shareholder derivative action was filed in the United States District Court for the Eastern District of New York in December 2022 relating to the historical trading practices and related conduct, which asserts breach of fiduciary duty and contribution claims and alleges that the shareholder is excused from making a demand to commence litigation because such a demand would have been futile. In addition, a consolidated putative class action is pending in the United States District Court for the Eastern District of New York on behalf of shareholders who acquired shares of JPMorgan Chase common stock during the putative class period, alleging that certain SEC filings of the Firm were materially false or misleading because they did not disclose certain information relating to the historical trading practices and conduct. Defendants have moved to dismiss the amended complaint in this action.

A separate shareholder derivative suit was filed in March 2022 in the United States District Court for the Eastern District of New York asserting breaches of fiduciary duty and violations of federal securities laws based on the alleged failure of the Board of Directors to exercise adequate oversight over the Firm's compliance with records preservation requirements which were the subject of resolutions between certain of the Firm's subsidiaries and the SEC and the CFTC. Defendants' motion to dismiss the amended complaint is pending.

* * *

In addition to the various legal proceedings discussed above, JPMorgan Chase and its subsidiaries are named as defendants or are otherwise involved in a substantial number of other legal proceedings. The Firm believes it has meritorious defenses to the claims asserted against it in its currently outstanding legal proceedings and it intends to defend itself vigorously. Additional legal proceedings may be initiated from time to time in the future.

The Firm has established reserves for several hundred of its currently outstanding legal proceedings. In accordance with the provisions of U.S. GAAP for contingencies, the Firm accrues for a litigation-related liability when it is probable that such a liability has been incurred and the amount of the loss can be reasonably estimated. The Firm evaluates its outstanding legal proceedings each quarter to assess its litigation reserves, and makes adjustments in such reserves, upward or downward, as appropriate, based on management's best judgment after consultation with counsel. The Firm's legal expense was \$266 million, \$426 million and \$1.1 billion for the years ended December 31, 2022, 2021 and 2020, respectively. There is no assurance that the Firm's litigation reserves will not need to be adjusted in the future.

Notes to consolidated financial statements

In view of the inherent difficulty of predicting the outcome of legal proceedings, particularly where the claimants seek very large or indeterminate damages, or where the matters present novel legal theories, involve a large number of parties or are in early stages of discovery, the Firm cannot state with confidence what will be the eventual outcomes of the currently pending matters, the timing of their ultimate resolution or the eventual losses, fines, penalties or consequences related to those matters. JPMorgan Chase believes, based upon its current knowledge and after consultation with counsel, consideration of the material legal proceedings described above and after taking into account its current litigation reserves and its estimated aggregate range of possible losses, that the other legal proceedings currently pending against it should not have a material adverse effect on the Firm's consolidated financial condition. The Firm notes, however, that in light of the uncertainties involved in such proceedings, there is no assurance that the ultimate resolution of these matters will not significantly exceed the reserves it has currently accrued or that a matter will not have material reputational consequences. As a result, the outcome of a particular matter may be material to JPMorgan Chase's operating results for a particular period, depending on, among other factors, the size of the loss or liability imposed and the level of JPMorgan Chase's income for that period.

Note 31 – International operations

The following table presents income statement and balance sheet-related information for JPMorgan Chase by major international geographic area. The Firm defines international activities for purposes of this footnote presentation as business transactions that involve clients residing outside of the U.S., and the information presented below is based predominantly on the domicile of the client, the location from which the client relationship is managed, booking location or the location of the trading desk. However, many of the Firm's U.S. operations serve international businesses.

As the Firm's operations are highly integrated, estimates and subjective assumptions have been made to apportion revenue and expense between U.S. and international operations. These estimates and assumptions are consistent with the allocations used for the Firm's segment reporting as set forth in Note 32.

The Firm's long-lived assets for the periods presented are not considered by management to be significant in relation to total assets. The majority of the Firm's long-lived assets are located in the U.S.

As of or for the year ended December 31, (in millions)	Revenue ^(b)	Expense ^(c)	Income before income tax expense	Net income	Total assets
2022					
Europe/Middle East/Africa	\$ 18,765	\$ 11,754	\$ 7,011	\$ 5,158	\$ 558,430 ^(d)
Asia-Pacific	10,025	6,763	3,262	2,119	281,479
Latin America/Caribbean	3,178	1,697	1,481	1,156	78,673
Total international	31,968	20,214	11,754	8,433	918,582
North America ^(a)	96,727	62,315	34,412	29,243	2,747,161
Total	\$ 128,695	\$ 82,529	\$ 46,166	\$ 37,676	\$ 3,665,743
2021					
Europe/Middle East/Africa	\$ 16,561	\$ 10,833	\$ 5,728	\$ 4,202	\$ 517,904 ^(d)
Asia-Pacific	9,654	6,372	3,282	2,300	277,897
Latin America/Caribbean	2,756	1,589	1,167	878	65,040 ^(e)
Total international	28,971	18,794	10,177	7,380	860,841
North America ^(a)	92,678	43,293	49,385	40,954	2,882,726 ^(e)
Total	\$ 121,649	\$ 62,087	\$ 59,562	\$ 48,334	\$ 3,743,567
2020					
Europe/Middle East/Africa	\$ 16,566	\$ 10,987	\$ 5,579	\$ 3,868	\$ 530,687 ^(d)
Asia-Pacific	9,289	5,558	3,731	2,630	252,553
Latin America/Caribbean	2,740	1,590	1,150	837	63,853 ^(e)
Total international	28,595	18,135	10,460	7,335	847,093
North America ^(a)	91,356	66,001	25,355	21,796	2,537,664 ^(e)
Total	\$ 119,951	\$ 84,136	\$ 35,815	\$ 29,131	\$ 3,384,757

(a) Substantially reflects the U.S.

(b) Revenue is composed of net interest income and noninterest revenue.

(c) Expense is composed of noninterest expense and the provision for credit losses.

(d) Total assets for the U.K. were approximately \$357 billion, \$365 billion and \$353 billion at December 31, 2022, 2021 and 2020, respectively.

(e) Prior-period amounts have been revised to conform with the current presentation.

Note 32 – Business segments

The Firm is managed on an LOB basis. There are four major reportable business segments - Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment. The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is evaluated by the Firm's Operating Committee. Segment results are presented on a managed basis. Refer to Segment results of this footnote for a further discussion of JPMorgan Chase's business segments.

The following is a description of each of the Firm's business segments, and the products and services they provide to their respective client bases.

Consumer & Community Banking

Consumer & Community Banking offers products and services to consumers and small businesses through bank branches, ATMs, digital (including mobile and online) and telephone banking. CCB is organized into Banking & Wealth Management (including Consumer Banking, J.P. Morgan Wealth Management and Business Banking), Home Lending (including Home Lending Production, Home Lending Servicing and Real Estate Portfolios) and Card Services & Auto. Banking & Wealth Management offers deposit, investment and lending products, cash management, payments and services. Home Lending includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card Services issues credit cards and offers travel services. Auto originates and services auto loans and leases.

Corporate & Investment Bank

The Corporate & Investment Bank, which consists of Banking and Markets & Securities Services, offers a broad suite of investment banking, market-making, prime brokerage, lending, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, merchants, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Payments, which provides payments services enabling clients to manage payments and receipts globally, and cross-border financing. Markets & Securities Services includes Markets, a global market-maker across products, including cash and derivative instruments, which also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Securities Services also includes

Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Commercial Banking

Commercial Banking provides comprehensive financial solutions, including lending, payments, investment banking and asset management products across three primary client segments: Middle Market Banking, Corporate Client Banking and Commercial Real Estate Banking. Other includes amounts not aligned with a primary client segment.

Middle Market Banking covers small and midsized companies, local governments and nonprofit clients.

Corporate Client Banking covers large corporations.

Commercial Real Estate Banking covers investors, developers, and owners of multifamily, office, retail, industrial and affordable housing properties.

Asset & Wealth Management

Asset & Wealth Management, with client assets of \$4.0 trillion, is a global leader in investment and wealth management.

Asset Management

Offers multi-asset investment management solutions across equities, fixed income, alternatives and money market funds to institutional and retail investors providing for a broad range of clients' investment needs.

Global Private Bank

Provides retirement products and services, brokerage, custody, estate planning, lending, deposits and investment management to high net worth clients.

The majority of AWM's client assets are in actively managed portfolios.

Corporate

The Corporate segment consists of Treasury and Chief Investment Office ("CIO") and Other Corporate. Treasury and CIO is predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding, capital, structural interest rate and foreign exchange risks.

Other Corporate includes staff functions and expense that is centrally managed as well as certain Firm initiatives and activities not aligned to a specific LOB. The major Other Corporate functions include Real Estate, Technology, Legal, Corporate Finance, Human Resources, Internal Audit, Risk Management, Compliance, Control Management, Corporate Responsibility and various Other Corporate groups.

Segment results

The following table provides a summary of the Firm's segment results as of or for the years ended December 31, 2022, 2021 and 2020, on a managed basis. The Firm's definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue for the Firm (and each of the reportable business segments) on an FTE basis.

Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. This allows management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense/(benefit). These adjustments have no impact on net income as reported by the Firm as a whole or by the LOBs.

Capital allocation

Each business segment is allocated capital by taking into consideration a variety of factors including capital levels of similarly rated peers and applicable regulatory capital requirements. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

The Firm's allocation methodology incorporates Basel III Standardized RWA, Basel III Advanced RWA, the GSIB surcharge, and a simulation of capital in a severe stress environment. At least annually, the assumptions, judgments and methodologies used to allocate capital are reassessed and, as a result, the capital allocated to the LOBs may change.

Segment results and reconciliation^(a)

(Table continued on next page)

As of or for the year ended December 31, (in millions, except ratios)	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking			Asset & Wealth Management		
	2022	2021	2020	2022	2021	2020	2022	2021	2020	2022	2021	2020
Noninterest revenue	\$ 15,089	\$17,286	\$17,740	\$35,999	\$ 38,209	\$35,120	\$ 3,336	\$ 3,929	\$ 3,067	\$12,507	\$13,071	\$10,822
Net interest income	39,928	32,787	33,528	11,900	13,540	14,164	8,197	6,079	6,246	5,241	3,886	3,418
Total net revenue	55,017	50,073	51,268	47,899	51,749	49,284	11,533	10,008	9,313	17,748	16,957	14,240
Provision for credit losses	3,813	(6,989)	12,312	1,158	(1,174)	2,726	1,268	(947)	2,113	128	(227)	263
Noninterest expense	31,471	29,256	27,990	27,087	25,325	23,538	4,719	4,041	3,798	11,829	10,919	9,957
Income/(loss) before income tax expense/(benefit)	19,733	27,806	10,966	19,654	27,598	23,020	5,546	6,914	3,402	5,791	6,265	4,020
Income tax expense/(benefit)	4,862	6,876	2,749	4,684	6,464	5,926	1,333	1,668	824	1,426	1,528	1,028
Net income/(loss)	\$ 14,871	\$20,930	\$ 8,217	\$14,970	\$ 21,134	\$ 17,094	\$ 4,213	\$ 5,246	\$ 2,578	\$ 4,365	\$ 4,737	\$ 2,992
Average equity	\$ 50,000	\$50,000	\$52,000	\$103,000	\$ 83,000	\$ 80,000	\$25,000	\$ 24,000	\$ 22,000	\$17,000	\$ 14,000	\$10,500
Total assets	514,085	500,370	496,705	1,334,296	1,259,896	1,095,926	257,106	230,776	228,911	232,037	234,425	203,384
Return on equity	29 %	41 %	15 %	14 %	25 %	20 %	16 %	21 %	11 %	25 %	33 %	28 %
Overhead ratio	57	58	55	57	49	48	41	40	41	67	64	70

Notes to consolidated financial statements

(Table continued from previous page)

As of or for the year ended December 31, (in millions, except ratios)	Corporate			Reconciling Items ^(a)			Total		
	2022	2021	2020	2022	2021	2020	2022	2021	2020
Noninterest revenue	\$ (1,798)	\$ 68	\$ 1,199	\$ (3,148)	\$ (3,225)	\$ (2,560)	\$ 61,985	\$ 69,338	\$ 65,388
Net interest income	1,878	(3,551)	(2,375)	(434)	(430)	(418)	66,710	52,311	54,563
Total net revenue	80	(3,483)	(1,176)	(3,582)	(3,655)	(2,978)	128,695	121,649	119,951
Provision for credit losses	22	81	66	—	—	—	6,389	(9,256)	17,480
Noninterest expense	1,034	1,802	1,373	—	—	—	76,140	71,343	66,656
Income/(loss) before income tax expense/(benefit)	(976)	(5,366)	(2,615)	(3,582)	(3,655)	(2,978)	46,166	59,562	35,815
Income tax expense/(benefit)	(233)	(1,653)	(865)	(3,582)	(3,655)	(2,978)	8,490	11,228	6,684
Net income/(loss)	\$ (743)	\$ (3,713)	\$ (1,750)	\$ —	\$ —	\$ —	\$ 37,676	\$ 48,334	\$ 29,131
Average equity	\$ 58,068	\$ 79,968	\$ 72,365	\$ —	\$ —	\$ —	\$ 253,068	\$ 250,968	\$ 236,865
Total assets	1,328,219	1,518,100	1,359,831	NA	NA	NA	3,665,743	3,743,567	3,384,757
Return on equity	NM	NM	NM	NM	NM	NM	14 %	19 %	12 %
Overhead ratio	NM	NM	NM	NM	NM	NM	59	59	56

(a) Segment results on a managed basis reflect revenue on a FTE basis with the corresponding income tax impact recorded within income tax expense/(benefit). These adjustments are eliminated in reconciling items to arrive at the Firm's reported U.S. GAAP results.

Note 33 – Parent Company

The following tables present Parent Company-only financial statements.

Statements of income and comprehensive income

Year ended December 31, (in millions)	2022	2021	2020
Income			
Dividends from subsidiaries and affiliates:			
Bank and bank holding company	\$ 40,500	\$ 10,000	\$ 6,000
Non-bank	—	—	—
Interest income from subsidiaries	498	32	63
Other income/(expense) from subsidiaries:			
Bank and bank holding company	(3,497)	859	2,019
Non-bank	335	366	(569)
Other income/(expense)	5,271	1,137	205
Total income	43,107	12,394	7,718
Expense			
Interest expense/(income) to subsidiaries and affiliates ^(a)	22,731	5,353	(8,830)
Other interest expense/(income) ^(a)	(14,658)	(1,349)	14,150
Noninterest expense	2,817	2,637	2,222
Total expense	10,890	6,641	7,542
Income before income tax benefit and undistributed net income of subsidiaries	32,217	5,753	176
Income tax benefit	1,260	1,329	1,324
Equity in undistributed net income of subsidiaries	4,199	41,252	27,631
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Other comprehensive income/(loss), net	(17,257)	(8,070)	6,417
Comprehensive income	\$ 20,419	\$ 40,264	\$ 35,548

Balance sheets

December 31, (in millions)	2022	2021
Assets		
Cash and due from banks	\$ 41	\$ 36
Deposits with banking subsidiaries	9,806	6,809
Trading assets	2,727	2,293
Advances to, and receivables from, subsidiaries:		
Bank and bank holding company	136	431
Non-bank	46	50
Investments (at equity) in subsidiaries and affiliates:		
Bank and bank holding company	532,759	545,635
Non-bank	1,064	1,007
Other assets	9,108	12,220
Total assets	\$ 555,687	\$ 568,481
Liabilities and stockholders' equity		
Borrowings from, and payables to, subsidiaries and affiliates	\$ 24,164	\$ 28,039
Short-term borrowings	1,130	1,018
Other liabilities	10,440	9,340
Long-term debt ^{(b)(c)}	227,621	235,957
Total liabilities^(c)	263,355	274,354
Total stockholders' equity	292,332	294,127
Total liabilities and stockholders' equity	\$ 555,687	\$ 568,481

Statements of cash flows

Year ended December 31, (in millions)	2022	2021	2020
Operating activities			
Net income	\$ 37,676	\$ 48,334	\$ 29,131
Less: Net income of subsidiaries and affiliates	44,699	51,252	33,631
Parent company net loss	(7,023)	(2,918)	(4,500)
Cash dividends from subsidiaries and affiliates	40,500	10,000	6,000
Other operating adjustments	(23,747)	(12,677)	15,357
Net cash provided by/(used in) operating activities	9,730	(5,595)	16,857
Investing activities			
Net change in:			
Advances to and investments in subsidiaries and affiliates, net	—	(3,000)	(2,663)
All other investing activities, net	31	31	24
Net cash provided by/(used in) investing activities	31	(2,969)	(2,639)
Financing activities			
Net change in:			
Borrowings from subsidiaries and affiliates	(4,491)	2,647	1,425
Short-term borrowings	—	—	(20)
Proceeds from long-term borrowings	41,389	49,169	37,312
Payments of long-term borrowings	(18,294)	(15,543)	(34,194)
Proceeds from issuance of preferred stock	—	7,350	4,500
Redemption of preferred stock	(7,434)	(2,575)	(1,430)
Treasury stock repurchased	(3,162)	(18,408)	(6,517)
Dividends paid	(13,562)	(12,858)	(12,690)
All other financing activities, net	(1,205)	(1,238)	(1,080)
Net cash provided by/(used in) financing activities	(6,759)	8,544	(12,694)
Net increase/(decrease) in cash and due from banks and deposits with banking subsidiaries	3,002	(20)	1,524
Cash and due from banks and deposits with banking subsidiaries at the beginning of the year	6,845	6,865	5,341
Cash and due from banks and deposits with banking subsidiaries at the end of the year	\$ 9,847	\$ 6,845	\$ 6,865
Cash interest paid	\$ 7,462	\$ 4,065	\$ 5,445
Cash income taxes paid, net ^(d)	6,941	15,259	5,366

- (a) Includes interest expense for intercompany derivative hedges on the Firm's LTD and related fair value adjustments, which is predominantly offset by related amounts in Other interest expense/(income).
- (b) At December 31, 2022, long-term debt that contractually matures in 2023 through 2027 totaled \$9.4 billion, \$23.5 billion, \$26.8 billion, \$28.2 billion, and \$17.5 billion, respectively.
- (c) Refer to Notes 20 and 28 for information regarding the Parent Company's guarantees of its subsidiaries' obligations.
- (d) Represents payments, net of refunds, made by the Parent Company to various taxing authorities and includes taxes paid on behalf of certain of its subsidiaries that are subsequently reimbursed. The reimbursements were \$11.3 billion, \$13.9 billion, and \$8.3 billion for the years ended December 31, 2022, 2021 and 2020, respectively.

Supplementary Information: Distribution of assets, liabilities and stockholders' equity; interest rates and interest differentials

Consolidated average balance sheets, interest and rates
 Provided below is a summary of JPMorgan Chase's consolidated average balances, interest and rates on a taxable-equivalent basis for the years 2020 through 2022. Income computed on a taxable-equivalent basis is the income reported in the Consolidated statements of income, adjusted to present interest income and rates earned on

assets exempt from income taxes (i.e., federal taxes) on a basis comparable with other taxable investments. The incremental tax rate used for calculating the taxable-equivalent adjustment was approximately 24% in 2022, 2021 and 2020.

(Table continued on next page)

(Unaudited)	2022			
Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	Average balance	Interest ^(g)	Rate	
Assets				
Deposits with banks	\$ 670,773	\$ 9,039	1.35 %	
Federal funds sold and securities purchased under resale agreements	307,150	4,632	1.51	
Securities borrowed	205,516	2,237	1.09	
Trading assets - debt instruments	283,108	9,097	3.21	
Taxable securities	626,122	10,372	1.66	
Non-taxable securities ^(a)	27,863	1,224	4.39	
Total investment securities	653,985	11,596	1.77	(i)
Loans	1,100,318	52,877	(h)	4.81
All other interest-earning assets ^(b)	128,229	3,763	2.93	
Total interest-earning assets	3,349,079	93,241	2.78	
Allowance for loan losses	(17,399)			
Cash and due from banks	27,601			
Trading assets - equity and other instruments	140,778			
Trading assets - derivative receivables	78,606			
Goodwill, MSRs and other intangible assets	59,467			
All other noninterest-earning assets	215,408			
Total assets	\$ 3,853,540			
Liabilities				
Interest-bearing deposits	\$ 1,748,666	\$ 10,082	0.58 %	
Federal funds purchased and securities loaned or sold under repurchase agreements	242,762	3,721	1.53	
Short-term borrowings ^(c)	46,063	747	1.62	
Trading liabilities - debt and all other interest-bearing liabilities ^{(d)(e)}	268,019	3,246	1.21	
Beneficial interests issued by consolidated VIEs	11,208	226	2.02	
Long-term debt	250,080	8,075	3.23	
Total interest-bearing liabilities	2,566,798	26,097	1.02	
Noninterest-bearing deposits	719,249			
Trading liabilities - equity and other instruments ^(e)	39,155			
Trading liabilities - derivative payables	57,388			
All other liabilities, including the allowance for lending-related commitments	185,989			
Total liabilities	3,568,579			
Stockholders' equity				
Preferred stock	31,893			
Common stockholders' equity	253,068			
Total stockholders' equity	284,961	(f)		
Total liabilities and stockholders' equity	\$ 3,853,540			
Interest rate spread			1.76 %	
Net interest income and net yield on interest-earning assets	\$ 67,144	2.00		

(a) Represents securities that are tax-exempt for U.S. federal income tax purposes.

(b) Includes brokerage-related held-for-investment customer receivables, which are classified in accrued interest and accounts receivable, and all other interest-earning assets, which are classified in other assets on the Consolidated Balance Sheets.

(c) Includes commercial paper.

(d) All other interest-bearing liabilities include brokerage-related customer payables.

Within the Consolidated average balance sheets, interest and rates summary, the principal amounts of nonaccrual loans have been included in the average loan balances used to determine the average interest rate earned on loans. Refer to Note 12 for additional information on nonaccrual loans, including interest accrued.

(Table continued from previous page)

2021				2020			
Average balance	Interest ^(g)	Rate	Average balance	Interest ^(g)	Rate		
\$ 719,772	\$ 512	0.07 %	\$ 444,058	\$ 749	0.17 %		
269,231	958	0.36	275,926	2,436	0.88		
190,655	(385)	(0.20) ^(j)	143,472	(302)	(0.21) ^(j)		
283,829	6,856	2.42	322,936	7,869	2.44		
563,147	6,460	1.15	476,650	7,843	1.65		
30,830	1,336	4.33	33,287	1,437	4.32		
593,977	7,796	1.31 ⁽ⁱ⁾	509,937	9,280	1.82		
1,035,399	41,663 ^(h)	4.02	1,004,597	43,886 ^(h)	4.37		
123,079	894	0.73	78,784	1,023	1.30		
3,215,942	58,294	1.81	2,779,710	64,941	2.34		
(22,179)			(25,775)				
26,776			22,241				
172,822			120,878 ^(k)				
69,101			73,749 ^(k)				
55,003			51,934				
207,737			179,413				
\$ 3,725,202			\$ 3,202,150				
\$ 1,672,669 ^(k)	\$ 531	0.03 %	\$ 1,389,224	\$ 2,357	0.17 %		
259,302	274	0.11	255,421	1,058	0.41		
44,618	126	0.28	38,853	372	0.96		
241,431	257	0.11	205,255	195	0.10		
14,595	83	0.57	19,216	214	1.12		
250,378	4,282	1.71	254,400	5,764	2.27		
2,482,993	5,553	0.22	2,162,369	9,960	0.46		
674,485 ^(k)			517,527				
36,656			32,628				
60,318			61,593				
186,755			161,269				
3,441,207			2,935,386				
33,027			29,899				
250,968			236,865				
283,995 ^(f)			266,764 ^(f)				
\$ 3,725,202			\$ 3,202,150				
	1.59 %					1.88 %	
\$ 52,741	1.64		\$ 54,981			1.98	

- (e) The combined balance of trading liabilities – debt and equity instruments was \$138.1 billion, \$128.2 billion and \$106.5 billion for the years ended December 31, 2022, 2021 and 2020, respectively.
- (f) The ratio of average stockholders' equity to average assets was 7.4%, 7.6% and 8.3% for the years ended December 31, 2022, 2021 and 2020, respectively. The return on average stockholders' equity, based on net income, was 13.2%, 17.0% and 10.9% for the years ended December 31, 2022, 2021 and 2020, respectively.
- (g) Interest includes the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable.
- (h) Fees and commissions on loans included in loan interest amounted to \$1.8 billion, \$1.9 billion and \$1.0 billion for the years ended December 31, 2022, 2021 and 2020.
- (i) The annualized rate for securities based on amortized cost was 1.75%, 1.33% and 1.85% for the years ended December 31, 2022, 2021 and 2020, respectively, and does not give effect to changes in fair value that are reflected in AOCI.
- (j) Negative interest and rates reflect the net impact of interest earned offset by fees paid on client-driven prime brokerage securities borrowed transactions.
- (k) Prior-period amounts have been revised to conform with the current presentation.

Interest rates and interest differential analysis of net interest income - U.S. and non-U.S.

Presented below is a summary of interest and rates segregated between U.S. and non-U.S. operations for the years 2020 through 2022. The segregation of U.S. and non-U.S. components is based on the location of the office recording the transaction.

(Table continued on next page)

(Unaudited) Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2022		
	Average balance	Interest	Rate
Interest-earning assets			
Deposits with banks:			
U.S.	\$ 456,366	\$ 7,418	1.63 %
Non-U.S.	214,407	1,621	0.76
Federal funds sold and securities purchased under resale agreements:			
U.S.	130,213	2,191	1.68
Non-U.S.	176,937	2,441	1.38
Securities borrowed: ^(a)			
U.S.	142,736	1,811	1.27
Non-U.S.	62,780	426	0.68
Trading assets - debt instruments:			
U.S.	170,975	5,414	3.17
Non-U.S.	112,133	3,683	3.28
Investment securities:			
U.S.	623,285	10,994	1.76
Non-U.S.	30,700	602	1.96
Loans:			
U.S.	985,187	48,953	4.97
Non-U.S.	115,131	3,924	3.41
All other interest-earning assets, predominantly U.S.	128,229	3,763	2.93
Total interest-earning assets	3,349,079	93,241	2.78
Interest-bearing liabilities			
Interest-bearing deposits:			
U.S.	1,358,322	7,026	0.52
Non-U.S.	390,344	3,056	0.78
Federal funds purchased and securities loaned or sold under repurchase agreements:			
U.S.	173,016	3,083	1.78
Non-U.S.	69,746	638	0.91
Trading liabilities - debt, short-term and all other interest-bearing liabilities ^(b)			
U.S.	194,570	2,384	1.23
Non-U.S.	119,512	1,609	1.35
Beneficial interests issued by consolidated VIEs, predominantly U.S.	11,208	226	2.02
Long-term debt:			
U.S.	246,670	8,026	3.25
Non-U.S.	3,410	49	1.44
Total interest-bearing liabilities	2,566,798	26,097	1.02
Noninterest-bearing liabilities ^(c)	782,281		
Total investable funds	\$ 3,349,079	\$ 26,097	0.78 %
Net interest income and net yield:			
U.S.	\$ 67,144	2.00 %	
Non-U.S.	58,950	2.27	
Percentage of total assets and liabilities attributable to non-U.S. operations:			
Assets	8,194	1.09	
Liabilities	24.9		
	20.6		

(a) Negative interest and rates reflect the net impact of interest earned offset by fees paid on client-driven prime brokerage securities borrowed transactions.
 (b) Includes commercial paper.

(c) Represents the amount of noninterest-bearing liabilities funding interest-earning assets.

Refer to the "Net interest income" discussion in Consolidated Results of Operations on pages 51-54 for further information.

(Table continued from previous page)

	2021			2020		
	Average balance	Interest	Rate	Average balance	Interest	Rate
\$	527,340	\$ 693	0.13 %	\$ 294,669	\$ 768	0.26 %
	192,432	(181)	(0.09)	149,389	(19)	(0.01)
	114,406	299	0.26	141,409	1,341	0.95
	154,825	659	0.43	134,517	1,095	0.81
	137,752	(319)	(0.23)	100,026	(305)	(0.30)
	52,903	(66)	(0.12)	43,446	3	0.01
	158,793	3,530	2.22	216,025	5,056	2.34
	125,036	3,326	2.66	106,911	2,813	2.63
	563,109	7,399	1.31	475,832	8,703	1.83
	30,868	397	1.29	34,105	577	1.69
	924,713	39,215	4.24	909,850	41,708	4.58
	110,686	2,448	2.21	94,747	2,178	2.30
	123,079	894	0.73	78,784	1,023	1.30
	3,215,942	58,294	1.81	2,779,710	64,941	2.34
	1,301,616	901	0.07	1,068,857	2,288	0.21
	371,053	(370)	(0.10)	320,367	69	0.02
	199,220	222	0.11	204,958	863	0.42
	60,082	52	0.09	50,463	195	0.39
	176,466	(345)	(0.20)	151,120	(30)	(0.02)
	109,583	728	0.66	92,988	597	0.64
	14,595	83	0.57	19,216	214	1.12
	244,850	4,229	1.73	247,623	5,704	2.30
	5,528	53	0.96	6,777	60	0.89
	2,482,993	5,553	0.22	2,162,369	9,960	0.46
	732,949			617,341		
\$	3,215,942	\$ 5,553	0.17 %	\$ 2,779,710	\$ 9,960	0.36 %
		\$ 52,741	1.64 %		\$ 54,981	1.98 %
		46,622	1.86		49,242	2.25
		6,119	0.87		5,739	0.97
						23.5
						20.9

Changes in net interest income, volume and rate analysis

The table below presents an attribution of net interest income between volume and rate. The attribution between volume and rate is calculated using annual average balances for each category of assets and liabilities shown in the table and the corresponding annual rates (refer to pages 292-296 for more information on average balances and rates). In this analysis, when the change cannot be isolated to either volume or rate, it has been allocated to volume. The annual rates include the impact of changes in market rates, as well as the impact of any change in composition of the various products within each category of asset or liability. This analysis is calculated separately for each category without consideration of the relationship between categories (for example, the net spread between the rates earned on assets and the rates paid on liabilities that fund those assets). As a result, changes in the granularity or groupings considered in this analysis would produce a different attribution result, and due to the complexities involved, precise allocation of changes in interest rates between volume and rates is inherently complex and judgmental.

(Unaudited) Year ended December 31, (On a taxable-equivalent basis; in millions)	2022 versus 2021			2021 versus 2020		
	Increase/(decrease) due to change in:			Increase/(decrease) due to change in:		
	Volume	Rate	Net change	Volume	Rate	Net change
Interest-earning assets						
Deposits with banks:						
U.S.	\$ (1,185)	\$ 7,910	\$ 6,725	\$ 308	\$ (383)	\$ (75)
Non-U.S.	166	1,636	1,802	(42)	(120)	(162)
Federal funds sold and securities purchased under resale agreements:						
U.S.	267	1,625	1,892	(66)	(976)	(1,042)
Non-U.S.	311	1,471	1,782	75	(511)	(436)
Securities borrowed: ^(a)						
U.S.	64	2,066	2,130	(84)	70	(14)
Non-U.S.	69	423	492	(13)	(56)	(69)
Trading assets - debt instruments:						
U.S.	375	1,509	1,884	(1,267)	(259)	(1,526)
Non-U.S.	(418)	775	357	481	32	513
Investment securities:						
U.S.	1,061	2,534	3,595	1,170	(2,474)	(1,304)
Non-U.S.	(2)	207	205	(44)	(136)	(180)
Loans:						
U.S.	2,988	6,750	9,738	600	(3,093)	(2,493)
Non-U.S.	148	1,328	1,476	355	(85)	270
All other interest-earning assets, predominantly U.S.	161	2,708	2,869	320	(449)	(129)
Change in interest income	4,005	30,942	34,947	1,793	(8,440)	(6,647)
Interest-bearing liabilities						
Interest-bearing deposits:						
U.S.	268	5,857	6,125	109	(1,496)	(1,387)
Non-U.S.	161	3,265	3,426	(55)	(384)	(439)
Federal funds purchased and securities loaned or sold under repurchase agreements:						
U.S.	(466)	3,327	2,861	(6)	(635)	(641)
Non-U.S.	93	493	586	8	(151)	(143)
Trading liabilities - debt, short-term and all other interest-bearing liabilities ^(b)						
U.S.	206	2,523	2,729	(43)	(272)	(315)
Non-U.S.	125	756	881	112	19	131
Beneficial interests issued by consolidated VIEs, predominantly U.S.	(69)	212	143	(27)	(104)	(131)
Long-term debt:						
U.S.	75	3,722	3,797	(64)	(1,411)	(1,475)
Non-U.S.	(31)	27	(4)	(12)	5	(7)
Change in interest expense	362	20,182	20,544	22	(4,429)	(4,407)
Change in net interest income	\$ 3,643	\$ 10,760	\$ 14,403	\$ 1,771	\$ (4,011)	\$ (2,240)

(a) Negative interest and rates reflect the net impact of interest earned offset by fees paid on client-driven prime brokerage securities borrowed transactions.

(b) Includes commercial paper.

Glossary of Terms and Acronyms

2022 Form 10-K: Annual report on Form 10-K for the year ended December 31, 2022, filed with the U.S. Securities and Exchange Commission.

ABS: Asset-backed securities

AFS: Available-for-sale

ALCO: Asset Liability Committee

Amortized cost: Amount at which a financing receivable or investment is originated or acquired, adjusted for accretion or amortization of premium, discount, and net deferred fees or costs, collection of cash, charge-offs, foreign exchange, and fair value hedge accounting adjustments. For AFS securities, amortized cost is also reduced by any impairment losses recognized in earnings. Amortized cost is not reduced by the allowance for credit losses, except where explicitly presented net.

AOCI: Accumulated other comprehensive income/(loss)

ARM: Adjustable rate mortgage(s)

AUC: Assets under custody

AUM: “Assets under management”: Represent assets managed by AWM on behalf of its Private Banking, Institutional and Retail clients. Includes “Committed capital not Called.”

Auto loan and lease origination volume: Dollar amount of auto loans and leases originated.

AWM: Asset & Wealth Management

Beneficial interests issued by consolidated VIEs:

Represents the interest of third-party holders of debt, equity securities, or other obligations, issued by VIEs that JPMorgan Chase consolidates.

Benefit obligation: Refers to the projected benefit obligation for pension plans and the accumulated postretirement benefit obligation for OPEB plans.

BHC: Bank holding company

BWM: Banking & Wealth Management

CB: Commercial Banking

CCAR: Comprehensive Capital Analysis and Review

CCB: Consumer & Community Banking

CCO: Chief Compliance Officer

CCP: “Central counterparty” is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes a counterparty to trades with market participants through novation, an open offer system, or another legally binding arrangement.

CDS: Credit default swaps

CECL: Current Expected Credit Losses

CEO: Chief Executive Officer

CET1 Capital: Common equity Tier 1 capital

CFO: Chief Financial Officer

CFP: Contingency funding plan

CFTC: Commodity Futures Trading Commission

Chase Bank USA, N.A.: Chase Bank USA, National Association

CIB: Corporate & Investment Bank

CIO: Chief Investment Office

Client assets: Represent assets under management as well as custody, brokerage, administration and deposit accounts.

Client deposits and other third-party liabilities: Deposits, as well as deposits that are swept to on-balance sheet liabilities (e.g., commercial paper, federal funds purchased and securities loaned or sold under repurchase agreements) as part of client cash management programs.

Client investment assets: Represent assets under management as well as custody, brokerage and annuity accounts, and deposits held in investment accounts.

CLO: Collateralized loan obligations

CLTV: Combined loan-to-value

CMT: Constant Maturity Treasury

Collateral-dependent: A loan is considered to be collateral-dependent when repayment of the loan is expected to be provided substantially through the operation or sale of the collateral when the borrower is experiencing financial difficulty, including when foreclosure is deemed probable based on borrower delinquency.

Commercial Card: provides a wide range of payment services to corporate and public sector clients worldwide through the commercial card products. Services include procurement, corporate travel and entertainment, expense management services, and business-to-business payment solutions.

Credit derivatives: Financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Upon the occurrence of a credit event by the reference entity, which may include, among other events, the bankruptcy or failure to pay its obligations, or certain restructurings of the debt of the reference entity, neither party has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value at the time of settling the credit derivative contract. The determination as to whether a credit event has occurred is generally made by the relevant International Swaps and Derivatives Association (“ISDA”) Determinations Committee.

Glossary of Terms and Acronyms

Criticized: Criticized loans, lending-related commitments and derivative receivables that are classified as special mention, substandard and doubtful categories for regulatory purposes.

CRO: Chief Risk Officer

CRR: Capital Requirements Regulation

CTC: CIO, Treasury and Corporate

Custom lending: Loans to AWM's Global Private Bank clients, including loans to private investment funds and loans that are collateralized by nontraditional asset types, such as art work, aircraft, etc.

CVA: Credit valuation adjustment

Debit and credit card sales volume: Dollar amount of card member purchases, net of returns.

Deposit margin/deposit spread: Represents net interest income expressed as a percentage of average deposits.

Distributed denial-of-service attack: The use of a large number of remote computer systems to electronically send a high volume of traffic to a target website to create a service outage at the target. This is a form of cyberattack.

Dodd-Frank Act: Wall Street Reform and Consumer Protection Act

DVA: Debit valuation adjustment

EC: European Commission

Eligible HQLA: Eligible high-quality liquid assets, for purposes of calculating the LCR, is the amount of unencumbered HQLA that satisfy certain operational considerations as defined in the LCR rule.

Eligible LTD: Long-term debt satisfying certain eligibility criteria

Embedded derivatives: are implicit or explicit terms or features of a financial instrument that affect some or all of the cash flows or the value of the instrument in a manner similar to a derivative. An instrument containing such terms or features is referred to as a "hybrid." The component of the hybrid that is the non-derivative instrument is referred to as the "host." For example, callable debt is a hybrid instrument that contains a plain vanilla debt instrument (i.e., the host) and an embedded option that allows the issuer to redeem the debt issue at a specified date for a specified amount (i.e., the embedded derivative). However, a floating rate instrument is not a hybrid composed of a fixed-rate instrument and an interest rate swap.

EPS: Earnings per share

ERISA: Employee Retirement Income Security Act of 1974

ETD: "Exchange-traded derivatives": Derivative contracts that are executed on an exchange and settled via a central clearing house.

EU: European Union

Expense categories:

- Volume- and/or revenue-related expenses generally correlate with changes in the related business/ transaction volume or revenue. Examples include commissions and incentive compensation within the LOBs, depreciation expense related to operating lease assets, and brokerage expense related to trading transaction volume.
- Investments in the business include expenses associated with supporting medium- to longer-term strategic plans of the Firm. Examples include front office growth, market expansion, initiatives in technology (including related compensation), marketing, and acquisitions.
- Structural expenses are those associated with the day-to-day cost of running the Firm and are expenses not included in the above two categories. Examples include employee salaries and benefits, certain other incentive compensation, and costs related to real estate.

Fannie Mae: Federal National Mortgage Association

FASB: Financial Accounting Standards Board

FCA: Financial Conduct Authority

FCC: Firmwide Control Committee

FDIC: Federal Deposit Insurance Corporation

Federal Reserve: The Board of the Governors of the Federal Reserve System

FFIEC: Federal Financial Institutions Examination Council

FHA: Federal Housing Administration

FHLB: Federal Home Loan Bank

FICC: The Fixed Income Clearing Corporation

FICO score: A measure of consumer credit risk provided by credit bureaus, typically produced from statistical models by Fair Isaac Corporation utilizing data collected by the credit bureaus.

FINRA: Financial Industry Regulatory Authority

Firm: JPMorgan Chase & Co.

Forward points: Represents the interest rate differential between two currencies, which is either added to or subtracted from the current exchange rate (i.e., "spot rate") to determine the forward exchange rate.

FRC: Firmwide Risk Committee

Freddie Mac: Federal Home Loan Mortgage Corporation

Free standing derivatives: a derivative contract entered into either separate and apart from any of the Firm's other financial instruments or equity transactions. Or, in conjunction with some other transaction and is legally detachable and separately exercisable.

FSB: Financial Stability Board

FTE: Fully taxable equivalent

Glossary of Terms and Acronyms

FVA: Funding valuation adjustment

FX: Foreign exchange

G7: Group of Seven nations: Countries in the G7 are Canada, France, Germany, Italy, Japan, the U.K. and the U.S.

G7 government bonds: Bonds issued by the government of one of the G7 nations.

Ginnie Mae: Government National Mortgage Association

GSIB: Global systemically important banks

HELOC: Home equity line of credit

Home equity – senior lien: Represents loans and commitments where JPMorgan Chase holds the first security interest on the property.

Home equity – junior lien: Represents loans and commitments where JPMorgan Chase holds a security interest that is subordinate in rank to other liens.

Households: A household is a collection of individuals or entities aggregated together by name, address, tax identifier and phone number.

HQLA: “High-quality liquid assets” consist of cash and certain high-quality liquid securities as defined in the LCR rule.

HTM: Held-to-maturity

IBOR: Interbank Offered Rate

ICAAP: Internal capital adequacy assessment process

IDI: Insured depository institutions

IHC: JPMorgan Chase Holdings LLC, an intermediate holding company

Investment-grade: An indication of credit quality based on JPMorgan Chase's internal risk assessment. The Firm considers ratings of BBB-/Baa3 or higher as investment-grade.

IPO: Initial public offering

ISDA: International Swaps and Derivatives Association

JPMorgan Chase: JPMorgan Chase & Co.

JPMorgan Chase Bank, N.A.: JPMorgan Chase Bank, National Association

JPMorgan Chase Foundation or the Firm's Foundation: A not-for-profit organization that makes contributions for charitable and educational purposes.

JPMorgan Securities: J.P. Morgan Securities LLC

JPMSE: J.P. Morgan SE

LCR: Liquidity coverage ratio

LDA: Loss Distribution Approach

LGD: Loss given default

LIBOR: London Interbank Offered Rate

LLC: Limited Liability Company

LOB: Line of business

LOB CROs: Line of Business and CTC Chief Risk Officers

LTIP: Long-term incentive plan

LTV: “Loan-to-value”: For residential real estate loans, the relationship, expressed as a percentage, between the principal amount of a loan and the appraised value of the collateral (i.e., residential real estate) securing the loan.

Origination date LTV ratio

The LTV ratio at the origination date of the loan. Origination date LTV ratios are calculated based on the actual appraised values of collateral (i.e., loan-level data) at the origination date.

Current estimated LTV ratio

An estimate of the LTV as of a certain date. The current estimated LTV ratios are calculated using estimated collateral values derived from a nationally recognized home price index measured at the metropolitan statistical area (“MSA”) level. These MSA-level home price indices consist of actual data to the extent available and forecasted data where actual data is not available. As a result, the estimated collateral values used to calculate these ratios do not represent actual appraised loan-level collateral values; as such, the resulting LTV ratios are necessarily imprecise and should therefore be viewed as estimates.

Combined LTV ratio

The LTV ratio considering all available lien positions, as well as unused lines, related to the property. Combined LTV ratios are used for junior lien home equity products.

Macro businesses: the macro businesses include Rates, Currencies and Emerging Markets, Fixed Income Financing and Commodities in CIB's Fixed Income Markets.

Managed basis: A non-GAAP presentation of Firmwide financial results that includes reclassifications to present revenue on a fully taxable-equivalent basis. Management also uses this financial measure at the segment level, because it believes this provides information to enable investors to understand the underlying operational performance and trends of the particular business segment and facilitates a comparison of the business segment with the performance of competitors.

Markets: consists of CIB's Fixed Income Markets and Equity Markets businesses.

Master netting agreement: A single agreement with a counterparty that permits multiple transactions governed by that agreement to be terminated or accelerated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due).

MBS: Mortgage-backed securities

MD&A: Management's discussion and analysis

Glossary of Terms and Acronyms

Measurement alternative: Measures equity securities without readily determinable fair values at cost less impairment (if any), plus or minus observable price changes from an identical or similar investment of the same issuer.

Merchant Services: offers merchants payment processing capabilities, fraud and risk management, data and analytics, and other payments services. Through Merchant Services, merchants of all sizes can accept payments via credit and debit cards and payments in multiple currencies.

MEV: Macroeconomic variable

Moody's: Moody's Investor Services

Mortgage origination channels:

Retail - Borrowers who buy or refinance a home through direct contact with a mortgage banker employed by the Firm using a branch office, the Internet or by phone. Borrowers are frequently referred to a mortgage banker by a banker in a Chase branch, real estate brokers, home builders or other third parties.

Correspondent - Banks, thrifts, other mortgage banks and other financial institutions that sell closed loans to the Firm.

Mortgage product types:

Alt-A

Alt-A loans are generally higher in credit quality than subprime loans but have characteristics that would disqualify the borrower from a traditional prime loan. Alt-A lending characteristics may include one or more of the following: (i) limited documentation; (ii) a high CLTV ratio; (iii) loans secured by non-owner occupied properties; or (iv) a debt-to-income ratio above normal limits. A substantial proportion of the Firm's Alt-A loans are those where a borrower does not provide complete documentation of his or her assets or the amount or source of his or her income.

Option ARMs

The option ARM real estate loan product is an adjustable-rate mortgage loan that provides the borrower with the option each month to make a fully amortizing, interest-only or minimum payment. The minimum payment on an option ARM loan is based on the interest rate charged during the introductory period. This introductory rate is usually significantly below the fully indexed rate. The fully indexed rate is calculated using an index rate plus a margin. Once the introductory period ends, the contractual interest rate charged on the loan increases to the fully indexed rate and adjusts monthly to reflect movements in the index. The minimum payment is typically insufficient to cover interest accrued in the prior month, and any unpaid interest is deferred and added to the principal balance of the loan. Option ARM loans are subject to payment recast, which converts the loan to a variable-rate fully amortizing loan upon meeting specified loan balance and anniversary date triggers.

Prime

Prime mortgage loans are made to borrowers with good credit records who meet specific underwriting

requirements, including prescriptive requirements related to income and overall debt levels. New prime mortgage borrowers provide full documentation and generally have reliable payment histories.

Subprime

Subprime loans are loans that, prior to mid-2008, were offered to certain customers with one or more high risk characteristics, including but not limited to: (i) unreliable or poor payment histories; (ii) a high LTV ratio of greater than 80% (without borrower-paid mortgage insurance); (iii) a high debt-to-income ratio; (iv) an occupancy type for the loan is other than the borrower's primary residence; or (v) a history of delinquencies or late payments on the loan.

MREL: Minimum requirements for own funds and eligible liabilities

MSA: Metropolitan statistical areas

MSR: Mortgage servicing rights

Multi-asset: Any fund or account that allocates assets under management to more than one asset class.

NA: Data is not applicable or available for the period presented.

NAV: Net Asset Value

Net Capital Rule: Rule 15c3-1 under the Securities Exchange Act of 1934.

Net charge-off/(recovery) rate: Represents net charge-offs/(recoveries) (annualized) divided by average retained loans for the reporting period.

Net interchange income includes the following components:

- **Interchange income:** Fees earned by credit and debit card issuers on sales transactions.
- **Reward costs:** The cost to the Firm for points earned by cardholders enrolled in credit card rewards programs generally tied to sales transactions.
- **Partner payments:** Payments to co-brand credit card partners based on the cost of loyalty program rewards earned by cardholders on credit card transactions.

Net mortgage servicing revenue: Includes operating revenue earned from servicing third-party mortgage loans, which is recognized over the period in which the service is provided; changes in the fair value of MSRs; the impact of risk management activities associated with MSRs; and gains and losses on securitization of excess mortgage servicing. Net mortgage servicing revenue also includes gains and losses on sales and lower of cost or fair value adjustments of certain repurchased loans insured by U.S. government agencies.

Net revenue rate: Represents Card Services net revenue (annualized) expressed as a percentage of average loans for the period.

Glossary of Terms and Acronyms

Net yield on interest-earning assets: The average rate for interest-earning assets less the average rate paid for all sources of funds.

NFA: National Futures Association

NM: Not meaningful

NOL: Net operating loss

Nonaccrual loans: Loans for which interest income is not recognized on an accrual basis. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection. Collateral-dependent loans are typically maintained on nonaccrual status.

Nonperforming assets: Nonperforming assets include nonaccrual loans, nonperforming derivatives and certain assets acquired in loan satisfaction, predominantly real estate owned and other commercial and personal property.

NOW: Negotiable Order of Withdrawal

NSFR: Net Stable Funding Ratio

OAS: Option-adjusted spread

OCC: Office of the Comptroller of the Currency

OCI: Other comprehensive income/(loss)

OPEB: Other postretirement employee benefit

Over-the-counter (“OTC”) derivatives: Derivative contracts that are negotiated, executed and settled bilaterally between two derivative counterparties, where one or both counterparties is a derivatives dealer.

Over-the-counter cleared (“OTC-cleared”) derivatives: Derivative contracts that are negotiated and executed bilaterally, but subsequently settled via a central clearing house, such that each derivative counterparty is only exposed to the default of that clearing house.

Overhead ratio: Noninterest expense as a percentage of total net revenue.

Parent Company: JPMorgan Chase & Co.

Participating securities: Represents unvested share-based compensation awards containing nonforfeitable rights to dividends or dividend equivalents (collectively, “dividends”), which are included in the earnings per share calculation using the two-class method. JPMorgan Chase grants RSUs to certain employees under its share-based compensation programs, which entitle the recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock. These unvested awards meet the definition of participating securities. Under the two-class method, all earnings (distributed and undistributed) are allocated to

each class of common stock and participating securities, based on their respective rights to receive dividends.

PCA: Prompt corrective action

PCAOB: Public Company Accounting Oversight Board

PCD: “**Purchased credit deteriorated**” assets represent acquired financial assets that as of the date of acquisition have experienced a more-than-insignificant deterioration in credit quality since origination, as determined by the Firm.

PD: Probability of default

Pillar 1: The Basel framework consists of a three “Pillar” approach. Pillar 1 establishes minimum capital requirements, defines eligible capital instruments, and prescribes rules for calculating RWA.

Pillar 3: The Basel framework consists of a three “Pillar” approach. Pillar 3 encourages market discipline through disclosure requirements which allow market participants to assess the risk and capital profiles of banks.

PPP: Paycheck Protection Program under the Small Business Association (“SBA”)

PRA: Prudential Regulation Authority

Pre-provision profit/(loss): Represents total net revenue less noninterest expense. The Firm believes that this financial measure is useful in assessing the ability of a lending institution to generate income in excess of its provision for credit losses.

Pre-tax margin: Represents income before income tax expense divided by total net revenue, which is, in management’s view, a comprehensive measure of pretax performance derived by measuring earnings after all costs are taken into consideration. It is one basis upon which management evaluates the performance of AWM against the performance of their respective competitors.

Principal transactions revenue: Principal transactions revenue is driven by many factors, including:

- the bid-offer spread, which is the difference between the price at which a market participant is willing and able to sell an instrument to the Firm and the price at which another market participant is willing and able to buy it from the Firm, and vice versa; and
- realized and unrealized gains and losses on financial instruments and commodities transactions, including those accounted for under the fair value option, primarily used in client-driven market-making activities, and on private equity investments.
 - Realized gains and losses result from the sale of instruments, closing out or termination of transactions, or interim cash payments.
 - Unrealized gains and losses result from changes in valuation.

In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities, including

Glossary of Terms and Acronyms

physical commodities inventories and financial instruments that reference commodities.

Principal transactions revenue also includes realized and unrealized gains and losses related to:

- derivatives designated in qualifying hedge accounting relationships, primarily fair value hedges of commodity and foreign exchange risk;
- derivatives used for specific risk management purposes, primarily to mitigate credit, foreign exchange and interest rate risks.

Production revenue: Includes fees and income recognized as earned on mortgage loans originated with the intent to sell, and the impact of risk management activities associated with the mortgage pipeline and warehouse loans. Production revenue also includes gains and losses on sales and lower of cost or fair value adjustments on mortgage loans held-for-sale (excluding certain repurchased loans insured by U.S. government agencies), and changes in the fair value of financial instruments measured under the fair value option.

PSUs: Performance share units

Regulatory VaR: Daily aggregated VaR calculated in accordance with regulatory rules.

REO: Real estate owned

Reported basis: Financial statements prepared under U.S. GAAP, which excludes the impact of taxable-equivalent adjustments.

Retained loans: Loans that are held-for-investment (i.e., excludes loans held-for-sale and loans at fair value).

Revenue wallet: Proportion of fee revenue based on estimates of investment banking fees generated across the industry (i.e., the revenue wallet) from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking competitive analysis and volume-based league tables for the above noted industry products.

RHS: Rural Housing Service of the U.S. Department of Agriculture

ROA: Return on assets

ROE: Return on equity

ROTCE: Return on tangible common equity

ROU assets: Right-of-use assets

RSU(s): Restricted stock units

RWA: “Risk-weighted assets”: Basel III establishes two comprehensive approaches for calculating RWA (a Standardized approach and an Advanced approach) which include capital requirements for credit risk, market risk, and in the case of Basel III Advanced, also operational risk. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive

approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced.

S&P: Standard and Poor's 500 Index

SA-CCR: Standardized Approach for Counterparty Credit Risk

SAR as it pertains to Hong Kong: Special Administrative Region

SAR(s) as it pertains to employee stock awards: Stock appreciation rights

SCB: Stress Capital Buffer

Scored portfolios: Consumer loan portfolios that predominantly include residential real estate loans, credit card loans, auto loans to individuals and certain small business loans.

SEC: Securities and Exchange Commission

Securities financing agreements: Include resale, repurchase, securities borrowed and securities loaned agreements

Seed capital: Initial JPMorgan capital invested in products, such as mutual funds, with the intention of ensuring the fund is of sufficient size to represent a viable offering to clients, enabling pricing of its shares, and allowing the manager to develop a track record. After these goals are achieved, the intent is to remove the Firm's capital from the investment.

Shelf securities: Securities registered with the SEC under a shelf registration statement that have not been issued, offered or sold. These securities are not included in league tables until they have actually been issued.

Single-name: Single reference-entities

SLR: Supplementary leverage ratio

SMBS: Stripped mortgage-backed securities

SOFR: Secured Overnight Financing Rate

SPEs: Special purpose entities

Structural interest rate risk: Represents interest rate risk of the non-trading assets and liabilities of the Firm.

Structured notes: Structured notes are financial instruments whose cash flows are linked to the movement in one or more indexes, interest rates, foreign exchange rates, commodities prices, prepayment rates, underlying reference pool of loans or other market variables. The notes typically contain embedded (but not separable or detachable) derivatives. Contractual cash flows for principal, interest, or both can vary in amount and timing throughout the life of the note based on non-traditional

Glossary of Terms and Acronyms

indexes or non-traditional uses of traditional interest rates or indexes.

Taxable-equivalent basis: In presenting results on a managed basis, the total net revenue for each of the business segments and the Firm is presented on a tax-equivalent basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in managed basis results on a level comparable to taxable investments and securities; the corresponding income tax impact related to tax-exempt items is recorded within income tax expense.

TBVPS: Tangible book value per share

TCE: Tangible common equity

TDR: “**Troubled debt restructuring**” is deemed to occur when the Firm modifies the original terms of a loan agreement by granting a concession to a borrower that is experiencing financial difficulty. Loans with short-term and other insignificant modifications that are not considered concessions are not TDRs.

TLAC: Total loss-absorbing capacity

U.K.: United Kingdom

Unaudited: Financial statements and/or information that have not been subject to auditing procedures by an independent registered public accounting firm.

U.S.: United States of America

U.S. GAAP: Accounting principles generally accepted in the U.S.

U.S. government agencies: U.S. government agencies include, but are not limited to, agencies such as Ginnie Mae and FHA, and do not include Fannie Mae and Freddie Mac which are U.S. government-sponsored enterprises (“U.S. GSEs”). In general, obligations of U.S. government agencies are fully and explicitly guaranteed as to the timely payment of principal and interest by the full faith and credit of the U.S. government in the event of a default.

U.S. GSE(s): “U.S. government-sponsored enterprises” are quasi-governmental, privately-held entities established or chartered by the U.S. government to serve public purposes as specified by the U.S. Congress to improve the flow of credit to specific sectors of the economy and provide certain essential services to the public. U.S. GSEs include Fannie Mae and Freddie Mac, but do not include Ginnie Mae or FHA. U.S. GSE obligations are not explicitly guaranteed as to the timely payment of principal and interest by the full faith and credit of the U.S. government.

U.S. Treasury: U.S. Department of the Treasury

VA: U.S. Department of Veterans Affairs

VaR: “**Value-at-risk**” is a measure of the dollar amount of potential loss from adverse market moves in an ordinary market environment.

VCG: Valuation Control Group

VGF: Valuation Governance Forum

VIEs: Variable interest entities

Warehouse loans: Consist of prime mortgages originated with the intent to sell that are accounted for at fair value and classified as loans.

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As of March 1, 2023

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Vice Chairman
National Committee of the Chinese
People's Political Consultative Conference
Hong Kong, China

Jaime Augusto Zobel de Ayala

Chairman
Ayala Corporation
Makati City, Philippines

Corporate headquarters

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Telephone: 212-270-6000
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Annual Report on Form 10-K

The Annual Report on Form 10-K of JPMorgan Chase & Co. as filed with the U.S. Securities and Exchange Commission will be made available without charge upon request to:

Office of the Secretary
JPMorgan Chase & Co.
383 Madison Avenue, 39th Floor
New York, NY 10179-0001
corporate.secretary@jpmchase.com

Stock listing

New York Stock Exchange

The New York Stock Exchange ticker symbol for the common stock of JPMorgan Chase & Co. is JPM.

Financial information about JPMorgan Chase & Co. can be accessed by visiting our website at jpmorganchase.com and clicking on "Investor Relations." Additional questions should be addressed to:

Investor Relations
JPMorgan Chase & Co.
277 Park Avenue
New York, NY 10172-0001
Telephone: 212-270-2479
JPMCinvestorrelations@jpmchase.com

Directors

To contact any of the Board members or committee chairs, the Lead Independent Director or the non-management directors as a group, please mail correspondence to:

JPMorgan Chase & Co.
Attention (Board member(s))
Office of the Secretary
383 Madison Avenue, 39th Floor
New York, NY 10179-0001
corporate.secretary@jpmchase.com

The Corporate Governance Principles, the charters of the principal standing Board committees, the Code of Conduct, the Code of Ethics for Finance Professionals and other governance information can be accessed by visiting our website at jpmorganchase.com and clicking on "Governance" under the "Who We Are" tab.

Transfer agent and registrar

Computershare
150 Royall Street, Suite 101
Canton, MA 02021-1031
United States
Telephone: 800-758-4651
www.computershare.com/investor

Investor Services Program

JPMorgan Chase & Co.'s Investor Services Program offers a variety of convenient, low-cost services to make it easier to reinvest dividends and buy and sell shares of JPMorgan Chase & Co. common stock. A brochure and enrollment materials may be obtained by contacting the Program Administrator, Computershare, by calling 800-758-4651, by writing to the address indicated above or by visiting its website at www.us.computershare.com/investor.

Direct deposit of dividends

For information about direct deposit of dividends, please contact Computershare.

Stockholder inquiries

Contact Computershare:

By telephone:

Within the United States, Canada and Puerto Rico: 800-758-4651
(toll free)

From all other locations:
201-680-6862 (collect)

TDD service for the hearing impaired within the United States, Canada and Puerto Rico: 800-231-5469
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United States

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Independent registered public accounting firm

PricewaterhouseCoopers LLP
300 Madison Avenue
New York, NY 10017

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