CFRA

Industry Surveys

Capital Markets

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CHARTS & FIGURES

NEW THEMES

What's Changed: CFRA expects market volatility to remain substantial in 2023, which will likely lead to CEOs putting off M&A and capital raising until more clarity on the direction of the economy emerges. Read more on page 17.

What's Changed: The SEC has begun talks about reforming equity markets, which includes levelling the playing field between stock exchanges and dark pools. We see this as a positive for exchanges. For more on this, read page 28.

EXECUTIVE SUMMARY

Here are the recent trends and key drivers CFRA thinks are top of mind for investors tracking the Capital Markets industry. CFRA has a negative outlook on the Investment Banking & Brokerage sub-industry and a positive outlook on the Financial Exchanges & Data sub-industry.

Capital Market Activity Remains Muted as Fed Tightening Continues

The Federal Reserve (Fed) has maintained its hawkish tone by continuing to hike interest rates, although a pause is looking like it may occur sometime in the first half of 2023. After raising interest rates by 425 bps in 2022, the Fed started 2023 by raising rates by an additional 25 bps while reaffirming their previous forecast for interest rates to reach 5.0%-5.25% in 2023, an additional 50 bps of hikes. The Fed has also stuck to its plan to let assets roll off the balance sheet, further tightening capital markets. As a result, we see capital market activity continuing to slow, resulting in underperformance from large banks and brokerage firms with the highest exposure to capital market activity in 2023. However, firms with the highest exposure to net interest income should benefit from this new rate-raising regime.

M&A Activity Likely to Face Continued Headwinds in 2023, with CEOs Remaining Bearish

We expect M&A activity to remain weak in 2023 as significant headwinds, in the form of rising interest rates, geopolitical tensions, and market uncertainty, led to a “risk-off” investment environment that continues to take a toll on deal-making activity. CEOs turned remarkably bearish in 2022 amid this challenging market environment, with the Conference Board measure of CEOs’ confidence declining for the sixth consecutive quarter to 32 in the fourth quarter of 2022, down from 34 in the third quarter of 2022 and 65 a year prior. A reading lower than 50 reflects more negative than positive responses. This marks the lowest level seen since the depths of the great recession in 2007/2008. Around 98% of CEOs surveyed now expect at least a brief recession in the U.S., while 74% of CEOs expect economic conditions to continue worsening.

Proposed SEC Regulations Could Provide Further Headwinds in 2023/2024

The current administration’s progressive leadership has empowered the Securities Exchange Commission (SEC) to pursue regulatory changes that could impact firms operating across the Capital Markets industry. Specifically, the SEC has proposed four separate rules for market structure reform including proposals that would address order competition (payment for order flow), expanded disclosure requirements, lower minimum pricing increments, and a new best execution standard. It remains to be seen if any of these reforms will be passed or in what form, but investors should follow closely to assess potential impacts if new regulations come to pass.

Financial Exchanges Provide Recession Protection and Bull Market Growth Drivers

We see financial exchanges as well-poised to execute in a variety of scenarios. If we see increased market volatility in 2023, then we should see a corresponding increase in trading volumes. As operators of equity and derivative exchanges, these companies charge trading fees and therefore would benefit as trading volumes rise. On the flip side, if 2023 turns out economically better than expected, exchanges should benefit from a push into data analytics and rising recurring revenues. As a group, the four major U.S. exchanges of ICE, NDAQ, CME, and CBOE have grown EPS at nearly double the speed of the S&P 500 over the last decade and impressively were able to grow before, during, and after the pandemic. With rapid innovation in the exchange space, we expect most exchanges to outperform in upcoming years as they continue to judiciously meet client needs with new products and services.

CFRA **Industry Snapshot** www.cfraresearch.com

CAPITAL MARKETS

Outlook: Negative

MARKET CAP BREAKDOWN*

(as of January 31, 2023)

RANK NO.	COMPANY NAME	MARKET CAP ($ billion)
1	Morgan Stanley	163.0
2	Charles Schwab	144.5
3	Goldman Sachs	127.4
4	S&P Global	122.2
5	CME Group	63.5
	Others†	292.3

Source: CFRA, S&P Global Market Intelligence.
*Companies included in the S&P 1500 index.
†Refer to the Comparative Company Analysis section of this survey for other companies in the industry.

ETF FOCUS

ETF	AUM ($M)	Expense Ratio
XLF Financial Select Sector SPDR	33,131.9	0.10
VFH Vanguard Financials	9,206.0	0.10
IAI iShares U.S. Broker-Dealers & Securities Exchanges	880.2	0.39
KCE SPDR S&P Capital Markets	117.7	0.35

BY THE NUMBERS

32
Conference Board Measure of CEO Confidence in Q4 2022, down from 65 in Q4 2021

$148 billion
Global IPO activity in 2022, down 64% Y/Y

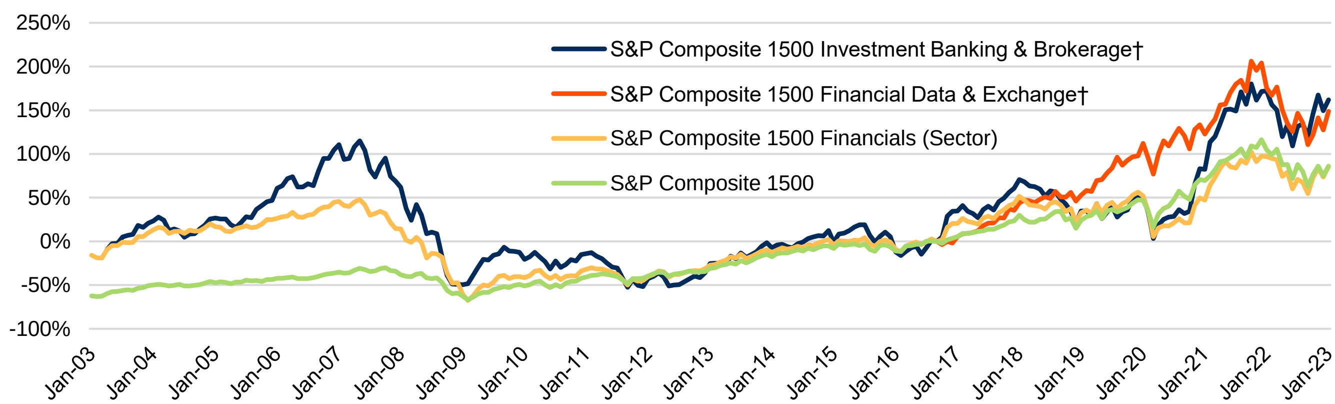
$8.3 billion
Global debt capital market activity in 2022, down 19% Y/Y

$3.6 trillion
Worldwide M&A activity in 2022, down 37% Y/Y

425 bps
Fed rate hikes in 2022 with expectation of another 75 bps hike in 1H 2023

$7.3 billion
FICC trading volume as of Q3 2022

20-YEAR INDEX PERFORMANCE



†IB Index launched in April 2003, FX index launched in September 2016.
*Data through January 31, 2023.
Source: S&P Global Market Intelligence.

SCENARIO ANALYSIS

SCENARIO IMPLICATIONS

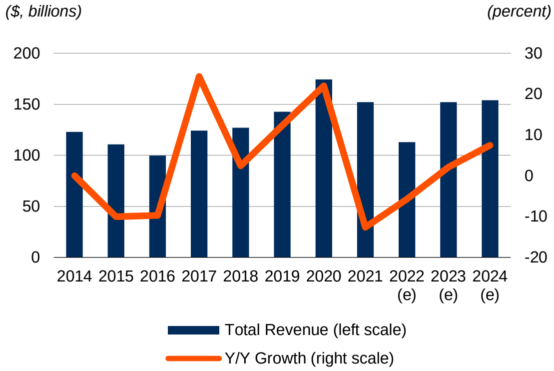
Bull Case Scenario	Bear Case Scenario
◆ The U.S. economy defies expectations with GDP growth remaining positive while inflation falls quickly towards the Fed's long-term 2% target. ◆ The unemployment rate remains low as household employment/income boosts consumer confidence, household spending, and investing. ◆ Institutions and retail investors increase exposure to equity markets, with faith the worst is behind us and the Fed can engineer a "soft-landing." ◆ Demographic trends lead to a growing number of investors in the stock market, coming from self-directed or robo-advisor accounts.	◆ The unemployment rate begins rising quickly while income/wage gains lag inflation as Fed tightening significantly weakens economy. ◆ Labor force participation remains well below pre-pandemic levels, leaving jobs unfilled as labor force productivity reverts to pre-pandemic levels. ◆ A worsening of geopolitical conflicts, potentially caused by an escalation in Ukraine or a conflict with Taiwan, leads investor uncertainty to new highs. ◆ The Fed continues hiking rates higher than expected while shrinking the Fed balance sheet to ensure inflation does not become entrenched, leads to severe recession and/or stagflation.

INVESTMENT BANKING & BROKERAGE SUB-INDUSTRY EXPECTATION INVESTING

	Strong Fundamentals	Poor Fundamentals
High Expectations	Private equity investors benefit from an abundance of dry powder and the potential to acquire assets at depressed valuations, partially offset by rapidly rising rates making borrowing more costly.	Net interest income remains strong, but growth moderates as net interest margins begin to stabilize. Loan volume activity is likely to slow through 2023, with fears of a recession and higher rates.
Low Expectations	Asset and wealth management continue to realize lower mark-to-market on assets under management or supervision in 1H 2023. Performance remains stable with low-to-mid-single digit growth, and alternative investments continue to be marketed.	Risk-off investment environment continues as market volatility remains amid rising interest rates and geopolitical uncertainty. Investment banking, equity/fixed income underwriting, IPOs, and SPACs continue to recede from record 2021 levels.

FINANCIAL METRICS

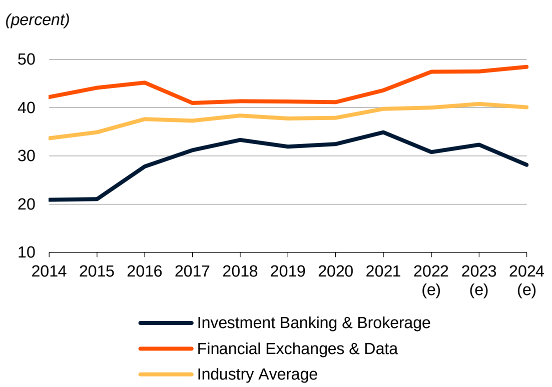
Total Revenue



Source: CFRA, S&P Global Market Intelligence.

- In 2022, IPO activity slowed significantly due to sustained market volatility and uncertainty. Debt issuance has been impacted by rapidly rising interest rates, becoming much more expensive for borrowers. Consensus estimates indicate a 2.1% revenue growth Y/Y in 2023, depending on whether a risk-off environment persists.
- Investment Banking & Brokerage is expected to remain subdued with slow growth of 0.9% in 2023, following a 7.4% decline in 2022 amid uncertain economic outlook of potential recession.
- Financial Exchanges & Data companies are set to continue benefitting from high recurring revenue from data and analytics and low capital investment requirements. The revenue of the sub-industry is expected to grow 6.6% in 2023 from a 5.7% decline in 2022. The key variable to either higher or lower revenue growth is the market services (exchange trading) business, which is subject to wide swings in average trading volume. The more stable data and analytics units have a much higher client retention rate – in the 80% to 90% level – from applying a subscription fee structure.

Operating Margins

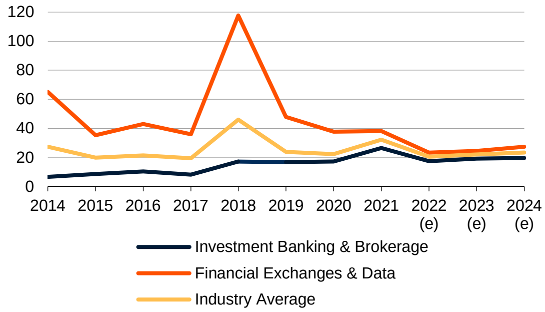


Source: CFRA, S&P Global Market Intelligence.

- Investment Banking & Brokerage operating margins are expected to remain muted in 2023 on lower revenue, which is not surprising as margins are highly dependent on healthy capital markets. This sub-industry is very dependent on fee revenues from its investment banking and asset management units as well as transaction fees from trading.
- Financial Exchanges & Data reported 47.5% operating margins in 2022 versus 43.6% in 2021, with increased trading volumes and growth in high margin products. In 2023, CFRA sees slow erosion of rate per contract (RPC) will likely negatively impact margins. However, positives from rising recurring revenues from transformation to data intensive businesses will help to enable higher trading volume and efficiency and contribute to margins of 47%-49% range in 2023-2024.

Return on Equity (ROE)

(percent)

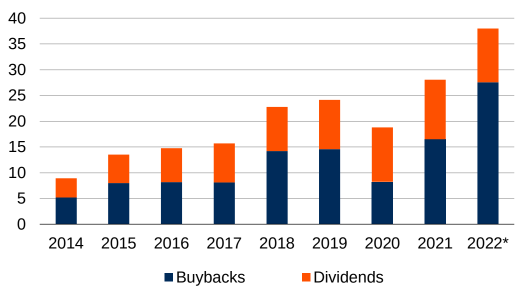


Source: CFRA, S&P Global Market Intelligence.

- ◆ Share repurchases were another major contributor to the higher average ROE, and we expect companies to remain active with buybacks as they utilize generally strong balance sheets to take advantage of the market pullback (lower share prices).
- ◆ The ROEs of both sub-industries are likely to portray slight improvements in both 2023 and 2024, in CFRA's view.
- ◆ CFRA notes that the Federal Reserve (Fed) has approved dividend increases and share repurchases for the large banks (including Goldman Sachs and Morgan Stanley) after the Dodd-Frank Act Stress Test (DFAST) released in June 2022 showed an ability to withstand a severe economic downturn.

Return on Capital

($, billions)

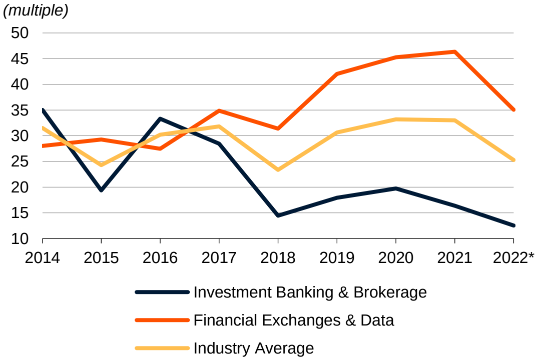


*Data for nine months ending September 30, 2022.
Source: CFRA, S&P Global Market Intelligence.

- ◆ Return on capital grew steadily since 2014 prior to the pandemic in 2020, with buybacks of $14.6 billion in 2019 and paid dividends of $9.6 billion representing CAGRs of 23.1% and 20.7%, respectively.
- ◆ As of the third quarter of 2022, common share repurchases for the Capital Market industry group were $27.6 billion compared to $16.5 billion in 2021. Cash dividends paid were $10.4 billion as of the third quarter of 2022 versus $11.6 billion in 2021.

Price-to-Normalized Earnings Per Share

(multiple)



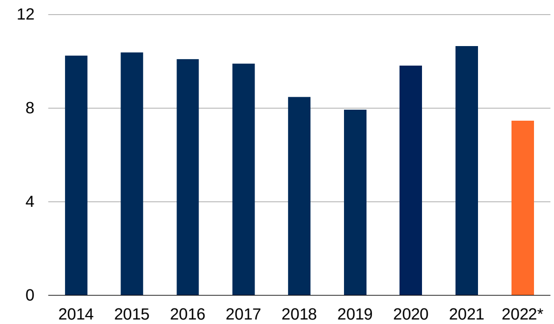
*Data for nine months ending September 30, 2022.
Source: CFRA, S&P Global Market Intelligence.

- ◆ The combined sub-industries' nine-month normalized P/E dropped to 25.3x in 2022 from 32.8x in 2021. As of the third quarter of 2022, Financial Exchanges & Data companies with stable businesses from data analytics contribute to higher P/E ratios (35.1x) than Investment Banking & Brokerage companies (12.5x), which have highly cyclical addressable markets and a more variable fee revenue stream.
- ◆ We expect normalized P/E ratios to remain below historical averages through 2023 as market headwinds contribute to lower earnings growth and/or result in year-over-year earnings declines. For Financial Exchanges & Data companies, P/E ratios will be impacted by expected weaker trading activity from rising interest rates.

KEY INDUSTRY DRIVERS

Brokerage Commission Revenues

($, billions)

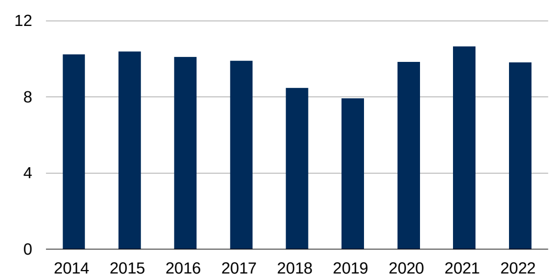


*Data for nine months ending September 30, 2022.
Source: CFRA, S&P Global Market Intelligence.

- Brokerage commission revenue trended lower from 2016 to 2019, as equity trading subsided due to the pivot from transaction fees to monthly advisor fees based on assets under supervision. From 2020-2021, lower commission rates, as well as retail trading on online brokerage platforms from major firms and new entrants, sparked higher trading volumes and brokerage commissions.
- Brokerage commission covers trading commission and fees, with an increasing shift from commissions per trade to monthly fee-based accounts. In 2022, brokerage commission declined slightly by 2.3% Y/Y and we expect commissions to be flat in 2023 as challenging market conditions remain.
- This client-generated revenue from institutions and retail accounts is transaction-based for equities and equity-based trading products, such as options.

Underwriting & Investment Banking Fees

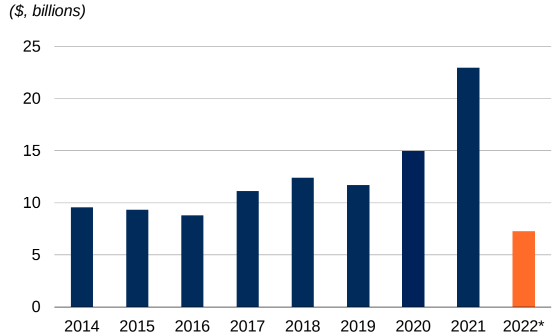
($, billions)



Source: CFRA, S&P Global Market Intelligence

- Investment banking (IB) fees dropped 33% in 2022, the slowest annual period for global IB fees since 2019, according to Refinitiv. Total wallet share captured by the top five banks totaled 25.4% in 2022, versus 30.6% during 2021.
- Total debt underwriting also fell in the same period by 30%.
- M&A fees registered a relatively small decline of 24% compared to IB and debt underwriting fees, according to Refinitiv.

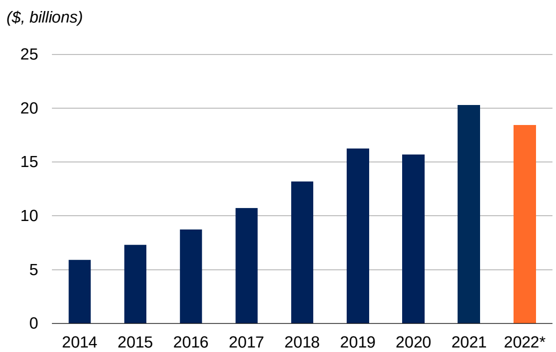
Trading and Principal Transaction Revenue



*Data for nine months ending Q3 2022.
Source: CFRA, S&P Global Market Intelligence.

- Trading here is classified as fixed income, commodities, and currencies (FICC). Large investment banks have reduced their capital in FICC trading, but the markets were receptive to a low-rate environment. Annualized FICC principal transaction fees were down 47% Y/Y as of the third quarter of 2022.
- We expect FICC trading to remain weak in 2023 as market volatility remains elevated and rates remain high. Areas such as derivative trading within FICC require high levels of regulated capital that the major banks are looking to reduce, not increase. Some of the major banks have reduced their headcount in FICC trading operations by 20% or more since the financial crisis.

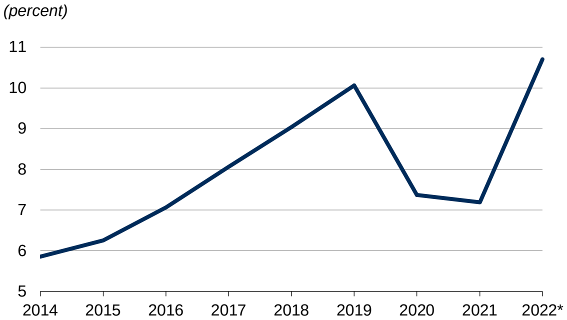
Net Interest Income



*Data for nine months ending Q3 2022.
Source: CFRA, S&P Global Market Intelligence.

- Net interest income (NII) was $18.4 billion as of the third quarter of 2022, versus $20.3 billion in full-year 2021. NII should remain elevated in 2023 as the Fed continues to hike interest rates.
- We expect NII to be up 10%-15% in 2023 Y/Y, with higher interest rates and increased new brokerage accounts compared to 2019 and 2020. For the brokerage and wealth management segments, investor account growth spurs higher NII for the firms, even if rate growth decelerates.
- Interest rates have risen rapidly in the U.S. and abroad as resilient economic conditions, pandemic-related stimulus, geopolitical conflict, and supply chain issues have given rise to the highest inflation many developed economies have seen in decades. We believe additional rate hikes are likely in the first half of 2023 before central banks pause to see the delayed impacts of their actions on both inflation and economic growth.

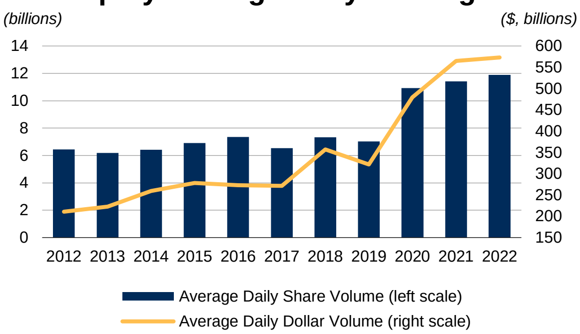
Net Interest Income Margin



*Data for nine months ending Q3 2022.
Source: CFRA, S&P Global Market Intelligence.

- Net interest income margin (NIM) for the capital markets was 10.7% as of the third quarter of 2022, compared to 7.2% in full-year 2021.
- CFRA expects NIM to stabilize in 2023, as the interest paid on liabilities begins to rise. The Fed has hiked interest rates by 425 bps in 2022 and we expect an additional 75 bps of rate hikes in the first half of 2023, a slower pace of rate increases as economic growth and inflation show signs of cooling.

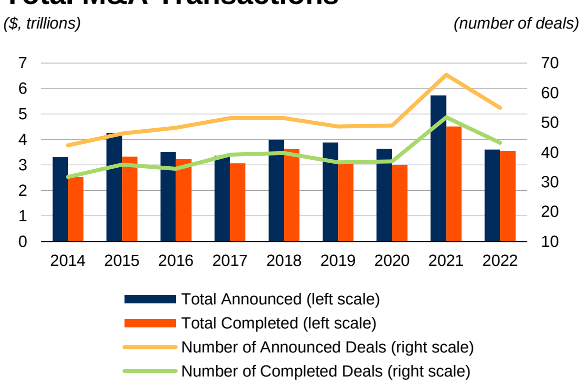
U.S. Equity Average Daily Trading Volume



Source: SIFMA.

- Average trading volume has risen to $573.1 billion in 2022. Average daily dollar trading volume was $564.7 billion in 2021, up from $479.4 billion in 2020.
- We expect the average daily trading volume to remain elevated into 2023, with volatility high because of significant geopolitical uncertainty, high inflation, and a more hawkish Fed.

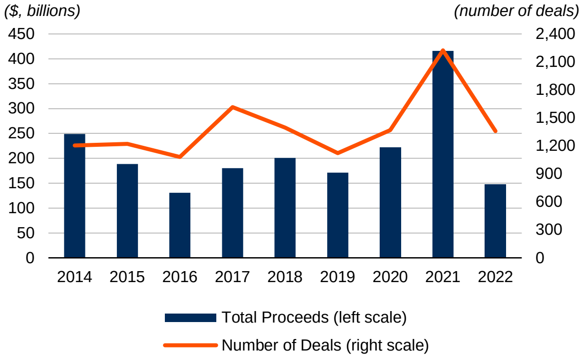
Total M&A Transactions



Source: Refinitiv.

- Global M&A activity (announced deals) totaled $3.6 trillion in 2022, down 37% from the prior year period, propelled by rising interest rates and economic uncertainty. M&A fees were down 24% in 2022 versus a year ago.
- M&A is often correlated to CEO confidence, based on historical data. In the fourth quarter 2022 survey, the Conference Board Measure of CEO Confidence was 32, declining for the sixth consecutive quarter (a reading above 50 points reflects more positive than negative responses). Overall, 5% of the CEOs surveyed expect economic conditions to improve over the next six months, down from 7% in the third quarter of 2022.

IPO Deals



Source: Refinitiv.

- Total IPO proceeds were $148 billion in 2022, compared to $416 billion in 2021 and $222 billion in 2020. The top five investment banks represented 25.2% of total IPO proceeds in 2022.
- IPO activity in 2022 was down 62% from the prior year period, as the Ukraine-Russia war and fears over a potential recession dampened investor sentiment. We believe IPO activity will remain weak in the first half of 2023 as the market remains in a risk-off environment, with the potential to pick up in the second half of 2023 if market volatility subsides.

10-Year to 2-Year Treasury Spread

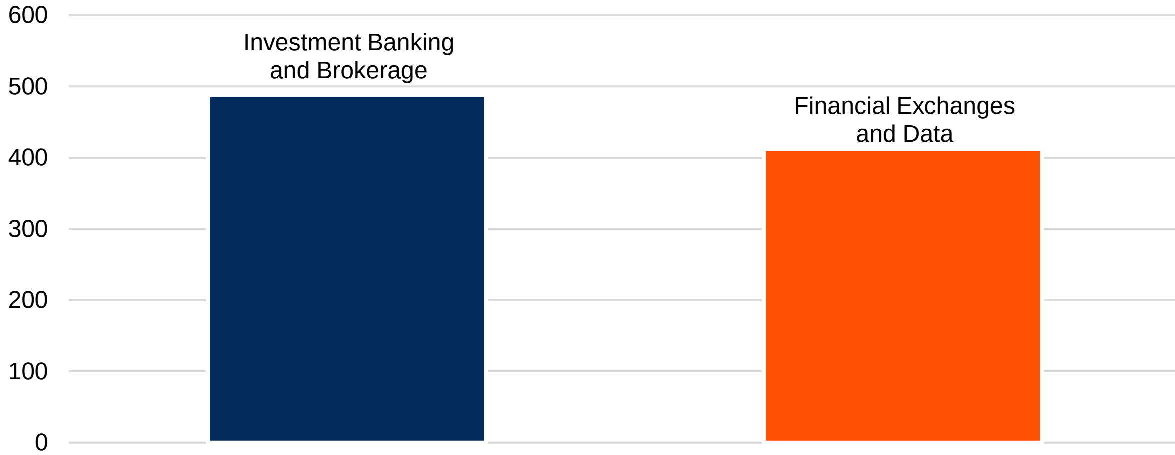
*Data through January 18, 2023.
Source: U.S. Department of the Treasury.

- A spread (the yield on the 10-year minus the yield on the 2-year Treasury) that shows a positive value may imply an economic rebound, while a negative value may imply future declines. An inversion of the yield curve may signal an economic recession in the near future.
- Given the current rising-rate environment and significant economic uncertainty, CFRA believes investors are shifting to lower-risk investment vehicles in the near term. We think the Fed's hawkish policies will lead to a challenging environment for U.S. equities, including IPOs, into 2023.

INDUSTRY TRENDS

Globalization, structural changes, and regulatory uncertainty are prominent trends affecting the Capital Markets industry. The industry consists of three distinct sub-industries: 1) Asset Management & Custody Banks, 2) Investment Banking & Brokerage, and 3) Financial Exchanges & Data. CFRA discusses the Asset Management & Custody Banks sub-industry in a separate Industry Survey (Asset Management & Custody Banks). Hence, discussions related to the Asset Management & Custody Banks sub-industry are excluded from this *Capital Markets* survey.

MARKET CAPITALIZATION OF SELECT SUB-INDUSTRIES
($, billions)



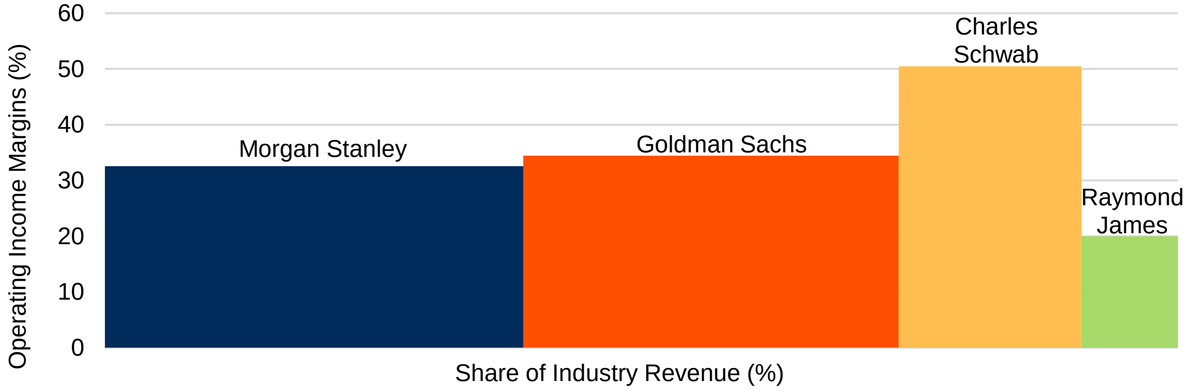
Source: CFRA, S&P Global Market Intelligence, as of January 31, 2023.

Investment Banking & Brokerage has the highest market value of the two sub-industries discussed in this survey, at $488 billion as of January 26, 2023, as significant headwinds from high inflation, geopolitical risks, and aggressive rate hikes have resulted in a 9.3% decline in market value in 2022. This follows a robust 2021 where impressive growth of 35% was driven by elevated trading revenue, investment banking fees, and IPOs amid a strong bull market and cheap financing. The Financial Exchanges & Data sub-industry was valued at $412 billion in the same period, with fear of a macro slowdown resulting in a 19.8% decline in market value in 2022. This again followed a strong 2021, where financial exchanges & data firms benefitted from high recurring revenue from data and analytics, strong debt issuance, and low capital investment requirements.

Capital Markets – Earnings Pool

PROFIT SHARE MAP OF INVESTMENT BANKING & BROKERAGE SUB-INDUSTRY*

(As of Q3 2022)



*Companies within the S&P Composite 1500 Index as of January 31, 2023.

Source: CFRA, Company Reports.

The difference between the largest investment banks and other brokerage firms has grown more significant over the past two decades, as Goldman Sachs and Morgan Stanley are leading global banks more commensurate with Citigroup, JPMorgan Chase, and others in the diversified banks sub-industry.

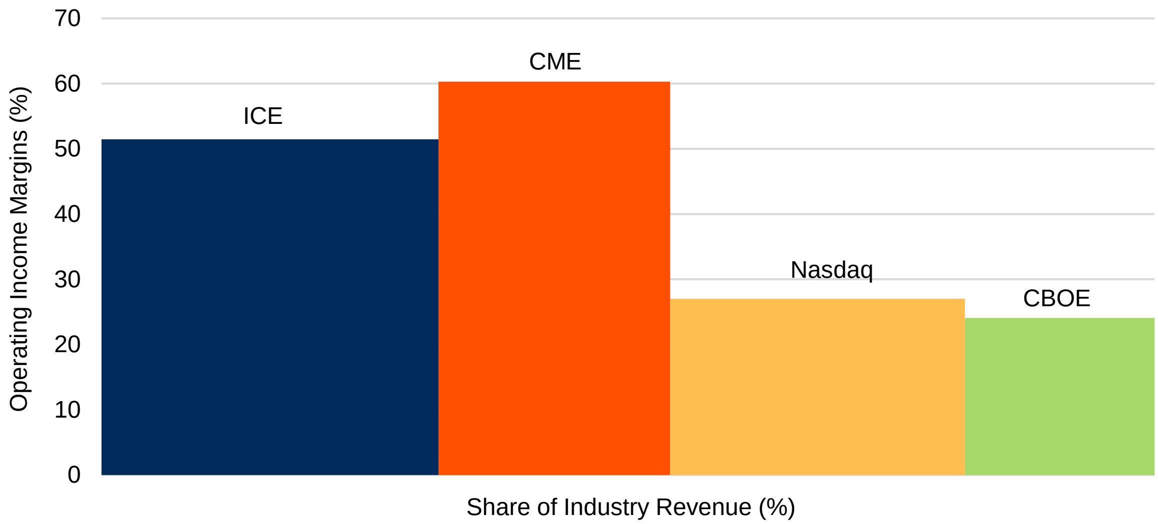
The rest of the companies in the Investment Banking & Brokerage sub-industry are either regional investment banking & brokerage firms (*i.e.,* Raymond James) or online direct brokerage firms (*i.e.,* Charles Schwab).

Charles Schwab has a high percentage of its total net revenue coming from net interest income at 43.4% in 2021 and 55.9% in 2020. A declining rate environment hurts these kinds of firms even more than other companies in the sub-industry with high levels of investor cash accounts that can be swept overnight to generate interest income, at lower interest rates. It is worth noting that Charles Schwab's net income margin dropped significantly in 2020-2021 compared to 2019 due to the low interest rate environment. This dynamic shifted quickly in 2022 as the Federal Reserve (Fed) aggressively hiked interest rates in an attempt to reign in soaring inflation. This resulted in a significant jump of 33% in net interest income in 2022, with a net interest income percent of total revenue rising to 51.4%. Moving forward, we expect continued rising rates to further boost net interest income as cash can be swept at higher rates while net income margins continue to expand, although at a more moderate pace than seen in 2022.

Unlike the global investment banks here, the regional investment & brokerage firms like Raymond James and other peers generate M&A advisory and underwriting fees from small- to mid-size companies, also known as the middle-market segment, as it is almost impossible to compete for business with large multinational companies.

Profitability, as measured by operating margins, is affected by each firm's business mix, which may vary between trading, investment banking, and asset/wealth management segments. All the firms have invested heavily in technology to provide more intelligent platforms for servicing customers and efficiency in processing transactions in the back office.

PROFIT SHARE MAP OF FINANCIAL EXCHANGES & DATA SUB-INDUSTRY*
(As of Q3 2022)



*Companies within the S&P Composite 1500 Index as of January 26, 2023.
Source: CFRA, Company Reports.

The Financial Exchanges & Data sub-industry has undergone dramatic changes over the past 15 years. Significant consolidation has occurred with both incumbent players and relatively new players being acquired.

Operating margins are likely to remain relatively stable in the medium term. We think margins will be supported by the network effect exchanges enjoy as well as the fact that exchange participants are locked into various trading platforms and systems in the short run. However, we caution that rates per contract traded continue to erode over the long run.

A more sustainable capital efficiency advantage for exchanges, in our view, is proprietary data. This is especially vital in an environment of challenging equity and potentially peaking derivative volumes. Proprietary data could include analytics, index licenses, or other firm-exclusive data products.

The Financial Exchanges & Data sub-industry continues to be pressured by alternative marketplaces and a declining rates per contract, leading to significant M&A to boost growth and achieve economies of scale from the more attractive trading product areas (*i.e.,* futures and derivative contracts or indices) for growth or profitability.

Competitive Environment

The competitive profiles for both sub-industries are highlighted along with a table that summarizes some of the key attributes using Porter's Five Forces analysis.

◆ **Investment Banking & Brokerage** firms are highly regulated, which limits their risk-taking and use of capital for principal investments, transactions, or return of capital. This sub-industry was most seriously impacted by the financial crisis and the post-crisis move to stricter regulation. For trading and underwriting, scale does matter by either geography or products. Industry rivalry is very high, with everyone keeping an eye on the quarterly league tables (*e.g.,* Refinitiv Investment Banking League) that show how each firm does in either investment banking fees or trading revenue. Electronic trading may be a competitive threat to fixed income and currency trading, but the real threat of substitution is not apparent because trading requires significant capital. The bargaining power of customers is rising with asset management customers looking for liquidity and fair pricing in the capital markets. Outside the U.S. market, European banks are retrenching from being global investment banks to more focused organizations emphasizing less risky business areas such as asset management, private banking, or retail wealth management. Investment banking is focused on regional markets as well as cross-border activity, while capital allocation and the breadth of trading products have been right-sized to bear less risk and gain higher return on capital.

◆ **Financial Exchanges & Data** are really two distinct businesses. Generally, financial exchanges are transaction-driven fee-based services as measured by rate per contract for different trading products. The threat of new entrants has evolved from trading outside of the traditional exchanges such as dark pools, but regulation is arresting some of these competitive threats. Financial exchanges have substantial scale, customer relationships, and national or global footprints. Pricing power is dependent on how proprietary the trading products are in the market. For example, CBOE has the exclusive trading of the S&P 500 Index through the SPX futures contracts. This is a high-margin contract compared to single equity options or ETF contracts. The data companies in this sub-industry are more akin to a “fintech” profile whereby companies like S&P Global, Thomson Reuters, or MSCI have leading data & analytics and/or index businesses. These are desirable businesses with high customer retention rates above 90%, high recurring fee revenues, wide operating margins, and low capital expenditures. The result is significant free cash flow generation, which can provide for an attractive return of capital or reinvested in the business.

	Degree of Rivalry/Competition	**Customer Buyer Power**	**Threat of Substitution**	**Threat of New Entry**
Investment Banking & Brokerage	**High** The sub-industry is highly concentrated, with the top four companies making up 63% of industry revenue as of the third quarter of 2022. Rivalry is further heightened because the industry is relatively mature with limited growth potential.	**Medium/High** Customers have buying power due to low switching costs; however, strong relationships can lead to significant repeat business. Industry players tend to keep their pricing competitive as a result.	**Medium/High** There has been a major switch from financial advisors to independent firms in wealth management.	**Low** The industry is highly regulated and relies on volume to create economies of scale and cost advantages. High capital requirements and restrictions also make new entries difficult.
Financial Exchanges & Data	**High** NYSE, Nasdaq, and CBOE accounted for 51% of total exchange trading volume in 2022, indicating a high concentration. There is intense competition in equity and derivative markets, and new data is regularly introduced.	**Medium/High** Customers of financial exchanges have relatively high buying power given the standardized product of most equities and derivatives combined with low switching costs. Buyers are becoming increasingly concentrated and are now integrating backwards and forming their own exchanges to trade among themselves.	**Low/Medium** Select proprietary products in indices or futures like the VIX have limited substitution threats, but data & analytics firms face threats due to large mutual funds creating their own index products.	**Low** Like the investment banking sub-industry, this sub-industry is highly regulated with heavy reliance on economies of scale and high capital requirements. In addition, trading product differentiation also poses barriers to new entrants.

Source: CFRA Research.

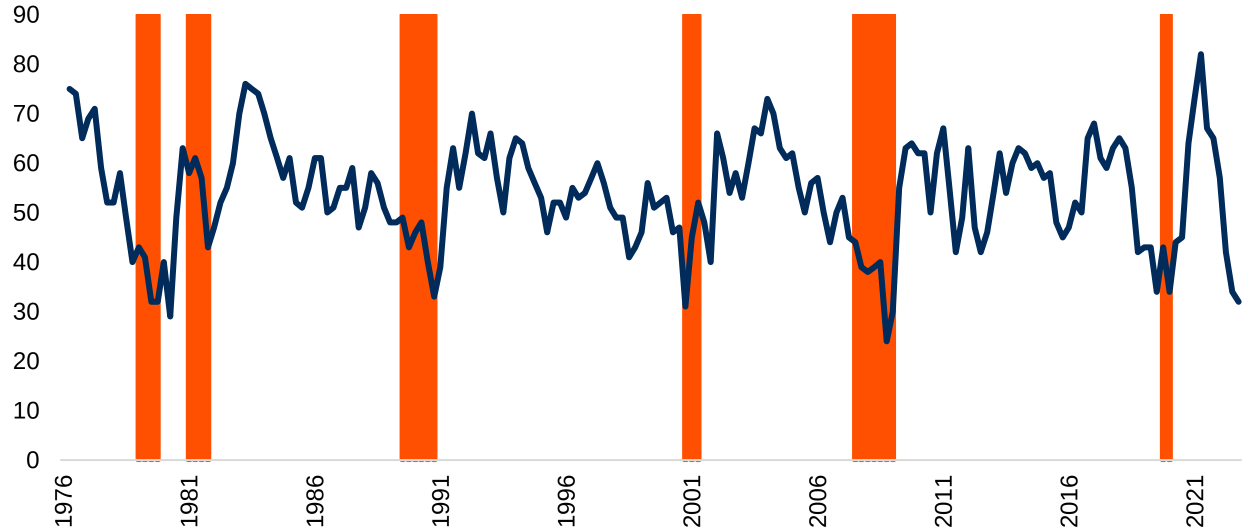
CEOs View Recession as Likely on Rising Interest Rates and Cooling Economy

CEO confidence is another barometer of the business climate and health of capital markets, M&A activity, and capital investments. In 2022, sustained high inflation, aggressive tightening measures from the Fed, and heightened geopolitical risks have all weighed heavily on CEO confidence. As a result, the Conference Board Measure of CEO Confidence dropped to 32 in the fourth quarter of 2022, compared to 34 in the third quarter of 2022 and 65 in the fourth quarter of 2021. Any reading below 50 reflects more negative than positive responses. This reading represents the lowest level of CEO confidence since the depths of the great recession in 2008/2009.

Looking ahead to 2023, CEO expectations in the fourth quarter survey indicate increased pessimism about the economic outlook. The survey shows 98% of CEOs are now prepared for a U.S. recession in the next 12 to 18 months, with 85% believing a brief and shallow recession is likely and 13% believing a deep recession will occur. Only 2% of CEOs now believe the U.S. economy can avoid a recession altogether, while only 5% expect economic conditions to improve over the next six months. This contrasts with the 74% of CEOs who expect conditions to worsen.

At CFRA, we expect CEOs to maintain a “risk-off” view to capital raising into 2023. We believe market volatility will remain substantial into 2023 as CEOs continue attempting to determine the impacts that inflation, the general direction of the economy, and higher interest rates could have on their business both in the near and long term. This will likely lead to CEOs putting off M&A and capital raising until more clarity on the direction of the economy emerges.

RELATIONSHIP BETWEEN CEO CONFIDENCE AND U.S. RECESSION



Source: Conference Board CEO Confidence Survey, St. Louis Fed.

Operating Environment

Although the industry structure and competitive environment of the principal sub-industries (investment banking & brokerage and financial exchanges & data) are markedly different, they do have overlapping businesses and, sometimes, similar customer bases. Each of the sub-industries tends to have a global presence, with U.S.-based companies having the largest concentration of businesses in the Americas, followed by Europe and Japan, with a growing presence in Asia-Pacific, the Middle East, and Africa.

INVESTMENT BANKING & BROKERAGE

The world's leading investment banks (based mainly in the U.S. and Europe, although Asia is represented as well) now compete for business around the world. In 2022, six U.S. investment banks – JPMorgan, Goldman Sachs, Morgan Stanley, BofA Securities, Citigroup, and Wells Fargo – were in the top 10 and have retained their spots in the top 10 in 2021 (as measured by global investment banking fees), according to Refinitiv.

TOP 10 GLOBAL INVESTMENT BANKING FEES
(for full-year 2022)

COMPANY NAME	RANK 2022	RANK 2021	FEES *(in $, millions)*	MARKET SHARE *(in percent)*
JPMorgan	1	1	7,060	6.4
Goldman Sachs & Co	2	2	6,585	6.0
BofA Securities Inc	3	4	5,604	5.1
Morgan Stanley	4	3	4,769	4.3
Citigroup	5	5	4,010	3.6
Barclays	6	7	2,817	2.5
Credit Suisse	7	6	2,268	2.1
Wells Fargo & Co	8	10	2,040	1.8
CITIC	9	16	1,918	1.7
RBC Capital Markets	10	12	1,739	1.6
Top 10			38,810	35.1
INDUSTRY TOTAL			110,536	100.0

Source: Refinitiv.

Investment banking volume fluctuates from year to year, but generally, it has a positive correlation with the overall health of the global economy and equity markets. In 2022, global investment banking fees reached $110.5 billion, down 33% from the prior year.

Underwriting is a major contributor for investment banks. Equity capital market (ECM) activity declined 62% in 2022. The total number of ECM decreased 39% compared to a year ago, a 10-year low at nearly 4,450 offerings.

TOP 10 GLOBAL EQUITY & EQUITY-RELATED PROCEEDS
(for full-year 2022)

COMPANY NAME	RANK 2022	RANK 2021	PROCEEDS *(in $, millions)*	MARKET SHARE *(in percent)*	NO. OF ISSUES
CITIC	1	6	30,416	6.2	161
Goldman Sachs & Co	2	1	29,886	6.1	182
JPMorgan	3	3	23,563	4.8	189
Morgan Stanley	4	2	23,088	4.7	166
China International Capital Co	5	7	22,007	4.5	124
BofA Securities Inc	6	4	20,689	4.2	147
Citigroup	7	5	20,354	4.2	125
China Securities Co Ltd	8	13	19,331	4.0	97
Huatai Securities Co Ltd	9	12	14,194	2.9	88
UBS	10	9	12,071	2.5	90
Top 10			215,599	44.2	1,369
INDUSTRY TOTAL			487,548	100.0	4,443

Source: Refinitiv.

TOP 10 U.S. EQUITY & EQUITY-RELATED DEALS
(for full-year 2022)

ISSUE DATE	ISSUER NAME	PROCEEDS *(in $, millions)*	ISSUE TYPE	MACRO SECTOR
06/02/22	American Tower Corp	2,351	Follow-On	Real Estate
09/14/22	NextEra Energy Inc	1,950	Convertible	Energy and Power
11/16/22	Wolfspeed Inc	1,750	Convertible	High Technology
01/04/22	Alexandria RE Equities Inc	1,691	Follow-On	Real Estate
09/14/22	Corebridge Financial Inc	1,680	IPO	Financials
11/07/22	Amerisourcebergen Corp	1,552	Follow-On	Consumer Products and Services
02/08/22	Snap Inc	1,500	Convertible	High Technology
04/21/22	Carvana Co	1,250	Follow-On	Retail
07/20/22	Carnival Corp	1,169	Follow-On	Consumer Products and Services
08/02/22	Royal Caribbean Cruises Ltd	1,150	Convertible	Industrials
11/01/22	Carnival Corp	1,131	Convertible	Consumer Products and Services
09/12/22	Sarepta Therapeutics Inc	1,130	Convertible	Healthcare
09/12/22	Alnylam Pharmaceuticals Inc	1,035	Convertible	Healthcare

Source: Refinitiv.

Global IPOs and follow-on offerings were down 64% Y/Y in 2022, the slowest annual period for global IPOs since 2016, according to Refinitiv, with American Tower Corp, NextEra Energy Ind, and Wolfspeed Inc leading the U.S. public offering calendar. IPOs on U.S. exchanges decreased 77% in 2022, while China-domiciled IPOs totaled $186.7 billion in 2022, a 43% decline Y/Y. There were 2,830 secondary equity offerings that totaled $271.3 billion in 2022, down 61% Y/Y, according to Refinitiv. By geography, the Asia Pacific equity market was $253 billion, or about 46% of total global issuances, followed by EMEA ($98 billion), the U.S. ($85 billion), and Japan ($9 billion).

GLOBAL INITIAL PUBLIC OFFERINGS PROCEEDS
(for full-year 2022)

COMPANY NAME	RANK 2022	RANK 2021	PROCEEDS *(in $, millions)*	MARKET SHARE *(in percent)*	NO. OF ISSUES
CITIC	1	6	12,526	8.5	73
China International Capital Co	2	12	7,144	4.8	59
China Securities Co Ltd	3	14	6,972	4.7	48
Goldman Sachs & Co	4	2	5,490	3.7	22
Citigroup	5	5	5,139	3.5	22
Morgan Stanley	6	3	4,912	3.3	33
Huatai Securities Co Ltd	7	15	4,721	3.2	38
BofA Securities Inc	8	4	4,180	2.8	21
Guotai Junan Securities	9	17	4,153	2.8	50
HSBC Holdings PLC	10	13	4,026	2.7	15
Top 10			59,263	40.0	381
INDUSTRY TOTAL			148,037	100.0	1,357

Source: Refinitiv.

After a record high year for global debt capital markets (DCM) underwriting in 2020, underwriting dropped 3% to $10.18 trillion in 2021. The number of new offerings brought to market in 2021 totaled 29,124, a 2% increase compared to the prior-year period. U.S. investment grade corporate debt issuance declined to $1.46 trillion in 2021, a 22% decrease compared to 2020. According to figures compiled by Refinitiv and the Climate Bonds Initiative, green bond issuance totaled $485 billion in 2021, a 98% increase compared to the previous year and an all-time full-year record. However, the overall global DCM activity slowed further to $8.3 trillion in 2022, down 19% Y/Y, the slowest annual period for DCM activity since 2019.

TOP 10 GLOBAL DEBT ISSUES
(for full-year 2022)

COMPANY NAME	RANK 2022	RANK 2021	PROCEEDS *(in $, millions)*	MARKET SHARE *(in percent)*	NO. OF ISSUES
JPMorgan	1	1	387,966	4.6	1,427
BofA Securities Inc	2	3	327,796	3.9	1,130
Citigroup	3	2	316,243	3.8	1,146
Goldman Sachs & Co	4	4	257,414	3.1	844
Barclays	5	6	247,104	3.0	1,052
Morgan Stanley	6	5	230,982	2.8	1,109
CITIC	7	12	222,177	2.7	3,311
HSBC Holdings PLC	8	9	194,817	2.3	939
Bank of China L td	9	13	190,597	2.3	2,871
Deustche Bank	10	7	189,435	2.3	959
Top 10			2,564,531	30.7	14,788
INDUSTRY TOTAL			8,347,333	100.0	26,625

Source: Refinitiv.

In the category of announced global M&A deals in 2022, U.S. investment banks held five of the top 10 spots (see the accompanying “Top M&A Advisors Worldwide” table for more details).

TOP M&A ADVISORS WORLDWIDE
(for full-year 2022)

FINANCIAL ADVISOR	RANK 2022	RANK 2021	VALUE *(in $, millions)*	NO. OF DEALS
Goldman Sachs & Co	1	1	1,140,025	415
JPMorgan	2	2	813,372	343
Morgan Stanley	3	3	798,838	303
Citigroup	4	4	566,854	203
BofA Securities Inc	5	5	558,090	215
Barclays	6	6	412,438	202
Credit Suisse	7	7	277,854	119
Lazard	8	10	233,934	280
BNP Paribas SA	9	13	223,204	155
Rothschild & Co	10	11	207,166	468
Evercore Partners	11	9	204,904	196
UBS	12	8	182,907	157
Jefferies LLC	13	15	155,666	232
RBC Capital Markets	14	17	150,177	149
Allen & Co Inc	15	24	146,663	11

Source: Refinitiv.

We view announced transactions in the pipeline as a leading indicator of M&A activity, though getting transactions to close can be delayed by regulatory or shareholder issues. Global M&A value climbed to stronger-than-expected levels in July 2020 and continued into 2021. In 2022, M&A activity fell 37%, and CFRA forecasts it will remain dampened as the business outlook remains uncertain.

Private-equity-backed buyouts accounted for a record 20% of overall M&A activity in 2022, reaching an overall value of $720 billion, a dip of 36% Y/Y growth, as second-half deal activity fell 57% Y/Y compared to a year ago, as recorded by Refinitiv. SPACs announced 225 initial business mergers in 2022, totaling $120 billion, about 3% of the overall M&A activity, according to Refinitiv. Cross-border M&A totaled $1.1 trillion, down 46% Y/Y.

Size has become increasingly important for participants in the capital markets, and it is viewed as a competitive advantage. As global capital markets expand, large firms with worldwide footprints remain the best positioned to tap into that growth. With several European global banks narrowing their focus to wealth management and private banking, CFRA sees opportunities for U.S. global banks to continue to gain market share in M&A advisory in 2023 as well as in equity and fixed-income underwriting. The European market has traditionally been tied to doing more bank loans than accessing new equity or debt from the capital markets. However, we think this will likely change in the future.

IPOs – Activity Grinds to a Halt as Market Volatility Escalates

After a robust 2021 that saw record IPO issuances and strong equity markets, 2022 has brought a complete turn in the market. The selloff in equity markets began shortly after the new year began and resulted in a bear market across all three major U.S. indices (Dow Jones, Nasdaq, and S&P) as well as the majority of international indices. Due to lower equity market levels and significant uncertainty relating to soaring inflation, rising interest rates, and geopolitical conflicts, many companies have decided to alter plans to go public in the near term. This view is highlighted by the dramatic shift in IPO volumes, as numerous private companies that had been weighing public offerings in 2022, many via IPOs or popular SPAC vehicles, decided their best option was to wait until 2023 or later when markets may be more receptive to new issuances. In 2022, IPO deal volume fell 39% from 2021 levels, according to data from S&P Global Market Intelligence, with the current pace of IPOs likely to result in the lowest deal volumes since the early 2000s. This was despite the strongest January for IPO proceeds in over 20 years, according to Refinitiv.

SPACs Fall Out of Favor

Specialized acquisition companies (SPACs) were a new phenomenon that exploded in popularity in 2021, enabling a company with no commercial operations to form a company and raise capital through an IPO for the purpose of acquiring an existing company. SPACs, also called blank check companies, have been around for decades but became popular in 2020-2021, even gaining the attention of well-known investors, athletes, and entertainment persons. SPACs have two years to complete an acquisition, or the entity must return funds to investors. Some industry observers think SPACs are primarily disadvantageous for investors other than the sponsor, particularly post-IPO-stage investors who hold on to their shares after the SPAC make its target acquisition. For example, in 2019, one SPAC owned by venture capitalist Chamath Palihapitiya bought a 49% interest in Virgin Galactic for $800 million before listing the company. As of January 3, 2023, Palihapitiya had sold his entire personal stake in Virgin Galactic for over $210 million, stepped down as chairman of Virgin Galactic, and left investors with a stock trading nearly 70% below its IPO price.

Being acquired by a SPAC can offer privately-owned companies a faster IPO track. In 2021, there were 613 SPAC listings, raising a total of $145 billion, a 91% increase in SPAC funding from 2020, according to Nasdaq. However, the SPAC IPO market cooled significantly in 2022 as investor appetite decreased and the overall market environment weakened. Many SPACs, such as Bill Ackman's $4 billion Pershing Square Tontine Holdings, have actually pulled the plug and stopped looking for companies to acquire as a result of the weak market environment, returning cash back to investors. As of December 27, 2022, there were about 550 SPACs holding a combined $121 billion in cash, according to data from SPAC Research. While many may decide to eventually return capital to investors like Ackman's Pershing Square, we expect others to push for deals despite a difficult market environment.

Another potential headwind for SPACs moving forward is proposed Securities Exchange Commission (SEC) regulations. While in the early stages, an SEC proposal to enhance disclosure and protect investors from potentially misleading claims, a common gripe many investors had during the SPAC boom, could make going public via SPAC significantly more difficult. This could limit the appeal of SPACs and make the process more akin to the traditional IPO route to taking a company public. It remains to be seen if anything will actually get done, but it is something to keep an eye on moving forward.

Key Trading Trends – Reddit and Robinhood for Traders and Investors

The investor enthusiasm from popular online communities like Reddit has sparked momentum trading from individual investors to pile into underperforming stocks such as GameStop, AMC Entertainment Holdings, Rocket Companies, Bed Bath and Beyond, and more. The target companies have typically had, but not always, high short interest positions from hedge funds and other institutions. The hyperbolic increase in average daily trading volume for select stocks is unprecedented, coming from younger investors who see a trading opportunity as they continue to buy the shares. Larger institutional investors, such as hedge funds, have taken notice with reports many have set up tracking devices to monitor Reddit and other forums to detect the potential for individual securities to experience sharp increases in volume and price movements that can impact current holdings. It remains unclear whether regulators like the SEC will come in and limit steep price movement.

Easy trading through firms like Robinhood has lured young investors who have not participated in the stock market and do not have an account with a retail brokerage firm. The fintech industry continues to find new ways to leverage technology for investing and recordkeeping. Founded in 2013, Robinhood's trading volume activity has taken off from the bull market and investors who have time to invest or trade from their homes. However, recent market headwinds and volatility may be taking some of the luster away. As of January, 30, 2023, Robinhood's stock is down nearly 85% from all-time highs. It remains to be seen how Robinhood's initial success will hold up through cooling equity markets and a potential recession, as many people believe poor market performance will result in a drop in trading activity from their younger and less affluent client base.

One of the fallouts of trading one click away is that new investors may trade the riskiest equities and at the fastest pace of trading. Recent studies show that Robinhood users trade 9x as many shares as E*Trade customers and 40x as many shares as Charles Schwab customers. We think Robinhood and other firms that appeal to new investors need to do education on their websites and communications. Robinhood may have difficulty keeping up with investor accounts and trading volume. The risks are a poor trading platform, not enough capital for executing trades with the clearinghouse, and challenges complying with securities regulations.

Bitcoin Market Cycle, Cryptocurrencies, and Equities

After reaching a new all-time high of almost $69,000 in late 2021, Bitcoin has tumbled more than 50%, now trading at just over $23,000 as of February 3, 2023. The "risk-off" investment environment and general market headwinds (S&P 500 down 15% in 2022) have resulted in steep declines in the value of many crypto assets. Investors looking at a chart of Bitcoin may assume it has followed the path of typical hyped-up technology or biotech stocks with a very sharp rise in price, only to be followed by a crash. Indeed, looking at the recent price action, it appears Bitcoin could have a long way to fall.

However, Bitcoin is different than many tech/biotech stocks in that it has done this before, and each time has gone on to make successive new highs. The other thing to notice is that Bitcoin's price action tends to repeat in four-year cycles. This is because Bitcoin has a pre-programmed monetary policy in its code whereby the amount of newly issued Bitcoin gets cut in half roughly every four years. For example, the number of Bitcoin minted started out at 50 coins every 10 minutes. Roughly four years later, that was cut in half to only 25 coins every 10 minutes, then four years later, 12.5. The most recent "halving" event occurred in May 2020, with the amount now at 6.25 coins created approximately every 10 minutes. The next halving will occur in 2024.

Why does the Bitcoin "halving" result in rapid price appreciation? Quite simply: supply and demand. Before each halving event, supply and demand are roughly in balance for that price range. However, the halving event is not gradual; it is an immediate step-change. Therefore, if the demand remains consistent and the supply of Bitcoin is perfectly inelastic, then the price must increase. The price tends to increase at an ever more rapid pace, given the higher price creates momentum and entices more investors and traders. Each four-year cycle has so far resulted in a frenzied "blow-off top," with the price doubling or more in a matter of weeks.

For investors who do not or cannot directly hold Bitcoin or other cryptocurrencies, there are several related equities that offer varying degrees of exposure. The cryptocurrency space has exploded with new companies that are going public as well as existing companies that are pivoting or taking advantage of this space.

Overall, we find equities with the highest correlation to Bitcoin to be concentrated in the crypto exchanges, miners, and crypto services companies. This, of course, is not surprising given the extreme leverage these companies have over the price of Bitcoin and other cryptos. For example, Coinbase (COIN) derives 90% of its revenue from trading fees that are assessed as a percentage of the transaction. Even its other revenue sources, such as custody services, are also based on a fee as a percentage of the assets stored and therefore correlated to the crypto price of these assets. Miners have relatively fixed costs of mining equipment and electricity, and profit margins can widen dramatically as the price of Bitcoin increases. However, miners have come under significant scrutiny for the vast energy resources needed to operate and mine cryptocurrencies. Therefore, investors looking for leveraged ways to play crypto should look in these areas but be prudent in assessing potential risks associated with each alternative.

Risk-Off Environment Cools Capital Markets

Our fundamental outlook on the Investment Banking & Brokerage sub-industry is negative. We believe global capital markets will remain weak into the first half of 2023. U.S. equity markets entered a bear market in the second quarter of 2022, with volatility increasing because of significant geopolitical uncertainty, inflation running at multi-decade highs, and a hawkish Fed committed to aggressively raising interest rates. We believe retail investor activity will remain elevated from pre-pandemic levels, although likely moderating amid this difficult macroeconomic backdrop. This in turn is likely to lead to slightly weaker trading volumes and fee commissions, in our view.

Equity trading volumes and transaction fees increased significantly during the pandemic on greater investor participation, with equity inflows and active trading from retail investors. In our view, equity trading volumes and transaction fees will remain above pre-pandemic levels in 2023, although well off highs set in 2021. We think retail investor confidence is likely to remain weak, despite the University of Michigan Consumer Sentiment Index reading rising to 59.7 in December 2022 from 50.0 in June 2022, its lowest reading since the 1980s recession. However, we believe trading mix could remain a positive as sophisticated investors utilize higher commission futures and options strategies amid volatile market conditions, helping to offset the pullback in retail trading volumes.

Investment banking fees are likely to continue falling into the first half of 2023 as CEO confidence continues weakening. Investment banking fees of $110.5 billion in 2022 were down 33% Y/Y, a three-year low, according to Refinitiv. The fourth quarter of 2022 represented the slowest quarter since 2016. Global M&A volume also decreased 37% Y/Y in 2022 to $3.6 trillion as the M&A environment was weak across all regions.

We expect debt capital market activity to remain soft as the rise in interest rates reduces demand for new issuances. In 2022, global debt underwriting activity totaled $8.3 trillion, down 19% Y/Y. High yield corporate debt has been hit the hardest amid the rising rate environment, reaching a 14-year low with proceeds down 80% in 2022.

Equity capital market activity is likely to remain muted in the first half of 2023 as geopolitical conflicts, rising inflation, and higher rates lead to a continuation of volatile equity market conditions and a “risk-off” strategy from investors. In 2022, global equity and equity-related issuance activity of $487.5 billion was down 62% Y/Y. All equity-related sectors were hit hard, with global IPO activity ($148 billion) down 64% Y/Y, follow-on offerings ($271 billion) down 61% Y/Y, and convertibles ($68 billion) down 63% Y/ Y. By geography, Asia recorded $253 billion total equity and equity-related issuances, followed by Americas ($99 billion), EMEA ($98 billion), and Japan ($9 billion).

CFRA believes investor sentiment is likely to remain negative through the first half of 2023 as elevated inflation on a global scale has pushed the Fed to be more aggressive in their tightening policy. Meanwhile, the odds of the Fed engineering a “soft landing,” avoiding a recession while raising rates and taming inflation, remain low, in our view. Risks of increased regulation from progressive leadership at the SEC to better address trading high risk securities or market structure reform (*e.g.*, payment for order flow) could provide additional headwinds.

In 2022, the Investment Banking & Brokerage sub-industry was down 8.7%, versus the S&P 1500 Index, down 19.3%. In 2021, this sub-industry rose 48.2%, compared to the S&P 1500, up 26.7%.

Trading and Wealth Management

We expect the Fed's plan to raise interest rates into 2023 before keeping them "higher for longer" will hurt fixed income and capital raising. The Fed raised interest rates 425 bps in 2022 and is expected to raise rates an additional 50 bps to 100 bps in 2023 before holding rates at that higher level until there is clear evidence of inflation moving down quickly to the Fed's long-term 2% target level. This has ended companies' abilities to take advantage of the record low interest rates that had been in place since the start of the pandemic. We see brokerage commissions staying relatively flat in 2023 as trading volumes stay elevated amid increased market volatility, which spurs trading commissions. Fixed income, currency, and commodities (FICC), as reported in principal trading revenue, is expected to remain weak through 2023 as banks look to reduce exposure to regulated capital amid significant market uncertainty and volatility. Finally, we believe 2023 should see healthy growth in principal investments in private equity and debt instruments, as asset management firms continue to weigh alternative investments that are not highly correlated with the global equity market.

Wealth management is another important business segment within the Investment Banking & Brokerage sub-industry. The wealth business has been transitioning away from transaction fee-based revenue to monthly account fees, based on assets under supervision. The positive attributes of wealth management are high recurring fee revenue, customer retention, and low-cost available funds from brokerage money market accounts that support other businesses. Some of the largest investment banks, like Morgan Stanley and Bank of America (Merrill Lynch), have made wealth management a central part of their corporate strategy and future growth. In late 2020, Morgan Stanley announced the purchase completion of E*Trade to extend its market presence to 401K plans, active traders, and millennials who are just building up their investable assets. Cryptocurrencies are also becoming a more common offering in the wealth management industry, with many firms beginning to give access to clients.

Risks that we see for wealth management are now less tied to regulation and more to market risks and technology disruptors. In 2022, wealth management faced significant headwinds from lower equity market values that were a drag on fee revenues and pre-tax margins.

Technology disruptors such as blockchain technology, robo-advisors, and no- or low-fee based accounts are moving at a rapid pace into the wealth management industry. Robo-advisors are defined as digital platforms that provide automated, algorithm-driven financial planning services with little to no human supervision. A typical robo-advisor collects information from clients about their financial situation and future goals through an online survey, and then uses the data to offer advice and/or automatically invest client assets.

According to PwC, wealth management firms are increasing the use of technology-led models to expand the reach of traditional business models. Work has been underway with the largest investment banks and brokerage firms with multi-year plans on front-to-back-office digitization, Big Data, analytics, artificial intelligence, and cybersecurity to bolster compliance and surveillance.

Federal Reserve Takes Conservative View on Large Bank Capital

Since the Dodd-Frank Act was signed into law in 2010, many companies have undertaken strategic initiatives to respond to new regulations and to de-risk their firms. While these companies cannot predict or control the highly cyclical capital markets, executives running investment banking and trading have taken significant steps to de-risk the balance sheet, redirect capital to higher-return businesses away from capital-intensive trading products, and sharpen their enterprise cost-reduction efforts.

No one knows for sure how the U.S. economy will perform or affect the large investment banks in the next 12 months. While U.S. investment banks were part of the problem in the financial crisis over a decade ago, the banks have been part of the solution working with the federal government in the Covid-19 crisis. The next 6-12 months bring significant uncertainty, as recessionary risks are increasing with geopolitical uncertainty, inflationary pressures, and supply chain issues impacting the economic recovery for banks.

In June 2020, the Fed issued its annual Dodd-Frank Act Stress Tests (DFAST) using a 10-year historical framework. The release showed a severely adverse scenario to be more conservative than what the Board of Governors thought may happen from the Covid-19 shock to GDP and unemployment. Looking at the large banks, the Fed evaluated three hypothetical Covid-19-related downside scenarios that may lead either to a V-shaped, U-shaped, or W-shaped recession. The loan loss rates are significant with the highest loan loss areas in credit cards, commercial loans, commercial real estate, and consumer loans.

In June 2022, the Fed released its annual bank stress test, which showed that large banks continued to have strong capital levels and could continue lending to households and businesses during a severe recession. The Fed conducted a sensitivity analysis to assess the resiliency of large banks under a hypothetical scenario that included a severe global recession with substantial stress in commercial real estate and corporate debt markets. The scenario includes: 1) The unemployment rate rises by 5.75 percentage points to a peak of 10% from the fourth quarter of 2021 to the third quarter of 2023; 2) a sharp decline in economic activity accompanied by increases in market volatility; and 3) widening of corporate bond spreads, and collapse in asset prices, including a nearly 40% decline in commercial real estate prices.

Under the sensitivity analysis, a total of 34 banks would collectively lose more than $612 billion. In 2021, 23 banks participated in the stress test because the smallest banks subject to supervisory stress tests are generally only required to participate in the test every other year. Thus, the aggregate results reported for the 2022 stress test are not fully comparable with the 2021 stress test results. The loan portfolios that constitute the largest amount of losses are commercial and industrial (C&I) loans and credit cards, each representing 26% of total loan losses.

On a more positive note, from the 2022 stress test results, all the major banks could withstand severe crisis due to their huge capital. Nonetheless, JPMorgan, Citigroup, and Goldman Sachs have been informed to increase their capital to defend against systemic risks they pose.

FINANCIAL EXCHANGES & DATA

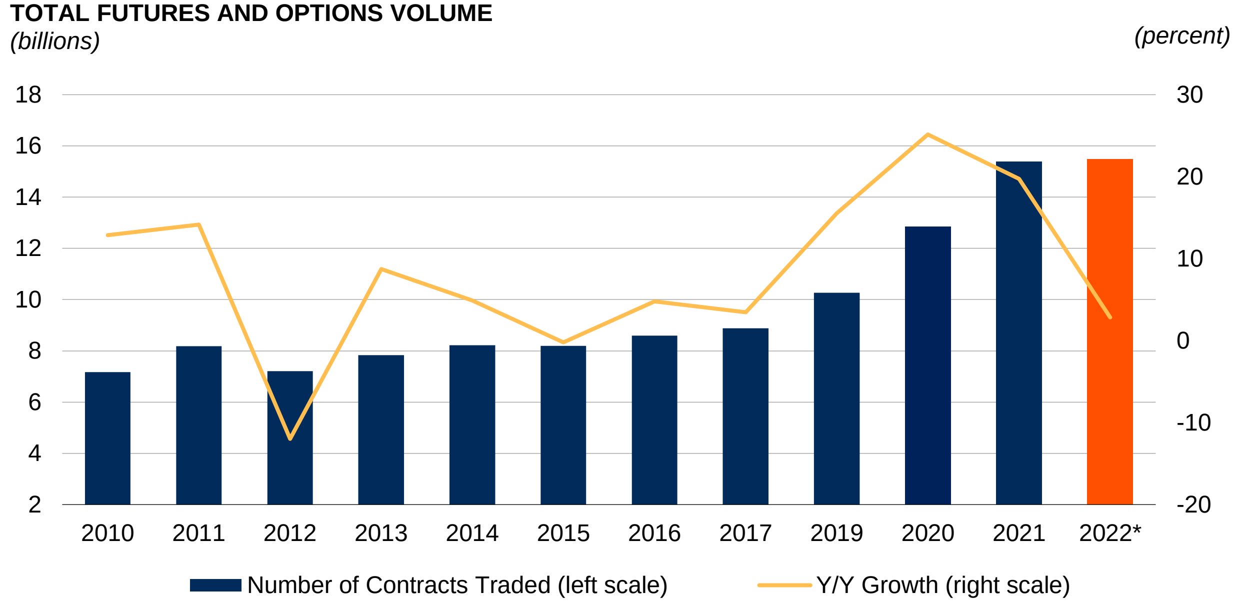
CFRA has a positive fundamental outlook on the Financial Exchanges & Data sub-industry for the next 12 months.

Market exchanges continue to benefit from the increasing acceptance and use of alternative investments, such as derivatives and commodities, and the ongoing transition from over-the-counter (OTC) markets to more efficient and transparent exchange-based electronic trading and central clearing. We expect exchanges to benefit from heightened trading and volatility due to interest rate uncertainty, geopolitical uncertainty, volatile commodity prices, and inflation levels not seen since the 1980s.

We see exchanges continuing to seek to diversify their revenue sources with non-transaction, recurring data subscriptions rather than be subject to market volume fluctuations. We believe the companies that succeed in this area will see multiple expansion with higher client retention rates and reduced exposure to swings in trading volume. As a group, the major U.S. exchanges have grown EPS at nearly double the speed of the S&P 500 over last decade and, impressively, were able to grow before, during, and after the pandemic. With rapid innovation in the exchange space, we expect most exchanges to continue to grow EPS at a quick pace as they continue to judiciously meet client needs with new products and services.

Following elevated trading volumes in 2022, we expect financial markets to remain choppy in upcoming quarters, but we see slowing growth as Y/Y comparisons become difficult. Outside of reliable recurring revenue, exchanges offer a market hedge with economic uncertainty increasing the attractiveness of transaction-related exchange products. No better example can be found than in the first quarter of 2020, when the market fell at its quickest pace in U.S. history as Covid-19 fears sparked the S&P 500 to fall by over 30% in just 22 trading days. In this period, all four exchanges reported double-digit revenue growth and 20%+ EPS growth.

TOTAL FUTURES AND OPTIONS VOLUME
(billions)



*Data as of November 2022.
Source: Futures Industry Association.

Data providers, largely the rating agencies, struggled in 2022 as geopolitical uncertainty, slowing economic growth, and a hawkish Fed severely impacted debt issuance volumes. Many corporations were coming from a position of power as they pulled forward debt issuance in 2020 to take advantage of historically low interest rates. As a result, corporations have sat on the sidelines when possible, resulting in corporate debt-to-GDP levels to fall from a high of 57% in the second quarter of 2020 to under 50% as of the third quarter of 2022. However, we see 2022 as a low watermark for debt issuance and expect issuance levels to rise throughout 2023 as the extreme uncertainty of 2022 moderates. We see issuance momentum continuing through 2025 as a growing level of corporate rated debt matures and needs to be replaced. As a result, we expect credit rating agencies to see improving performance as cost-cutting measures are met with improving debt issuance conditions. An added benefit should come from the analytics businesses, which help smooth out transaction-related revenues, given the acyclical nature of analytics revenue.

M&A – A Desirable Option

Because financial exchanges and clearinghouses gain competitive advantages from scale, and as top-line growth slows to mid-single digits, we think there will be increased desire for M&A among the exchanges. However, many cross-border M&A propositions have been rejected by regulators, so bolt-on acquisitions will likely drive activity, at least in the short term.

There will likely be a fundamental shift in the equity and fixed income markets, with fragmentation between equity trading on and off in the public exchanges. At the same time, the move to electronic trading brings more efficiency to trading and clearing for derivatives. CFRA sees the shift in fixed income markets to electronic trading as a multi-year trend for U.S. Treasuries and the like.

In January 2021, EU regulators approved the London Stock Exchange Group's (LSEG) purchase of data and trading group Refinitiv, removing the last major obstacle to a deal to create a major powerhouse in the financial markets. The deal closed a few days later.

The LSEG now owns Refinitiv's market data, analytics, and execution capabilities across asset classes and its focus on four core customer segments: trading, investment and advisory, wealth, and risk management. Refinitiv's data and analytics section provides company, economic, deal, pricing and reference data, low latency real-time data, and desktop analytics. Its other main focuses are the FXall and Matching Foreign Exchange trading platforms and the Tradeweb fixed income trading platform (in which Refinitiv owns a majority interest), as well as a range of products that support compliance and regulatory needs for a broad number of financial and corporate clients. Together, LSEG and Refinitiv generated combined revenue of £5.7 billion as of the third quarter of 2022.

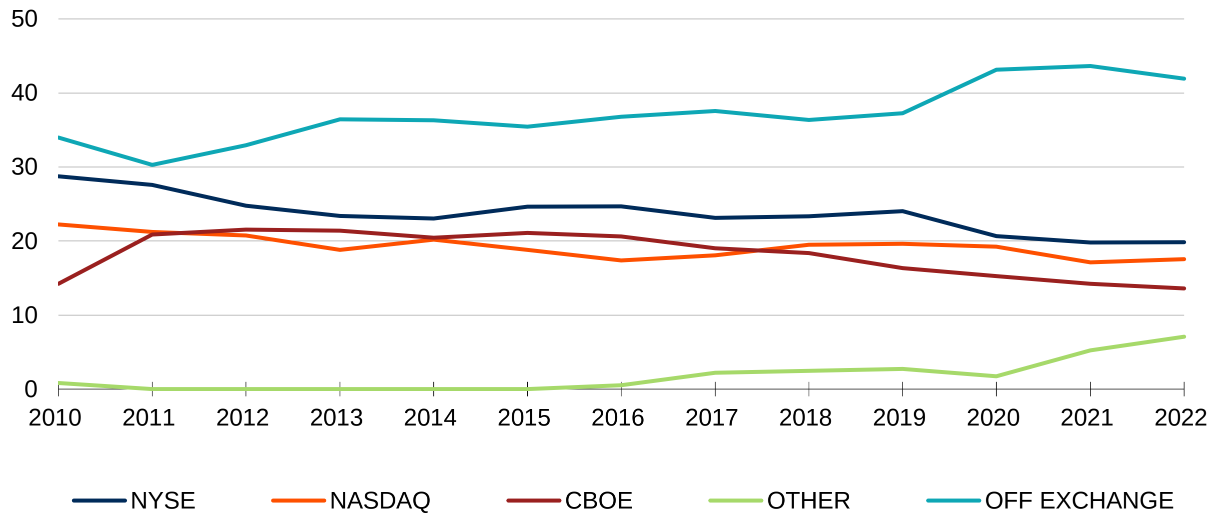
Increasingly, CFRA expects companies such as ICE and Nasdaq to continue to expand their data and analytics businesses tied to the capital markets. Without higher-margin proprietary products (such as the S&P equity options and the VIX owned by CBOE Global Markets), Nasdaq and others are looking to become less reliant on volatile trading commissions that are also experiencing eroding rates. Instead, data and analytics businesses can provide a high-margin, recurring revenue stream, as data and analytics are usually sold on a subscription basis.

Demand for data will be driven by regulatory requirements, such as MiFID II, which requires greater transparency and trade documentation. Data demand could also come from the continued use of algorithmic trading. We see data becoming more valuable as banks and brokers increasingly offload lower-value trading assignments, such as equities, to programmatic trading applications. This could be boosted by the rise and application of artificial intelligence as well.

Regulation Could Increase Equity Trading Volumes at Stock Exchanges

For years, exchanges have seen volumes move off-exchange to dark pools in a trend that, until recently, seemed inevitable to continue. In fact, since 2011, off-exchange volumes have increased from 30% to 42% of total equity trading volume. However, the SEC has begun talks about reforming equity markets as it looks to focus on transparency around best execution, disclosure of execution quality, and a general levelling of the playing field between exchanges and dark pools. We see more industry regulation as a positive for exchanges as they currently experience heightened regulatory scrutiny; thus, added transparency should help exchanges take back market share. As highlighted by John Sonsalla at Washington Analysis, a CFRA business, exchanges are currently at a disadvantage since the SEC generally prevents exchanges from quoting and executing orders in increments of less than one penny. As a potential proposal, the SEC could harmonize the tick sizes across trading venues and allow exchanges to quote in sub-penny increments and thus put exchanges on a level playing field.

U.S. EQUITY EXCHANGE TRADING MARKET SHARE
(in percent)



Source: SIFMA.

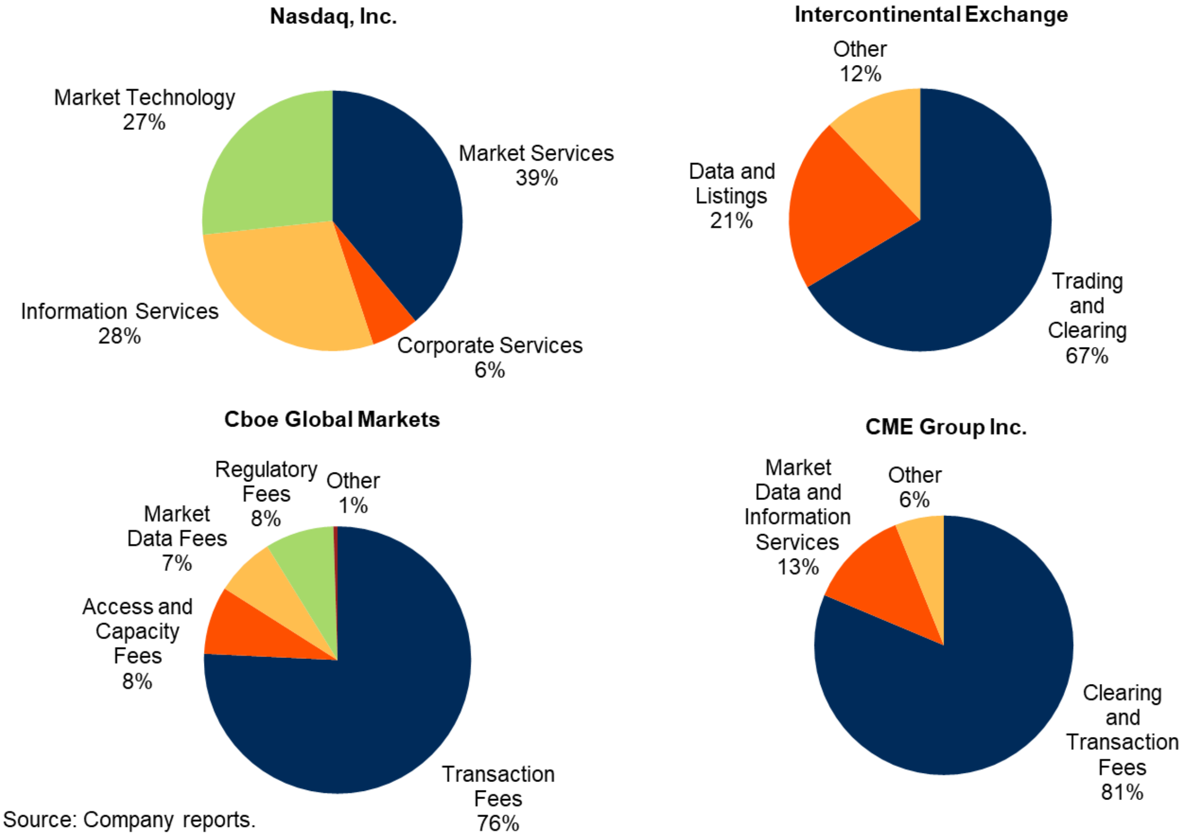
The Line Between Financial Exchanges and Data Providers Becomes Increasingly Blurred
Changes in trading volumes have a different impact on each exchange as some exchanges have significantly diversified their revenue streams. Most reliant on trading volume is CME Group, which derives a hefty 83% of revenue from clearing and transactions fees and thus is highly beholden to market swings in volatility. CBOE is in a similar position, with only 16% of revenue related to market data, but has benefited from an explosion in options volume. On the flip side, Intercontinental Exchange (ICE – owner of NYSE) and Nasdaq have diversified their revenues to a far greater degree. Nasdaq has been a leader in revenue diversification with a heavy emphasis on transforming to a data analytics business. This has resulted in more consistent results and more than 50% of Nasdaq's revenue now comes from recurring revenue rather than transaction revenue. ICE is also transforming its business, as it has increased its recurring revenue by growing its mortgage presence.

On May 4, 2022, ICE announced a definitive agreement to acquire Black Knight, a software company that creates software and works with data and analytics for the real-estate and housing finance markets. This comes after ICE announced the completion of a transformative acquisition on September 4, 2020, in acquiring Ellie Mae, a leading cloud-based platform provider for the mortgage industry. ICE had previously dipped its toes in the electronic mortgage market with its acquisition of Mortgage Electronic Registration Systems and Simplifile. As a result of the acquisitions, ICE's revenue from the mortgage business is expected to jump to 30% (following the closing of Black Knight), from under 2% just a few years ago. We think it makes sense for ICE to commit to its previous strategy and capture more of the entire mortgage process. However, we wonder if it will achieve the synergies that investors hope for as the mortgage business and exchange businesses are still very different, with different clients and customers who want the respective data feeds. We note that regulatory approval for Black Knight could be difficult, as antitrust concerns could force ICE to divest a portion of its business.

We see CBOE and CME continuing to derive most of their revenue from clearing and transaction fees. CME enjoys the benefit of having a vertically integrated clearing firm, which allows it to maintain higher margins, as trades opened on the CME must subsequently be closed on the CME. Meanwhile, CBOE enjoys proprietary products such as the S&P 500 options and futures as well as the volatility index, or VIX.

We think Nasdaq will be the most transformed company of the four major exchanges when it comes to shifting towards data and recurring revenue. Nasdaq has been disposing of lower-growth corporate services businesses and acquiring data businesses. Some of its more notable moves include the selling of its U.S. fixed income business; acquiring Verafin, a leading anti-financial crime technology provider; and acquiring eVestment, a database of asset managers and related analytics.

FINANCIAL EXCHANGES REVENUE SOURCES
(As of Q3 2022)



Source: Company reports.

Financial Exchanges Face the Pressure of a Falling Rate Per Contract (RPC)

For years, heavy competition in the exchange space has led to a decline in the average RPC across trading products. As a result, increases in revenue from higher trading volume is continually hindered by a falling RPC. This can be clearly seen in CME, the world's largest futures exchange, which has seen its average RPC fall from approximately $0.73 in 2018 to just $0.64 through the third quarter of 2022. Our expectation is that this trend will largely continue across all exchanges and relying on non-proprietary trading products will lead to underperformance in the long term. In an effort to combat a falling RPC, we expect exchanges to boost technology spending and move processes to the cloud to enable higher trading volumes and efficiency.

Financial Exchanges Expected to Deleverage

Although most exchanges are not overleveraged, we do expect exchanges to cut their debt levels as rising interest rates increase the cost of debt. Exchanges are entering the new elevated interest rate regime from a position of strength as all four major exchanges have investment-grade credit ratings. The most at risk is ICE, which raised $5 billion back in May to fund a portion of its pending Black Knight acquisition. However, we are encouraged that ICE was able to raise debt before interest rates surged and the exchange has a history of strong free cash flow generation. Additionally, ICE has a demonstrated history of paying down debt and, following its major Ellie Mae acquisition in September 2020, cut its net debt to EBITDA ratio from 4.7x to 3.0x in just 12 months. Looking at Nasdaq, the firm has $800 million of debt coming due at the end of 2022 and we expect the exchange to prioritize its debt paydown to maintain its excellent 2% cost of debt. With a last-12-month free cash flow of $1.4 billion and expected growth in 2023, we don't foresee any issues. We view CBOE's and CME's debt levels as not concerning.

Financial Exchanges Should Benefit When the Crypto Winter Ends

We believe financial exchanges are in a good spot should crypto recover from its current state of deflated prices and bankruptcy turmoil. ICE successfully launched new futures and was the first to offer custody and physical settlement in Bitcoin through Bakkt, a leader in the intersection of crypto assets, loyalty/rewards, and payments. Separately, Nasdaq plans to launch a crypto custody solution for institutions that offer the security of cold wallets and the accessibility of hot wallets simultaneously. CME has added Bitcoin options to its existing futures and introduced micro-Bitcoin futures contracts as well as Ether futures. While CBOE abandoned Bitcoin futures in 2019, it has returned into the space with the acquisition of crypto platform ErisX in 2022. The acquisition provides CBOE with an operator of a U.S.-based digital asset spot market, a regulated futures exchange, and a regulated clearinghouse. Given the collapse in trust surrounding crypto, we view these crypto products more like call options with limited downside but significant upside as all four major U.S. exchanges can continue to grow without any help from crypto.

HOW THE INDUSTRY OPERATES

Broadly defined, the Capital Markets industry in the U.S. comprises these major segments: investment management or asset management (also called the "buy side" by industry participants) and investment banking & brokerage (the "sell side"). Although each segment provides different services to clients, their operations frequently overlap. For example, almost every investment bank owns or operates an investment management and/or high-net-worth division.

In recent years, technological advances and financial product innovation have become key factors in the industry's development. Growing client demand for specialized investment products led to a wide array of financial product innovations, such as various new hedging vehicles, derivative products, and specialized mutual funds. Advances in technology lowered transaction costs and raised market and operating efficiencies. Computers calculate a firm's exposure to market movements, evaluate regulatory capital positions, and monitor developments in markets worldwide. In fact, some trades are executed automatically via computer to speed market response and transaction time.

Despite huge technological advancements, lower employment, and lower compensation, salaries and benefits still make up a large percentage of costs for investment banks, commercial banks, investment managers, and hedge funds.

It is worth noting that in recent years, the overall crypto markets have been under heavy regulatory scrutiny. Lawmakers and regulators' increasing scrutiny of crypto markets, including the debate over the U.S infrastructure bill's crypto tax reporting provision, may be spooking retail investors but not institutional investors. Furthermore, in 2021, the crackdown of crypto exchanges and crypto mining in a number of regions has plummeted Bitcoin's value significantly. Despite that, Bitcoin quickly recovered, but regulatory risks have now taken a backseat to increasing market volatility and a risk-off investor attitude, leading Bitcoin back below $20,000 (from all-time high of $68,990).

Even as Bitcoin poses a potential for greater regulatory oversight, institutional investors are optimistic about Bitcoin's future and find increasing regulations will help validate the industry. In July 2021, JPMorgan Chase became the first bank in the U.S. to offer a crypto fund to a majority of its clients. Other banking powerhouses like Goldman Sachs, Bank of America, and Morgan Stanley are currently offering crypto funds to their wealthy clients only, according to Portfolio Insider. Further, Fidelity Investments announced in June 2022 that it will now allow Bitcoin as an investment in 401Ks.

INVESTMENT BANKING & BROKERAGE

The U.S. Investment Banking & Brokerage sub-industry traces its origins back to colonial days in lower Manhattan when traders gathered to swap stock under the legendary buttonwood tree on what is now Wall Street. Activities in which securities brokers engage include investment banking; industry research; stock, bond, commodities, and options trading and market making; correspondent clearing; proprietary trading; and investment management.

Clients may be individuals, institutions, or governmental bodies. Brokerage firms assist corporations in stock and bond offerings, advise businesses on their foreign currency needs, help individuals plan financially, furnish corporate acquirers with fairness opinions, and the like.

Major Reporting Segments

The upheaval from 2007 to 2009 changed how we classify investment banks. What were considered national full-line firms, we now fold into commercial bank holding companies, along with large investment banks. The "others" category comprises firms that do not fit neatly into one of those definitions.

◆ **Global Investment Banks.** These firms are the largest full-service investment banks with extensive domestic and international operations. They offer advice, underwriting, prime brokerage, trading, asset management, brokerage, and lending services. Some have extensive retail brokerage operations, such as Bank of America and Morgan Stanley. Others, such as Goldman Sachs, primarily service institutional clients. This category also includes large international banks, such as Barclays, Deutsche Bank AG, UBS AG, HSBC Holdings plc, and Credit Suisse Group AG.

◆ **Independent Investment Banks.** These are self-clearing institutions, which maintain limited branch networks that are concentrated in major cities and are typically headquartered in New York City with predominantly institutional client bases. Lazard and Evercore are examples of companies in this category.

◆ **Regional Brokers.** These are full-service brokers/dealers with branch networks in certain regions of the country. Although they mainly serve retail clients, they may also serve institutional clients. Raymond James Financial Inc. and Stifel Financial Corp. are examples of large regional firms.

◆ **Discounters and Online Brokers.** These brokers/dealers primarily engage in executing orders to buy and sell stocks, and typically charge lower commissions than full-service brokers. Commissions, mainly retail, are the primary revenue source. Discounters and online brokers also offer a range of portfolio management and research tools. Charles Schwab Corp., based in Westlake, Texas, is a discounter with a large network of brick-and-mortar offices as well as an online presence, while other leading online brokers, such as TD Ameritrade and E*Trade, were acquired by Charles Schwab and Morgan Stanley in 2020.

◆ **Others.** This category comprises research boutiques, floor specialists, companies with large clearing operations, and other firms that do not fit into one of the five categories listed.

Classifying by Revenue Source

The simplest way to break down the industry is to look at revenue mix.

◆ **Commissions.** In the simplest case, a commission is the broker's fee for executing a customer's order to buy shares of a given stock. The formal definition of commission revenue is that which is produced from all agency equity transactions (including closed-end mutual funds but excluding open-end ones) and debt transactions (including non-inventory principal transactions).

◆ **Trading Income.** This equals the realized and unrealized gains and losses on securities that the firm holds for sale in the ordinary course of business, and gains or losses on securities identified as held for investment. The trading income figure is net of dividends and interest earned on such securities, but it is not reduced by floor costs or taxes.

◆ **Investment Banking Revenue.** This includes income from underwriting and financial advisory operations. Underwriting revenue equals gross profits or losses from managing or investing in underwriting syndicates and selling groups, and equals the sales price less the purchase price, adjusted for discounts, commissions, and allowances. Financial advisory revenues are typically calculated as a percentage of the transaction size, and transactions can include mergers, acquisitions, restructurings, and other activities.

◆ **Asset Management Fees.** These fees represent income from the sale of mutual fund securities, account supervision fees, or investment advisory or administrative services fees.

◆ **Margin Interest.** This is interest earned on customers' securities and commodities accounts when customers borrow against the value of their securities to finance purchases.

◆ **Other Securities-Related Revenue.** This catchall category may include private placement fees, proxy solicitation fees, or subscription fees for research and other periodic publications, as well as dividends and interest from investment accounts (including repurchase agreements and reverse repurchase agreements).

◆ **Non-securities Income.** This income comes from diversified activities, such as mortgage operations.

FINANCIAL EXCHANGES & DATA

Within the Financial Exchanges & Data sub-industry there is, as the name suggests, a bifurcation between financial exchanges and clearing organizations and those that only provide data and do not offer trading services.

◆ **Revenue Sources for Financial Exchanges** are generally derived from transaction fees that are paid whenever a participant opens or closes a trade. However, as noted above, exchanges such as Nasdaq and Intercontinental Exchange Group have been shifting toward recurring revenue sources such as data subscription fees. Exchanges also make money by selling data and co-location services to high-frequency trading firms (HFTs), which allows HFTs to put their trading engines closer to the exchange data in an attempt to receive trading data before competitors.

◆ **Revenue Sources for Data Providers** vary across companies. Rating agencies Moody’s and S&P Global derive the majority of their revenue from their credit rating services and are therefore dependent on the volume of global debt issuance. MSCI’s revenue is mostly comprised of its proprietary index services, which is in turn driven by the licensing and use of the indexes and have benefited greatly from the rise of passive index investing and ETFs. FactSet Research Systems provides data, analytics, and tools primarily to buy-side investors, selling it on a subscription basis.

The Financial Exchanges & Data sub-industry is generally not a very capital-intensive business as it is a service business to primarily serve institutional investors and traders. Employee compensation is the highest expense, followed by professional fees and technology expenses.

While the technological infrastructure is the only physical capital for the industry, increasingly firms are acquiring more data sets and other related businesses, driving up intangible assets and goodwill. This drives down returns in the short-term but can bolster a company’s competitive advantage, especially if the data product or service is proprietary.

HOW TO ANALYZE A COMPANY IN THIS INDUSTRY

This section begins with a discussion on how to analyze investment banks & brokerages, followed by a similar discussion for financial exchanges & data. The section also includes CFRA's thoughts on valuation methods for each sub-industry.

INVESTMENT BANKING & BROKERAGE

An analysis of an investment banking & brokerage firm requires a review of the firm's business mix, an evaluation of various quantitative factors contained in the income statement and the balance sheet, and a risk and quality assessment.

Business Mix

Investment banking & brokerage companies vary significantly. Although grouped in the same industry, these companies often focus on different market segments and products. Therefore, when assessing an investment banking & brokerage firm, it is important to understand the sources of a firm's revenues and the factors that could affect these revenues.

For example, Raymond James Financial, Inc. is a mid-sized domestic, primarily retail brokerage firm. It does very little business, if any, overseas – unlike Goldman Sachs Group, Inc., which generates a significant amount of revenues internationally. Goldman Sachs has indicated that the international market will be a prime driver of its growth going forward. In contrast, Raymond James has no such ambitions. Although both companies are investment banking & brokerage firms, it is easy to see how the dynamics that affect each firm's revenues could vary.

Morgan Stanley combines numerous business lines. In addition to operating a large retail and institutional business, it runs a substantial consumer finance business, while maintaining a significant presence both domestically and internationally.

The Income Statement

After assessing a firm's business mix, it is important to review the firm's recent operating performance and to examine the general direction of earnings and revenues. Although difficult to predict, the ultimate goal of analysis is to project future earnings trends. This involves assessing past trends in the company's operations and using both quantitative and qualitative measures to project revenue, earnings, and cash flows. The income statement provides the investor with concrete measures of operating performance. Important performance-related ratios include compensation ratios, cost ratios, pretax margin, and ROE.

◆ **Compensation Ratios.** The ratio of compensation (salaries, benefits, bonuses, and so on) to net revenues indicates how much of a firm's net revenues are absorbed by personnel costs, and it is particularly important because compensation is the industry's single-largest expense item. The compensation ratio can be many times as large as the next biggest expense (communications, occupancy, or some other category, depending on the broker). For most major industry participants, compensation ratios are in the 35%-40% range as a percentage of total revenue for the leading firms, such as Goldman Sachs and Morgan Stanley. This compares to regional firms like Raymond James and Stifel Financial that are in the 60%-70% range, with a higher percentage of labor tied to business segments.

◆ **Cost Ratios.** Non-compensation and non-interest costs (including occupancy, equipment, communications, business development, professional fees, and the like, but excluding special and nonrecurring costs) to net revenues is a near relative to the compensation ratio cited above. It reveals the level of relatively fixed costs required to produce a given level of revenues. Further cost analysis might focus on the ratio of fixed versus variable costs. These measures can indicate how a firm might perform in an upturn or a downturn.

Watch Out! *Companies can capitalize as assets certain sales commissions paid to broker/dealers in connection with trading. If client assets do not remain under management for a sufficient period, deferred sales charges and management fees could be insufficient to cover these up-front costs.*

◆ **Pretax Margin.** This is defined as pretax income to net revenues. It is a basic measure of profitability, expressing how much pretax profit is generated by each dollar in net revenues. Broker/dealers' pretax margins can vary widely over the course of an industry cycle; they were negative in 2007 and 2008, and then subsequently returned to positive. Compensation and benefit costs are the highest operating expenses to impact pretax margin levels.

Watch Out! *Companies can manage pro-forma earnings by characterizing income statement items as "one-time". Companies record special charges for unusual or infrequent items, e.g., restructuring charges. Such charges are often excluded from non-GAAP earnings, and therefore provide dishonest management with the ability to enhance analysts' perception of its profitability through aggressive use of these special charges.*

◆ **ROE.** Another measure of financial performance is ROE, which measures how efficiently a company employs shareholders' capital. ROE equals net income divided by average shareholders' equity. In a typical operating environment, brokers' balance sheets are highly liquid; they are composed mainly of securities, which are marked to market on a daily basis. Thus, if a broker were liquidated, the amount left over would be its balance-sheet equity.

The Balance Sheet

A company's financial strength – its ability to survive bad times and to grow during good times – may be quantitatively assessed based on its net assets, leverage ratio, liquidity, and credit rating. These numerical factors can be derived from the balance sheet, the statement listing company assets, liabilities, and net worth.

◆ **Net Assets.** This is calculated by subtracting reverse repurchase agreements from total assets. A reverse repurchase agreement is a transaction in which a dealer purchases securities with the agreement to resell them later at a given price. Such agreements inflate the balance sheet without really increasing leverage or risk.

◆ **Leverage Ratio.** There are a number of ways to measure leverage, but CFRA prefers to use total assets divided by total equity. The investment banking & brokerage industry maintains important leverage, in part, due to its significant trading, underwriting, and asset spread-based businesses.

◆ **Liquidity.** The liquidity of a firm's inventory holdings is another factor to consider in assessing financial strength. Liquidity is measured by the percentage of total assets that can be sold for cash in a short period.

◆ **Credit Rating.** An investor should look at a firm's credit rating. Because rating agencies have access to confidential company information, their opinions are based on more comprehensive knowledge than is available to the average investor. S&P Global credit ratings for industry participants are a good indication of a company's financial security and can materially affect a company's cost of capital and net interest spread. Look for any trends in these ratings over time.

Risk and Quality Assessment

Brokers are exposed to market, credit, and operational and support risks. A broker's risk assessment is done by analyzing the quality of management, the company's earnings record, and the stability of principal transactions income. However, specific information about a brokerage firm's investments and the way they are hedged is not publicly available. Often, companies attempt to offset investment risk by investing in securities expected to change in value by an equal amount in the opposite direction. Thus, risk may be difficult for outside analysts to assess.

◆ **Market Risk.** This is especially critical because the majority of revenues and profits are generated by capital markets activities, which typically include market making, specialist and proprietary trading, investing, and underwriting. Factors that can affect market risk include exposures to interest rates, equity prices, currency rates, and commodities prices. A thorough analysis of this area would involve an analysis of a company's diversification of exposures, control of position sizes, and hedging activities.

> ***Watch Out!*** *Inflection points in the interest rate cycle (e.g. when the Federal Reserve changes its interest rate policy) or significant changes in the shape of the yield curve are challenging environments that require financial institutions to adjust their balance sheets to maximize interest income. Failure to adequately hedge the portfolio can result in significant reductions in earnings.*

Investment banks perform scenario analyses and stress tests to manage their exposure to market risk. Many banks use a summary measure called Value at Risk (VaR) to quantify their exposure. Typically expressed as the potential loss in value of all trading positions in a given day at a specified confidence level, VaR can provide a useful measure of the trading risk incurred in a given quarter.

◆ **Credit Risk.** This refers to the risk involved if a counterparty is unable to honor its contractual obligations to the company. An example would be the loss a broker might sustain if the counterparty to one of its repurchase agreements or interest-rate swap arrangements failed to perform in accordance with the contractual terms of the agreement. Credit risk also refers to the possibility that one of the firm's investments may turn sour.

◆ **Operational and Support Risk.** This refers, among other things, to the prospect that inadequately supervised trading operations may result in losses. Most firms have a risk management department that functions in an internal auditing capacity.

◆ **Quality of Management.** This is a subjective consideration, involving a judgment of management skill. The reputation of a management team, although subjectively determined, often reflects the inner workings and culture of an investment services firm.

FINANCIAL EXCHANGE & DATA

An analysis of the financial exchanges and data companies requires first reviewing the revenue segments, mix of products traded and their respective margins, and a general view of how much those segments have grown and are expected to grow.

The Income Statement

◆ **Revenues.** The revenue of financial exchange is derived from the volume of contracts traded (usually defined as average daily volume or ADV) multiplied by the rate per contract or RPC. Analyst and investors track both trends and the factors that drive them. Increasing economic or geopolitical uncertainty leads to increased demand for risk management and the trading of derivatives, while the increasing use of high frequency trading also raises trading volume. The rating agencies' revenue tracks the issuance of new debt securities by corporations and governments, while data supplier revenue depends on AUM growth at asset management firms as well as general trading levels by market participants.

◆ **Expenses.** Compensation costs and benefits are usually the largest expenses for a financial exchange and data company. Technological and related professional fees are second as exchanges and data providers are continually updating and reinvesting in their platform to offer the latest trading products and data feeds.

◆ **Net Profit Margin.** Financial exchanges and data providers have high margins compared to other companies due to their capital-light business models, resilient recurring revenues, economies of scale, and proprietary products that provide high barriers to entry.

The Balance Sheet

Financial exchanges and data companies have relatively simple balance sheets due to the lower capital intensity.

◆ **Assets.** The largest assets for most companies are intangibles (proprietary trading products, indexes, etc.) and goodwill due to the increasing M&A activity and acquisition of data sets in the industry.

◆ **Liabilities.** The largest liabilities are usually debt, and for the exchanges can be a mixture of customer deposits or performance guarantees/bonds as the exchanges act as a counterparty to ensure trades are completed as agreed.

◆ **Leverage.** Financial exchanges tend to have lower leverage as credit risk is a significant factor for business operations, while rating agencies have higher leverage due to the relatively stable nature of the business.

Risk and Quality Assessment

◆ **Market Risk.** Because so much of the exchange and data revenue is tied to the capital markets trading and security issuance levels, market risk is one of the primary risks to growth. An economic slowdown and subsequent contracting of trading volumes, IPO issuance, and new debt issuance could severely curtail revenue.

◆ **Credit Risk.** As some financial exchanges also operate as clearing firms and counterparties, this exposes them to substantial credit risk. If a customer or clearing firm defaults on its obligation, and its margin or guaranty fund deposits are insufficient, the exchange could be at risk of covering the shortfall with its own resources or working capital.

Watch Out! *Setting proper reserve levels for inherent credit losses is one of the most significant issues for companies in the Financials sector, and it is the single most important accounting issue for any company specializing in lending. Not only is reserving for credit losses inherently subjective; but it is also subject to differing points of view depending on regulatory perspective. Unforeseen or ignored adverse trends in credit quality can result in significant earnings surprises.*

◆ **Operational Risk.** This is the risk that a financial exchange could experience system failures or technical problems. A major operational error or recurring errors and "glitches" could erode the trust and brand value of an exchange, pushing customers to other exchanges. Data providers also face similar risks. If their data is found to contain serious or repeated errors or omissions this would also diminish the data provider's reputation and brand.

Valuation

As a final step, the investor should establish a value for the company by comparing it with market and industry benchmarks. The benchmarks differ for the two sub-industries described below.

Investment Banking & Brokerage

Analyzing price-to-earnings (P/E) ratios remains the key metric for large brokers, such as Morgan Stanley, which have fairly diversified income streams. P/E ratio analysis centers on comparing a broker's P/E ratio to those of its peers and of the S&P 500 Index.

Historically, the preferred ratio to use in valuing a brokerage stock has been price-to-tangible book value. Book value benefits from the fact that brokers mark their positions to market every day, and their assets are highly liquid. This measure has come into focus during market troughs as companies were trading based on the quality of their balance sheets more than the earnings power of the company.

Financial Exchanges & Data

The preferred comparative valuation ratio for financial exchanges and data companies is the price-to-earnings (P/E) ratio. Given the constituents of this sub-industry are all highly profitable with a relatively stable history, the P/E ratio tends to be intuitive and easily calculated.

Financial exchanges and data companies have a higher mix of proprietary trading and data products receiving a higher P/E multiple. This premium may be justified given the proprietary products carry higher margins with greater barriers to entry. It also appears those with greater scale also receive a premium due to the natural economies of scale of the business.

GLOSSARY

Assets under management (AUM)—Market value of assets managed by an investment company on behalf of the investors.

Dealer—A firm that buys and sells securities for its own account rather than as an agent.

Exchange-traded fund (ETF)—A marketable security that tracks indices, bonds, commodities, or index funds. ETFs are traded like common stocks on an exchange.

Federal National Mortgage Association (Fannie Mae)—A U.S. government-sponsored enterprise (GSE) founded during the 1938 Great Depression with the purpose of stimulating the secondary mortgage market by securitizing mortgage loans in the form of mortgage-backed securities (MBS).

Federal Home Loan Mortgage Corporation (Freddie Mac)—Created in 1970 with a similar purpose to Fannie Mae. While Fannie Mae mostly buys mortgage loans from commercial banks, Freddie Mac purchases mortgages from smaller “thrifts” banks.

Fixed income, currencies, and commodities (FICC)—Trading, research, sales, and financial services for fixed-income, currencies, and commodities provided by investment banks.

Over-the-counter (OTC) trading—A market in which securities transactions are conducted through a telephone and computer network connecting dealers in stocks and bonds, rather than on the floor of an exchange.

Price-to-tangible book value—A useful measure to weigh how the stock market values the Capital Markets industry. It compares the price of a security with the tangible book value of a company.

Rate per contract (RPC)—The average total transaction fees per contract. RPC can be affected by various factors including exchange fee rates, volume-based discounts, and transaction mix by contract and product type.

Tangible book value—A company’s total book value minus the value of intangible assets such as patents, intellectual property, and goodwill.

Total enterprise value-to-earnings before interest, tax, depreciation, and amortization (TEV/EBITDA) multiple—A ratio used for the valuation of a company that takes into account debt, while removing the distorting effects of different taxation policies per country.

Underwriter—A firm that assumes the risk of buying newly issued securities from a (issuing) corporation or government entity and resells it to the public (either directly or through dealers). The underwriter makes a profit from the underwriting spread. The spread is the difference between the price the underwriter pays to the issuer and the (higher) public offering price.

Value at Risk (VaR)—One summary measure of market risk, which is typically expressed as the potential loss in value of trading positions in a given day at a specified confidence level.

Volume—Total number of stock shares, bonds, or commodities futures contracts traded in a particular period.

Yield curve—A graph showing the term structure of interest rates. It is constructed by plotting the yields of bonds of the same quality by maturity date ranging from the shortest to the longest-term bond available. The curve may be flat, positively sloped, or negatively sloped, depending on investor expectations and monetary conditions.

INDUSTRY REFERENCES

PERIODICALS

Forbes
forbes.com
A global media company focusing on business, investing, technology, entrepreneurship, leadership, and lifestyle.
The Wall Street Journal
wsj.com
A U.S. business-focused, English-language international daily newspaper.

TRADE ASSOCIATIONS & REGULATORY AGENCIES

Board of Governors of the Federal Reserve System
federalreserve.gov
The Federal Reserve System supervises and regulates banks; maintains the stability of the financial system; conducts U.S. monetary policy by influencing money and credit conditions; and provides certain financial services to the U.S. government, the public, financial institutions, and foreign official institutions.

Futures Industry Association (FIA)
fia.org
An association representing the cleared derivatives industry, made up of futures commission merchants, banks, and trading advisers operating in the U.S., EU, and Asian futures markets. Provides information and education on futures markets and trading.

Securities Industry Association (SIFMA)
sifma.org
U.S. industry trade group representing securities firms, banks, and asset management companies. Publishes research and reports on the U.S. capital markets.

World Federation of Exchanges (WFE)
world-exchanges.org
Formally the Federation Internationale des Bourses de Valeurs, or International Federation of Stock Exchanges. Represents 64 regulated exchanges across the world, and provides statistics on equity, derivatives, and fixed income market.

GOVERNMENT AGENCIES

U.S. Commodity Futures Trading Commission (CFTC)
cftc.gov
Independent regulator of the U.S. commodity futures and options market.

U.S. Securities and Exchange Commission (SEC)
sec.gov
Federal agency created in 1934 to protect the investing public against securities industry malpractice; supervises all national securities exchanges, broker/dealers, and investment advisors.

ONLINE RESOURCES

Chicago Board Options Exchange (CBOE)
cboe.org
Largest U.S. options exchange, also a market leader in developing new financial products. Provides volume and trading data on options.

Chicago Mercantile Exchange & Chicago Board of Trade (CME Group)
cmegroup.org
Financial market company operating an options and futures exchange. Provides data on options and futures.

Climate Bonds Initiative
climatebonds.net
An international organization working to mobilize global capital for climate action.

Intercontinental Exchange (ICE)
theice.com
Source of market data for New York Stock Exchange (NYSE) member firms.

Institutional Investor
institutionalinvestor.com
Examines trends in banking, pensions, corporate finance, insurance, corporations, and investing.

Portfolio Insider
Nasdaq.com
A fintech analytics company powering the open finance revolution. Provides on-chain market intelligence and real time data services for institutional and retail stakeholders.

Refinitiv (formerly Thomson Reuters Deals Intelligence)
refinitiv.com
A source of league table data to gauge investment banks' market activity, including M&A and underwriting volume; updated quarterly.

SPAC Research
spacresearch.com
A resource for information on Special Purpose Acquisition Companies.

The Conference Board
conference-board.org
A non-profit business membership and research group organization.

The Institute for Financial Markets (IFM)
theifm.org
Non-profit foundation focused on education and research on financial markets and the financial services industry.

The New York Stock Exchange (NYSE)
nyse.com
Source of market statistics, including trading volume, short interest, and margin debt.

The Options Clearing House (OCC)
theocc.com
A U.S. clearinghouse based in Chicago specializing in equity derivatives clearing. Provides data on the options market.

COMPARATIVE COMPANY ANALYSIS

				Operating Revenues															
				Million $							CAGR (%)			Index Basis (2012=100)					
Ticker	Company		Yr. End	2022	2021	2020	2019	2018	2017	2016	10-Yr.	5-Yr.	1-Yr.	2022	2021	2020	2019	2018	2017
INVESTMENT BANKING AND BROKERAGE																			
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN	0.0	1,595.5	795.0	569.8	366.6	301.7	188.4	NA	NA	NA	0	847	422	302	195	160
EVR	† EVERCORE INC.		DEC	2,762.0	3,285.1	2,294.7	2,008.7	2,064.7	1,635.3	1,440.1	15.7	11.1	-15.9	192	228	159	139	143	114
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	3,067.0	2,751.0	2,237.0	1,997.0	1,922.0	1,581.0	1,436.0	10.3	14.2	11.5	214	192	156	139	134	110
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	5,840.1	8,013.8	5,850.5	3,805.8	4,008.9	3,798.0	2,939.6	-4.6	9.0	-27.1	199	273	199	129	136	129
MS	[] MORGAN STANLEY		DEC	53,388.0	59,751.0	47,996.0	41,377.0	40,107.0	37,945.0	34,631.0	7.4	7.1	-10.6	154	173	139	119	116	110
PIPR	§ PIPER SANDLER COMPANIES		DEC	1,425.6	2,031.1	1,238.2	834.6	741.0	823.6	747.3	11.3	11.6	-29.8	191	272	166	112	99	110
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	10,801.0	9,813.0	7,757.0	7,693.0	7,236.0	6,378.0	5,379.6	11.1	11.1	10.1	201	182	144	143	135	119
SF	† STIFEL FINANCIAL CORP.		DEC	4,357.9	4,743.7	3,718.1	3,327.1	3,006.5	2,926.4	2,575.5	10.6	8.3	-8.1	169	184	144	129	117	114
SNEX	§ STONEX GROUP INC.		SEP	65,855.8	42,443.3	54,035.6	32,742.3	27,542.0	29,381.5	14,726.6	-0.1	17.5	55.2	447	288	367	222	187	200
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	20,762.0	18,520.0	11,691.0	10,721.0	10,132.0	8,618.0	7,462.0	15.7	19.2	12.1	278	248	157	144	136	115
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	44,650.0	58,982.0	41,462.0	35,481.0	35,942.0	32,073.0	30,608.0	2.7	6.8	-24.3	146	193	135	116	117	105
FINANCIAL EXCHANGES AND DATA																			
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	3,958.5	3,494.8	3,427.1	2,496.1	2,768.8	2,229.1	703.1	22.7	12.2	13.3	563	497	487	355	394	317
CME	[] CME GROUP INC.		DEC	5,019.4	4,679.3	4,870.3	4,868.0	4,309.4	3,644.7	3,595.2	5.6	6.6	7.3	140	130	135	135	120	101
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN	0.0	993.3	894.5	874.7	963.0	1,004.9	983.5	NA	NA	NA	0	101	91	89	98	102
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	1,843.9	1,591.4	1,494.1	1,435.4	1,350.1	1,221.2	1,127.1	8.6	8.6	15.9	164	141	133	127	120	108
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	7,292.0	7,146.0	6,036.0	5,202.0	4,979.0	4,638.0	4,512.0	18.3	9.5	2.0	162	158	134	115	110	103
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	718.3	699.0	689.1	511.4	435.6	393.4	367.7	14.2	12.8	2.8	195	190	187	139	118	107
MCO	[] MOODY'S CORPORATION		DEC	5,468.0	6,218.0	5,371.0	4,829.0	4,443.0	4,204.0	3,604.2	7.2	5.4	-12.1	152	173	149	134	123	117
MSCI	[] MSCI INC.		DEC	2,248.6	2,043.5	1,695.4	1,557.8	1,434.0	1,274.2	1,150.7	10.5	12.0	10.0	195	178	147	135	125	111
NDAQ	[] NASDAQ, INC.		DEC	6,226.0	5,886.0	5,625.0	4,258.0	4,277.0	3,948.0	3,704.0	7.2	9.5	5.8	168	159	152	115	115	107
SPGI	[] S&P GLOBAL INC.		DEC	11,181.0	8,297.0	7,442.0	6,699.0	6,258.0	6,063.0	5,661.0	10.1	13.0	34.8	198	147	131	118	111	107

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

Net Income

Ticker	Company		Yr. End	Million $							CAGR (%)			Index Basis (2012=100)					
				2022	2021	2020	2019	2018	2017	2016	10-Yr.	5-Yr.	1-Yr.	2022	2021	2020	2019	2018	2017
INVESTMENT BANKING AND BROKERAGE																			
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN	0.0	445.1	205.1	81.6	15.5	11.6	21.5	NA	NA	NA	0	2068	953	379	72	54
EVR	† EVERCORE INC.		DEC	476.5	740.1	350.6	297.4	377.2	125.5	107.5	32.4	30.6	-35.6	443	688	326	277	351	117
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	380.0	308.0	195.0	161.0	169.0	76.0	84.0	25.0	38.0	23.4	452	367	232	192	201	90
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	785.4	1,674.4	775.2	964.7	1,120.1	171.7	130.0	-0.8	35.5	-53.1	604	1288	596	742	862	132
MS	[] MORGAN STANLEY		DEC	11,029.0	15,034.0	10,996.0	9,042.0	8,748.0	6,111.0	5,979.0	66.3	12.5	-26.6	184	251	184	151	146	102
PIPR	§ PIPER SANDLER COMPANIES		DEC	110.7	278.5	40.5	111.7	57.0	-61.9	-22.0	10.4	NM	-60.3	-504	NM	-185	-509	-260	282
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	1,509.0	1,403.0	818.0	1,034.0	857.0	636.0	529.4	17.7	18.9	7.6	285	265	155	195	162	120
SF	† STIFEL FINANCIAL CORP.		DEC	662.2	824.9	503.5	448.4	394.0	182.9	81.5	16.9	29.3	-19.7	812	1012	618	550	483	224
SNEX	§ STONEX GROUP INC.		SEP	207.1	116.3	169.6	85.1	55.5	6.4	54.7	32.1	100.4	78.1	379	213	310	156	101	12
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	7,183.0	5,855.0	3,299.0	3,704.0	3,507.0	2,354.0	1,889.0	22.7	25.0	22.7	380	310	175	196	186	125
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	11,261.0	21,635.0	9,459.0	8,466.0	10,459.0	4,286.0	7,398.0	4.2	21.3	-48.0	152	292	128	114	141	58
FINANCIAL EXCHANGES AND DATA																			
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	235.0	529.0	468.2	374.9	426.5	401.7	186.8	4.1	-10.2	-55.6	126	283	251	201	228	215
CME	[] CME GROUP INC.		DEC	2,691.0	2,636.4	2,105.2	2,116.5	1,962.2	4,063.4	1,534.1	11.6	-7.9	2.1	175	172	137	138	128	265
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN	0.0	145.9	-25.9	37.6	73.6	9.7	59.1	NA	NA	NA	0	247	-44	64	125	16
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	396.9	399.6	372.9	352.8	267.1	258.3	338.8	7.7	9.0	-0.7	117	118	110	104	79	76
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	1,446.0	4,058.0	2,089.0	1,933.0	1,988.0	2,526.0	1,430.0	10.1	-10.6	-64.4	101	284	146	135	139	177
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	250.2	257.9	299.4	204.9	172.9	148.1	126.2	15.3	11.1	-3.0	198	204	237	162	137	117
MCO	[] MOODY'S CORPORATION		DEC	1,374.0	2,214.0	1,778.0	1,422.0	1,310.0	1,001.0	266.6	7.1	6.5	-37.9	515	830	667	533	491	375
MSCI	[] MSCI INC.		DEC	870.6	726.0	601.8	563.6	507.9	304.0	260.9	16.8	23.4	19.9	334	278	231	216	195	117
NDAQ	[] NASDAQ, INC.		DEC	1,125.0	1,187.0	933.0	774.0	458.0	729.0	106.0	12.3	9.1	-5.2	1061	1120	880	730	432	688
SPGI	[] S&P GLOBAL INC.		DEC	3,248.0	3,024.0	2,339.0	2,123.0	1,958.0	1,496.0	2,106.0	22.2	16.8	7.4	154	144	111	101	93	71

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

				Return on Revenues (%)						Return on Assets (%)						Return on Equity (%)					
Ticker	**Company**		**Yr. End**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**
INVESTMENT BANKING AND BROKERAGE																					
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN	0.0	0.0	27.9	25.8	14.3	4.2	NA	NA	7.6	7.7	3.5	0.8	0.0	0.0	56.7	43.9	25.3	6.3
EVR	† EVERCORE INC.		DEC	17.3	22.5	15.3	14.8	18.3	7.7	NA	19.5	10.4	11.4	17.7	7.9	33.0	55.6	31.6	33.1	49.1	22.7
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	12.4	11.2	8.7	8.1	8.8	4.8	0.3	0.3	0.2	0.2	0.3	0.1	16.9	17.0	13.9	14.4	16.6	12.9
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	13.4	20.9	13.3	25.3	27.9	4.5	1.5	3.0	1.5	2.0	2.4	0.4	7.4	16.5	7.9	9.6	0.0	NM
MS	[] MORGAN STANLEY		DEC	20.7	25.2	22.9	21.9	21.8	16.1	NA	1.3	1.0	1.0	1.0	0.7	10.7	14.4	12.0	11.3	11.1	8.0
PIPR	§ PIPER SANDLER COMPANIES		DEC	7.8	13.7	3.3	13.4	7.7	NM	NA	10.9	2.0	6.9	4.2	NM	8.4	30.7	5.7	12.3	7.4	3.3
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	14.0	14.3	10.5	13.4	11.8	10.0	1.9	2.3	1.7	2.7	2.3	1.8	17.0	18.1	11.8	15.8	14.1	11.8
SF	† STIFEL FINANCIAL CORP.		DEC	15.2	17.4	13.5	13.5	13.1	6.2	NA	2.4	1.9	1.8	1.6	0.9	12.9	17.8	12.7	13.1	13.0	6.5
SNEX	§ STONEX GROUP INC.		SEP	0.3	0.3	0.3	0.3	0.2	0.0	1.0	0.6	1.3	0.9	0.7	0.1	21.0	13.9	24.9	15.5	11.6	1.4
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	34.6	31.6	28.2	34.5	34.6	27.3	NA	0.9	0.6	1.3	1.2	1.0	15.4	10.4	8.5	17.5	17.9	13.5
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	25.2	36.7	22.8	23.9	29.1	13.4	0.8	1.5	0.8	0.9	1.1	0.5	9.9	20.8	10.0	9.2	12.0	5.0
FINANCIAL EXCHANGES AND DATA																					
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	5.9	15.1	13.7	15.0	15.4	18.0	3.4	7.8	7.2	7.3	8.0	7.6	6.6	15.2	14.0	11.2	13.3	23.2
CME	[] CME GROUP INC.		DEC	53.6	56.3	43.2	43.5	45.5	111.5	1.5	1.3	1.7	2.8	2.5	5.4	9.9	9.8	8.0	8.1	8.1	19.0
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN	0.0	0.0	14.7	NM	4.3	7.6	NA	NA	16.5	NM	4.2	8.5	0.0	0.0	46.7	NM	15.2	39.2
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	21.5	25.1	25.0	24.6	19.8	21.1	9.9	18.0	17.9	22.6	18.8	18.3	33.8	41.8	47.5	58.9	49.2	48.0
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	19.8	56.8	34.6	37.2	39.9	54.5	0.7	2.1	1.7	2.0	2.1	3.2	6.6	19.2	11.4	11.3	11.8	15.6
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	34.8	36.9	43.4	40.1	39.7	37.6	15.6	16.9	22.5	21.5	24.9	25.5	23.6	25.8	34.7	29.7	30.8	30.1
MCO	[] MOODY'S CORPORATION		DEC	25.1	35.6	33.1	29.4	29.5	23.8	9.6	15.1	14.3	13.9	13.8	11.6	49.0	94.6	136.7	191.4	487.9	NM
MSCI	[] MSCI INC.		DEC	38.7	35.5	35.5	36.2	35.4	23.9	17.4	13.2	14.3	13.4	15.0	9.3	NM	NM	NM	NM	433.1	84.6
NDAQ	[] NASDAQ, INC.		DEC	18.1	20.2	16.6	18.2	10.7	18.5	5.4	5.9	5.2	5.6	2.9	4.7	17.9	18.5	15.5	14.0	8.1	12.9
SPGI	[] S&P GLOBAL INC.		DEC	29.0	36.4	31.4	31.7	31.3	24.7	5.3	20.1	18.7	18.7	20.7	15.9	15.6	73.4	82.3	90.2	95.9	84.0

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

				Current Ratio						Debt/Capital Ratio (%)						Debt as a % of Net Working Capital					
Ticker	Company		Yr. End	2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017
INVESTMENT BANKING AND BROKERAGE																					
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN	0.0	0.0	2.1	2.2	1.7	1.5	NA	NA	133.7	114.7	135.1	184.1	NA	NA	148.9	150.1	218.1	295.8
EVR	† EVERCORE INC.		DEC	0.0	1.1	1.4	2.1	1.9	2.1	0.0	18.7	18.5	26.7	16.5	21.1	NA	390.1	79.1	54.0	30.1	38.5
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	1.1	1.1	1.1	1.1	1.1	1.1	77.1	115.7	111.0	83.2	62.4	97.0	79.4	122.4	114.1	85.0	63.3	98.6
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	1.5	1.6	1.7	1.7	1.6	1.6	100.3	100.0	111.7	105.5	103.9	101.7	139.6	128.4	117.2	123.9	119.5	118.9
MS	[] MORGAN STANLEY		DEC	0.0	1.9	1.8	1.8	1.8	1.8	0.0	103.7	104.8	107.0	104.5	108.7	NA	72.7	75.5	82.8	76.8	84.4
PIPR	§ PIPER SANDLER COMPANIES		DEC	0.0	1.5	1.5	2.1	1.6	1.3	0.0	9.6	17.9	23.3	7.5	39.8	NA	24.3	48.5	36.8	14.3	91.8
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	4.1	3.0	3.9	4.7	3.9	3.5	33.9	30.4	35.4	35.5	37.1	49.4	8.6	10.2	13.1	12.4	13.8	18.6
SF	† STIFEL FINANCIAL CORP.		DEC	0.0	0.9	0.8	0.8	0.7	0.7	0.0	25.1	25.2	36.2	54.6	58.8	NA	-41.2	-43.7	-46.2	-46.5	-42.1
SNEX	§ STONEX GROUP INC.		SEP	1.3	1.1	1.1	1.1	1.1	1.1	109.9	183.4	154.0	483.5	321.1	301.6	118.4	219.3	187.1	603.6	402.2	419.5
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	0.0	0.4	0.4	0.4	0.3	0.3	0.0	41.1	30.4	29.8	29.1	89.0	NA	-9.1	-7.3	-5.1	-4.4	-13.9
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	2.5	1.7	1.8	1.8	1.9	1.9	89.2	151.2	146.2	135.2	119.5	128.4	61.1	103.8	101.5	102.7	94.2	93.1
FINANCIAL EXCHANGES AND DATA																					
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	1.1	1.3	1.2	2.2	1.1	1.3	29.3	26.5	25.3	20.5	22.0	28.4	1,824.0	358.9	447.8	266.1	1,042.8	1,229.3
CME	[] CME GROUP INC.		DEC	1.0	1.0	1.0	1.0	1.0	1.0	11.3	11.4	11.6	12.5	14.8	9.1	247.2	252.7	317.1	358.1	716.7	181.0
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN	0.0	0.0	1.1	1.1	1.2	1.3	NA	NA	24.8	48.2	52.4	61.6	NA	NA	677.6	803.1	933.8	716.8
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	2.0	3.0	3.0	2.7	1.9	2.0	59.8	36.2	39.2	46.1	52.2	50.7	458.8	93.2	102.2	157.4	274.0	276.1
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	1.1	1.0	1.0	1.0	1.0	1.0	44.3	39.6	49.0	29.1	31.3	25.9	233.1	1,565.6	NM	NM	1,274.1	NM
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	7.9	6.8	6.2	5.3	4.9	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MCO	[] MOODY'S CORPORATION		DEC	1.7	1.6	2.0	1.9	1.6	1.3	73.3	71.8	78.5	87.0	88.9	104.9	429.8	490.8	280.8	315.8	406.1	1,013.8
MSCI	[] MSCI INC.		DEC	1.4	1.7	1.9	2.3	1.8	2.1	128.8	104.1	115.2	102.6	106.9	83.8	905.3	466.3	372.5	260.1	411.4	315.1
NDAQ	[] NASDAQ, INC.		DEC	1.0	0.9	1.6	1.0	1.0	1.1	49.5	52.0	46.3	39.2	45.6	43.8	NM	NM	202.5	5,376.2	NM	1,524.3
SPGI	[] S&P GLOBAL INC.		DEC	0.9	2.3	1.7	1.5	1.4	1.3	21.3	44.2	55.1	58.5	61.4	59.9	NM	87.8	171.2	243.9	382.7	285.6

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

				Price/Earnings Ratio (High-Low)						Dividend Payout Ratio (%)						Dividend Yield (High-Low, %)					
Ticker	Company		Yr. End	2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017	2022	2021	2020	2019	2018	2017
INVESTMENT BANKING AND BROKERAGE																					
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN		3 - 1	4 - 2	7 - 4	34 - 23	43 - 17	0.0	0.0	17.3	19.1	17.6	63.2	12.5 - 4.6	6.2 - 2.6	13.5 - 3.4	6.9 - 3.8	5.2 - 1.6	2.3 - 1.5
EVR	† EVERCORE INC.		DEC	12 - 7	9 - 6	13 - 4	13 - 9	12 - 7	29 - 21	0.0	16.0	30.4	32.5	20.5	45.1	2.7 - 2.1	3.6 - 1.9	2.6 - 1.7	6.5 - 2.6	3.2 - 2.1	2.6 - 1.6
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	22 - 14	25 - 18	25 - 14	28 - 21	35 - 20	57 - 31	0.0	12.3	16.4	19.3	17.2	36.8	0.6 - 0.5	0.8 - 0.5	0.7 - 0.5	1.1 - 0.7	0.9 - 0.7	0.8 - 0.5
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	13 - 8	7 - 4	9 - 5	7 - 5	9 - 6	60 - 47	35.7	13.3	20.8	15.5	14.8	68.4	3.6 - 3.0	4.6 - 2.3	3.5 - 2.3	5.0 - 2.3	3.1 - 2.3	2.5 - 1.4
MS	[] MORGAN STANLEY		DEC	17 - 12	13 - 8	10 - 4	10 - 7	12 - 8	17 - 13	0.0	27.7	24.9	29.1	27.1	34.1	3.7 - 3.1	4.1 - 2.6	3.1 - 1.5	5.0 - 2.2	3.6 - 2.5	2.8 - 1.7
PIPR	§ PIPER SANDLER COMPANIES		DEC	23 - 13	10 - 5	36 - 12	10 - 8	26 - 16	NM - NM	0.0	8.0	43.5	19.0	39.7	NM	5.3 - 2.3	9.6 - 4.6	5.9 - 2.1	6.6 - 2.2	4.1 - 3.0	3.7 - 1.3
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	16 - 12	14 - 7	17 - 9	13 - 10	17 - 14	19 - 13	18.4	15.5	25.1	18.5	17.6	20.0	1.6 - 1.1	1.6 - 1.0	2.1 - 1.1	2.7 - 1.5	2.0 - 1.3	1.4 - 0.9
SF	† STIFEL FINANCIAL CORP.		DEC	14 - 9	11 - 7	12 - 5	11 - 7	13 - 7	24 - 17	0.0	12.4	14.6	13.2	11.2	12.6	2.2 - 1.9	2.3 - 0.8	1.2 - 0.8	2.1 - 0.9	1.2 - 1.0	1.1 - 0.6
SNEX	§ STONEX GROUP INC.		SEP	9 - 5	12 - 9	7 - 3	11 - 8	19 - 13	129 - 100	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	27 - 17	30 - 18	25 - 13	19 - 13	24 - 15	32 - 23	0.0	31.1	38.8	28.6	22.4	25.1	1.3 - 1.0	1.3 - 0.8	1.5 - 0.9	2.5 - 1.3	1.9 - 1.1	1.2 - 0.6
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	13 - 9	7 - 4	10 - 5	11 - 8	11 - 6	29 - 23	0.0	12.6	24.7	24.9	17.3	41.3	2.9 - 2.6	3.4 - 2.0	2.3 - 1.3	3.7 - 2.0	2.6 - 1.5	1.7 - 1.1
FINANCIAL EXCHANGES AND DATA																					
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	59 - 48	27 - 18	30 - 18	37 - 27	36 - 24	34 - 20	0.0	36.5	36.4	40.0	30.6	29.4	1.7 - 1.6	1.8 - 1.5	2.0 - 1.3	2.1 - 1.1	1.4 - 1.1	1.3 - 0.8
CME	[] CME GROUP INC.		DEC	34 - 23	32 - 24	38 - 24	38 - 27	34 - 25	13 - 10	0.0	83.0	100.2	80.1	109.6	49.1	5.1 - 4.7	4.9 - 2.9	3.3 - 2.8	4.2 - 2.5	2.9 - 2.1	4.2 - 2.3
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN		5 - 1	NM - NM	20 - 12	12 - 8	99 - 63	0.0	0.0	0.0	0.0	0.0	0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0	0.0 - 0.0
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	47 - 33	36 - 28	37 - 21	33 - 20	33 - 23	28 - 23	31.7	29.5	29.6	28.4	33.5	31.3	0.9 - 0.8	1.0 - 0.7	1.0 - 0.9	1.4 - 0.9	1.4 - 0.9	1.4 - 1.0
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	53 - 35	19 - 15	30 - 18	28 - 21	24 - 19	17 - 13	59.0	18.4	32.0	32.1	27.9	18.8	1.6 - 1.4	1.7 - 1.0	1.2 - 1.0	1.8 - 1.1	1.5 - 1.2	1.4 - 1.1
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	62 - 33	84 - 50	74 - 35	76 - 37	49 - 37	52 - 36	0.0	38.7	30.3	37.2	36.1	33.0	1.1 - 0.8	1.3 - 0.6	0.8 - 0.4	0.9 - 0.4	1.0 - 0.5	1.0 - 0.6
MCO	[] MOODY'S CORPORATION		DEC	53 - 31	34 - 22	32 - 17	32 - 18	27 - 19	29 - 18	0.0	20.9	23.6	26.6	25.7	29.0	1.0 - 0.9	1.2 - 0.6	0.9 - 0.6	1.4 - 0.7	1.4 - 0.9	1.2 - 0.9
MSCI	[] MSCI INC.		DEC	57 - 35	77 - 45	62 - 31	40 - 21	31 - 22	38 - 23	42.8	41.7	40.9	39.5	33.7	39.4	1.1 - 1.0	1.3 - 0.6	0.8 - 0.5	1.2 - 0.7	1.7 - 0.9	1.6 - 0.9
NDAQ	[] NASDAQ, INC.		DEC	31 - 21	30 - 18	24 - 13	23 - 17	35 - 27	18 - 15	0.0	29.5	34.3	39.4	61.1	33.3	1.4 - 1.2	1.7 - 1.0	1.6 - 1.0	2.6 - 1.4	2.3 - 1.8	2.2 - 1.8
SPGI	[] S&P GLOBAL INC.		DEC	47 - 28	38 - 24	39 - 20	32 - 19	28 - 20	30 - 18	31.5	24.6	27.6	26.4	25.7	28.1	1.0 - 0.9	1.2 - 0.6	1.0 - 0.6	1.4 - 0.7	1.3 - 0.9	1.2 - 0.9

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

				Earnings per Share ($)						Tangible Book Value per Share ($)						Share Price (High-Low, $)					
Ticker	**Company**		**Yr. End**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**	**2022**	**2021**	**2020**	**2019**	**2018**	**2017**
INVESTMENT BANKING AND BROKERAGE																					
RILY	§ B. RILEY FINANCIAL, INC.	#	JAN	0.0	0.0	15.1	7.6	3.0	0.6	0.0	0.0	7.4	3.7	-3.1	-2.2	91.2 - 30.8	90.8 - 42.4	44.9 - 12.9	30.2 - 13.6	23.7 - 13.8	21.3 - 13.6
EVR	† EVERCORE INC.		DEC	11.6	17.1	8.2	6.9	8.3	2.8	33.3	31.4	27.0	18.8	15.5	10.0	142.2 - 78.7	164.6 - 103.5	112.2 - 33.3	98.9 - 70.0	117.5 - 64.4	93.0 - 66.8
IBKR	† INTERACTIVE BROKERS GROUP, INC.		DEC	3.8	3.2	2.4	2.1	2.3	1.1	27.7	23.9	21.1	18.5	16.6	14.8	81.5 - 52.2	82.8 - 58.8	63.0 - 33.7	59.3 - 44.5	80.3 - 46.4	62.3 - 33.0
JEF	† JEFFERIES FINANCIAL GROUP INC.		NOV	3.1	6.1	2.7	3.0	3.2	0.5	37.0	35.5	30.0	26.3	26.6	21.5	41.5 - 25.9	44.5 - 22.9	24.7 - 11.2	21.8 - 16.8	28.3 - 16.2	27.3 - 22.2
MS	[] MORGAN STANLEY		DEC	6.2	8.0	6.5	5.2	4.7	3.1	39.9	40.9	42.0	40.0	37.0	33.5	109.7 - 72.1	106.0 - 66.8	69.0 - 27.2	51.4 - 38.8	59.4 - 36.7	54.3 - 40.1
PIPR	§ PIPER SANDLER COMPANIES		DEC	6.5	16.4	2.7	7.8	3.7	-5.0	45.8	50.6	32.8	45.7	45.5	45.6	187.0 - 102.6	193.6 - 90.8	106.2 - 32.0	82.5 - 64.7	99.8 - 61.4	87.5 - 52.8
RJF	[] RAYMOND JAMES FINANCIAL, INC.		SEP	7.0	6.6	3.9	4.8	3.8	2.9	34.4	35.8	31.8	28.9	26.2	23.5	126.0 - 84.9	103.5 - 62.0	68.3 - 36.1	61.3 - 47.6	68.1 - 46.1	60.9 - 46.1
SF	† STIFEL FINANCIAL CORP.		DEC	5.3	6.7	4.2	3.7	3.2	1.4	29.1	27.7	21.3	19.0	17.5	15.4	83.3 - 49.3	78.6 - 47.7	52.7 - 20.8	42.3 - 26.5	45.8 - 25.6	41.0 - 28.0
SNEX	§ STONEX GROUP INC.		SEP	10.0	5.7	8.6	4.4	2.9	0.3	48.5	40.5	34.0	27.6	23.6	20.8	103.0 - 60.8	72.3 - 52.3	65.0 - 28.0	50.8 - 34.1	57.0 - 35.1	44.9 - 33.1
SCHW	[] THE CHARLES SCHWAB CORPORATION		DEC	3.5	2.8	2.1	2.7	2.5	1.6	3.1	13.2	14.0	13.7	12.4	10.7	96.2 - 59.4	86.4 - 50.8	53.3 - 28.0	51.6 - 34.6	60.2 - 37.8	52.5 - 37.2
GS	[] THE GOLDMAN SACHS GROUP, INC.		DEC	30.1	59.4	24.7	21.0	25.3	9.0	317.4	270.4	222.0	205.0	196.6	170.6	412.7 - 277.8	426.2 - 260.2	263.9 - 130.9	232.2 - 163.4	275.3 - 151.7	262.1 - 209.6
FINANCIAL EXCHANGES AND DATA																					
CBOE	[] CBOE GLOBAL MARKETS, INC.		DEC	2.2	4.9	4.3	3.3	3.8	3.7	-12.4	-10.6	-12.2	-8.5	-10.8	-13.7	130.5 - 103.8	139.0 - 87.0	127.9 - 72.0	124.9 - 89.5	138.5 - 87.9	128.3 - 72.5
CME	[] CME GROUP INC.		DEC	7.4	7.3	5.9	5.9	5.7	11.9	-11.3	-10.7	-18.2	-19.3	-21.2	-13.8	256.9 - 166.6	232.6 - 177.5	225.4 - 131.8	224.9 - 161.1	197.1 - 143.7	155.3 - 113.3
DFIN	§ DONNELLEY FINANCIAL SOLUTIONS, INC.	#	JAN	0.0	0.0	4.1	-0.8	1.1	2.2	0.0	0.0	-3.2	-6.7	-7.6	-9.1	48.0 - 24.6	52.3 - 16.7	20.3 - 4.0	17.1 - 9.2	22.2 - 13.2	27.1 - 18.1
FDS	[] FACTSET RESEARCH SYSTEMS INC.		AUG	10.3	10.4	9.7	9.1	6.8	6.5	-40.2	3.4	1.7	-3.6	-8.5	-8.2	486.5 - 345.9	495.4 - 294.2	363.6 - 195.2	305.4 - 193.8	238.0 - 184.5	207.3 - 155.1
ICE	[] INTERCONTINENTAL EXCHANGE, INC.		DEC	2.6	7.2	3.8	3.4	3.4	4.3	-20.6	-21.7	-29.4	-12.0	-11.7	-9.9	137.4 - 88.6	139.8 - 109.0	115.4 - 63.5	95.6 - 71.2	82.7 - 66.9	73.0 - 55.8
MKTX	[] MARKETAXESS HOLDINGS INC.		DEC	6.7	6.8	7.9	5.4	4.6	3.9	22.1	20.3	18.7	14.8	14.5	12.0	412.8 - 217.4	589.3 - 341.5	606.5 - 275.5	421.5 - 206.8	231.3 - 172.1	211.1 - 147.8
MCO	[] MOODY'S CORPORATION		DEC	7.4	11.8	9.4	7.4	6.7	5.2	-30.2	-30.9	-25.7	-24.6	-25.6	-29.9	392.5 - 230.2	407.9 - 261.4	306.0 - 164.2	240.3 - 135.9	188.0 - 129.3	153.9 - 93.5
MSCI	[] MSCI INC.		DEC	10.7	8.7	7.1	6.6	5.7	3.3	-47.5	-36.3	-27.2	-22.4	-23.7	-16.4	617.1 - 376.4	679.9 - 380.0	446.9 - 218.7	267.5 - 141.1	184.2 - 126.5	130.6 - 78.4
NDAQ	[] NASDAQ, INC.		DEC	2.3	2.4	1.9	1.5	0.9	1.4	-9.2	-9.7	-5.4	-6.0	-6.5	-6.3	70.3 - 46.8	71.7 - 43.6	46.5 - 23.9	36.1 - 26.2	32.3 - 24.3	26.7 - 22.0
SPGI	[] S&P GLOBAL INC.		DEC	10.2	12.5	9.7	8.6	7.7	5.8	-51.4	-11.6	-19.3	-18.9	-18.2	-14.8	472.8 - 279.3	484.2 - 303.5	379.9 - 186.1	275.8 - 164.0	217.3 - 156.7	174.1 - 107.9

Note: Data as originally reported. CAGR-Compound annual growth rate.
[]Company included in the S&P 500. †Company included in the S&P MidCap 400. §Company included in the S&P SmallCap 600. #Of the following calendar year.
Souce: S&P Capital IQ.

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