

Exchanges

US Exchanges 1Q23 Preview: Record volumes; worried about 2H deceleration

Price Objective Change

Expect strong results across the board in 1Q23

In the wake of the regional bank distress and subsequent closure of Silicon Valley Bank and Signature Bank, North American exchanges posted broadly strong volumes in 1Q23, and several exchanges even reported record volume days throughout the quarter. The macroeconomic uncertainty and elevated volatility were strong catalysts for trading. In cash equities (ICE, NDAQ), the higher volatility also caused volumes to migrate onto the largest lit exchanges where the likelihood of execution is higher. The market share of on-exchange trading increased nearly 4% m/m in March. We are raising or at least maintaining our 1Q23 EPS estimates for all covered exchanges, and we expect March volumes to drive upward consensus revisions into the print. With that said, we remain broadly cautious longer term on the industry going forward. Particularly in rates futures (CME), we think that declining levels of open interest and less market liquidity will hurt 2Q/3Q volumes. Additionally, we note that the exchanges have become relatively more expensive as investors have been attracted to their defensive qualities, while we continue to believe that their share prices will lag into a recovery (2H23-2024).

Largest 1Q23 beats from CME/TW versus in line at NDAQ

We look for the strongest 1Q23 financial results from CME and TW given their overweight exposure to the rates asset class, which has been the foremost beneficiary of the bank crisis. Derivative volume has increased significantly, with CME rates futures and TW SEF swap volumes up 16% and 48% QTD y/y, respectively. Meanwhile, intra-quarter NY Fed primary dealer volume disclosures indicate that cash trading was down just 5% QTD y/y (off a high base) and up 16% sequentially QTD. CME should also see tailwinds from higher pricing. On January 1, it raised market data pricing by about 4%, and on February 1, it raised trading fees by approximately 4-5%. By contrast, NDAQ's strong trading revenues are likely to be offset by weakness in its Workflow & Insights business (elongated sales cycles) as well as seasonal/cyclical weakness in Listings, Marketplace Technology, and Index. Additionally, NDAQ's Anti-Financial Crime business remains under the microscope given recent executive turnover as well as decelerating growth. While we expect an EPS beat from ICE, we are cautious about potential deal commentary on the call. We believe that ICE's new 3Q/4Q23 deal close guidance is aggressive and that the timeline could be walked back at some point.

Reiterate Buys (ICE, TW) on electronification thesis

We revise our POs for all exchange stocks (see Exhibit 1 and inside for details). We continue to expect significant upside potential to ICE and TW over the next 12 months, and we reiterate our Buy ratings on both stocks. We believe that there is significant runway left in the electronification of both the mortgage (ICE) and fixed income markets (TW, ICE). Additionally, we expect that the BKI deal would generate significant synergies for ICE's Mortgage Tech business (if it closes), and we think that the removal of the regulatory uncertainty will help the stock re-rate upward post close (through all likely scenarios). Meanwhile, we continue to believe that NDAQ and CME trade at a premium relative to their growth trajectory.

03 April 2023

Equity
United States
Exchanges

Craig Siegenthaler, CFA
Research Analyst
BofAS
+1 646 855 5004
craig.siegenthaler@bofa.com

Eli Abboud
Research Analyst
BofAS
+1 646 855 5791
eli.abboud@bofa.com

Mark McLaughlin, CFA
Research Analyst
BofAS
+1 646 855 4234
mark.mclaughlin@bofa.com

Maggie Cao
Research Analyst
BofAS
+1 646 855 5034
maggie.cao@bofa.com

Glossary

BKI: Black Knight
CME: CME Group
LSE: London Stock Exchange
ICE: Intercontinental Exchange
CME: CME Group

NDAQ: Nasdaq
PO: price objective
BKI: Black Knight

SEF: Swap Execution Facility
TW: Tradeweb

Exhibit 1: Price objective changes

We revise our POs for CME, ICE, NDAQ, TW

	PO		
	New	Old	% Delta
CME	156	160	-3%
ICE	140	127	10%
NDAQ	53	50	6%
TW	91	82	11%
Average	-	-	6%

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 12 to 16. Analyst Certification on page 11. Price Objective Basis/Risk on page 10.

12536431

Timestamp: 03 April 2023 12:36PM EDT

Selected data

Exhibit 2: BofA EPS versus consensus estimates

We see upside potential to consensus EPS estimates for all covered exchanges

	1Q23E			2Q23E			2023E			2024E		
	BofA	Consensus	% Delta	BofA	Consensus	% Delta	BofA	Consensus	% Delta	BofA	Consensus	% Delta
CME	2.34	2.19	7%	1.98	2.11	-6%	8.40	8.42	0%	8.51	8.59	-1%
ICE	1.44	1.34	7%	1.32	1.33	-1%	5.56	5.41	3%	6.44	5.88	9%
NDAQ	0.66	0.65	2%	0.68	0.68	1%	2.69	2.69	0%	2.83	2.95	-4%
TW	0.58	0.54	7%	0.55	0.55	1%	2.16	2.15	0%	2.42	2.36	2%
Average	-	-	6%	-	-	-1%	-	-	1%	-	-	2%

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 3: BofA EPS estimate revisions

After the trading spurt caused by the regional bank issues, we raise or maintain 1Q23 estimates for all exchanges

	1Q23E			2Q23E			2023E			2024E		
	New	Old	% Delta	New	Old	% Delta	New	Old	% Delta	New	Old	% Delta
CME	2.34	2.14	9%	1.98	2.12	-7%	8.40	8.35	1%	8.51	7.99	7%
ICE	1.44	1.31	10%	1.32	1.31	1%	5.56	5.38	3%	6.44	6.03	7%
NDAQ	0.66	0.66	0%	0.68	0.67	1%	2.69	2.68	0%	2.83	2.88	-2%
TW	0.58	0.55	5%	0.55	0.56	-2%	2.16	2.15	0%	2.42	2.33	4%
Average	-	-	6%	-	-	-2%	-	-	1%	-	-	4%

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 4: BofA price objective details

Among our exchange coverage, we believe that ICE has the highest total return potential

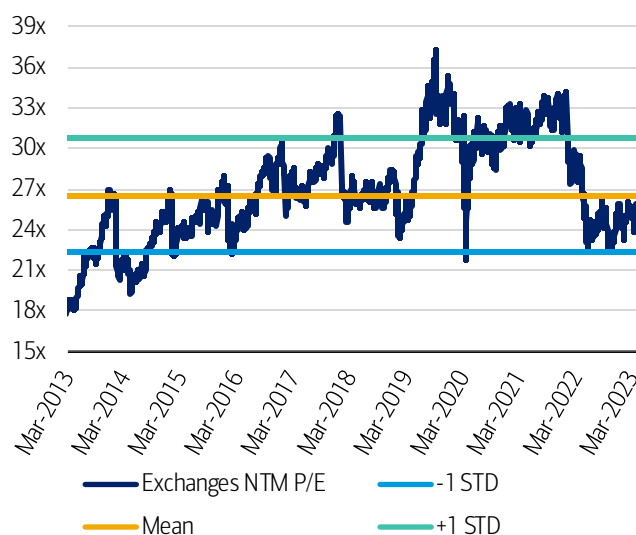
	PO			Return			
	New	Old	% Delta	Price	Upside	Div Yield	Total Return
CME	156	160	-3%	192	-19%	4%	-14%
ICE	140	127	10%	104	34%	2%	36%
NDAQ	53	50	6%	55	-3%	2%	-1%
TW	91	82	11%	79	15%	0%	16%
Average	-	-	6%	-	7%	2%	9%

Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 5: Average NTM P/E for the exchanges (absolute basis)

The exchanges are trading roughly in line with their historical average

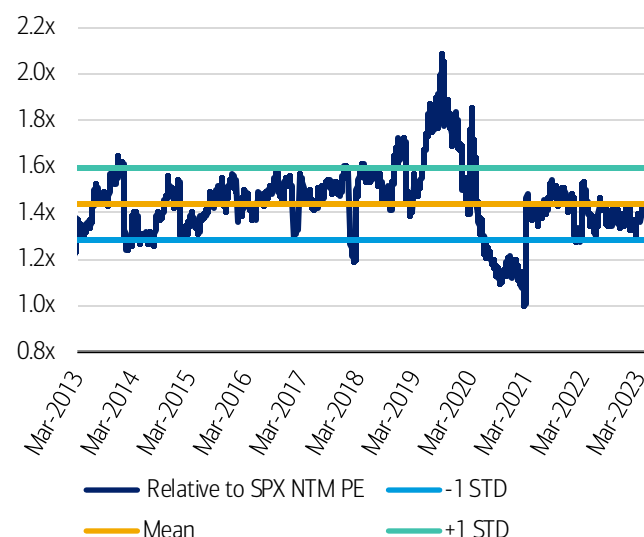


Source: Bloomberg, BofA Global Research
Note: Forward EPS estimates are consensus
Peers CME, ICE, NDAQ, MKTX, CBOE

BofA GLOBAL RESEARCH

Exhibit 6: Average NTM P/E for the exchanges (relative basis)

The exchanges trade at a modest premium to the S&P 500



Source: Bloomberg, BofA Global Research. NTM = net 12 months.
Note: Forward EPS estimates are consensus
Peers CME, ICE, NDAQ, MKTX, CBOE

BofA GLOBAL RESEARCH

Exhibit 7: Interest and currency performance (over select trailing time periods)

The yield curve remains inverted at the 10Y/2Y, signaling market expectations for (1) Fed rate cuts and (2) an economic recession

	12 mo.	3Y	5Y	10Y	QTD	Last Qtr	Q-2
10Y	120 bps	92 bps	81 bps	170 bps	-33 bps	5 bps	82 bps
3mo LIBOR	421 bps	258 bps	286 bps	489 bps	41 bps	101 bps	147 bps
Fed Funds	450 bps	243 bps	316 bps	474 bps	50 bps	125 bps	150 bps
10Y/2Y Spread	-61 bps	-74 bps	-105 bps	-218 bps	-2 bps	-10 bps	-51 bps
USD	4%	5%	14%	23%	-1%	-8%	7%
EUR vs USD	-2%	-3%	-12%	-15%	2%	9%	-7%
GBP vs USD	-6%	-5%	-12%	-19%	3%	8%	-8%
YEN vs USD	-8%	-16%	-20%	-29%	-1%	10%	-6%

Source: Bloomberg, BofA Global Research; As of 03/31/2023

BofA GLOBAL RESEARCH

Exhibit 8: Asset class returns

Equities and fixed income have benefitted the most from the macro backdrop YTD

Returns Tracker	Monthly										Quarterly					Annually			
	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23		Jun 22	Sep 22	Dec 22	Mar 22	Mar 23	Dec 19	Dec 20	Dec 21	Mar 23
Equities																			
S&P Composite	9.2	-4.1	-9.2	8.1	5.6	-5.8	6.3	-2.4	2.2		-4.6	-16.1	-4.9	7.5	-7.8	31.5	18.4	28.7	-12.0
Nasdaq Composite	12.4	-4.5	-10.4	3.9	4.5	-8.7	10.7	-1.0	5.0		-8.9	-22.3	-3.9	-0.8	-13.3	36.7	45.0	22.2	-21.0
Dow Jones Industrial Average	6.8	-3.7	-8.8	14.1	6.0	-4.1	2.9	-3.9	0.8		-4.1	-10.8	-6.2	16.0	-2.0	25.3	9.7	20.9	-6.0
S&P400 Index	10.8	-3.1	-9.2	10.5	6.1	-5.5	9.2	-1.8	-4.9		-4.9	-15.4	-2.5	10.8	-5.2	26.2	13.6	24.7	-9.8
Russell 2000	10.4	-2.0	-9.6	11.0	2.3	-6.5	9.7	-1.7	-6.6		-7.5	-17.2	-2.2	6.2	-11.6	25.5	19.9	14.8	-18.3
MSCI AC World	7.0	-3.6	-9.5	6.1	7.8	-3.9	7.2	-2.8	2.0		-5.2	-15.5	-6.7	9.9	-7.9	27.3	16.9	19.0	-12.8
MSCI Europe	7.6	-4.9	-6.3	6.2	6.9	-3.5	6.8	1.8	-0.6		-5.2	-8.7	-4.1	9.6	3.7	26.8	-2.8	25.8	-1.6
MSCI AC Asia	-1.1	0.0	-12.7	-6.1	18.8	-0.1	8.2	-6.8	2.8		-8.0	-8.9	-13.7	11.4	-9.2	18.5	25.5	-4.5	-16.4
MSCI Latin America	4.3	2.8	-3.2	9.7	0.5	-3.9	9.9	-6.2	1.4		27.3	-21.7	3.7	5.9	-10.0	17.8	-13.6	-7.7	14.5
iShares Emerging Markets	-0.3	-1.3	-11.5	-2.0	15.6	-2.6	9.1	-7.6	3.3		-7.6	-10.4	-13.0	10.3	-10.5	18.2	17.0	-3.6	-17.3
Fixed Income																			
iShares Core US Agg Bond	2.5	-3.0	-4.1	-1.3	3.8	-0.9	3.3	-2.7	2.1		-5.8	-4.6	-4.7	1.6	-4.6	8.5	7.5	-1.8	-10.2
iShares National Muni Bond	2.3	-2.4	-2.8	-0.8	4.8	-0.3	2.5	-2.3	2.3		-5.4	-2.5	-3.0	3.7	0.5	7.1	5.1	1.0	-5.0
iShares \$ IG Corporate Bond	4.4	-4.4	-6.0	-0.8	6.6	-1.6	5.2	-4.2	2.9		-8.4	-8.4	-6.2	4.2	-6.3	17.4	11.0	-1.8	-14.1
iShares MBS	3.2	-3.5	-5.1	-1.1	4.3	-0.8	3.4	-2.7	1.8		-4.9	-3.9	-5.6	2.2	-4.7	6.2	4.1	-1.4	-9.4
Vanguard Total International Bond	3.2	-3.6	-2.9	0.5	2.4	-2.7	2.4	-1.5	2.3		-4.8	-5.3	-3.4	0.2	-5.3	7.9	4.6	-2.3	-9.8
Barcap High Yield	2.4	-2.8	-4.3	-1.3	3.7	-0.5	3.1	-2.6	2.1		-5.9	-4.7	-4.8	1.9	-5.2	8.7	7.5	-1.5	-10.8
Alts																			
Vanguard REIT Index	8.7	-6.0	-12.8	3.5	6.2	-5.1	10.4	-5.9	-4.2		-6.0	-15.5	-11.0	4.3	-21.9	28.9	-4.7	40.4	-26.5
FX																			
EUR/USD	-2.5	-1.6	-2.5	0.8	5.3	2.9	1.5	-2.6	3.1		-2.7	-5.3	-6.5	9.2	-2.1	-2.2	8.9	-6.9	-4.7
JPY/USD	1.8	-4.1	-4.0	-2.7	7.7	5.3	0.8	-4.5	2.6		-5.4	-10.3	-6.2	10.4	-8.4	0.9	5.1	-10.2	-13.3
GBP/USD	-0.1	-4.5	-3.9	2.7	5.1	0.2	2.0	-2.4	3.0		-2.9	-7.3	-8.3	8.2	-6.2	3.9	3.1	-1.0	-8.9
CHF/USD	0.3	-2.6	-1.0	-1.4	5.9	2.3	0.9	-2.8	3.2		-1.1	-3.4	-3.3	6.8	0.8	1.4	9.4	-3.0	-0.3
Commodities																			
DJ Commodities Index	-0.1	-2.0	-6.4	2.5	2.1	-0.2	0.1	-4.2	-1.4		24.1	-6.7	-8.3	4.4	-14.5	12.1	13.9	29.3	6.1
GOLD	-2.3	-3.1	-2.9	-1.6	8.3	3.1	5.7	-5.3	8.4		5.9	-6.7	-8.1	9.8	1.6	18.3	25.1	-3.6	7.6
Oil	-6.8	-9.2	-11.2	8.9	-6.9	-0.4	-1.7	-2.3	-3.5		33.3	5.5	-24.8	1.0	-24.7	34.5	-20.5	55.0	0.5

Source: Bloomberg, BofA Global Research, Price data as of 03/31/2023

BofA GLOBAL RESEARCH



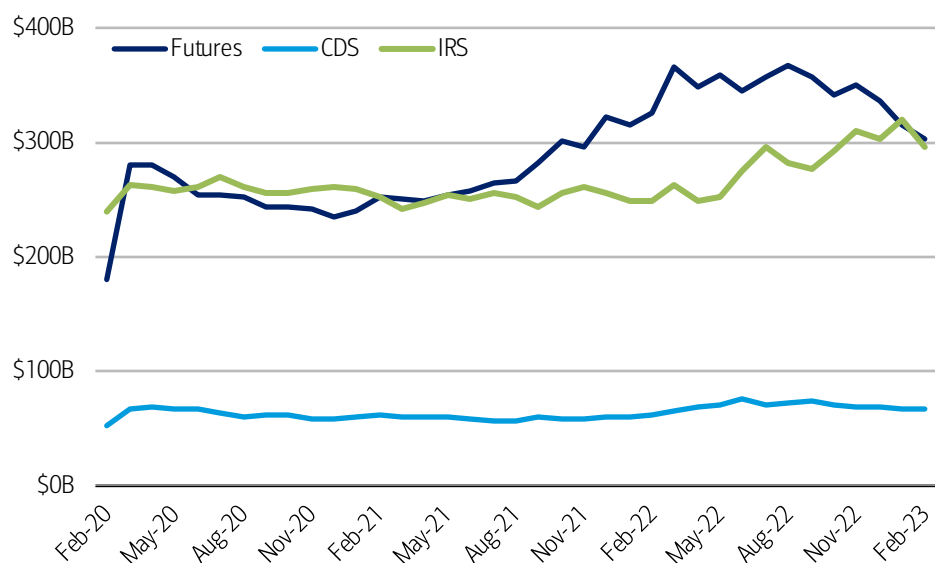
Industry highlights

Clearinghouse revenues have likely peaked; expect sequential declines in 1Q23

We expect that futures clearinghouse revenues for ICE and CME reached their cyclical peak in 3Q22 and 4Q22, respectively, and we expect sequential declines in both items for 1Q23. According to CFTC data as well as intra-quarter commentary, margin balances have generally been declining since August. Meanwhile, collateral fee rates have been steady at CME and declining at ICE in recent months. Specifically, on November 2, ICE cut its cash collateral fees for ICE Clear Europe by 10 bps for Euros, so 1Q23 should see a full-quarter impact of the lower fee rate. Although CME reported higher investment income in 4Q22, we believe that the sequential increase was attributable to earnings on its corporate cash, which ramps in 4Q22 due to its large variable dividend. With this offset absent in 1Q23, we expect sequential declines in all futures clearinghouse-related items (CME=Investment Income + Other revenue; ICE = OTC & Other revenue). That said, we do expect higher CDS Clearinghouse revenues at ICE Clear Credit given a fee rate hike in the quarter. Driven by this fee hike as well as higher volumes, a roll period, and positive mix shifts, we are forecasting an overall 76% sequential increase in CDS Clearing & Execution revenues at ICE.

Exhibit 9: Margin balances by asset class over time

Futures margin balances have been declining since August



Source: CFTC, BofA Global Research

Primary Futures Clearing Organizations = ICE, CME; Primary CDS Clearing Organizations = ICE; Primary IRS Clearing Organizations = LSE

BofA GLOBAL RESEARCH

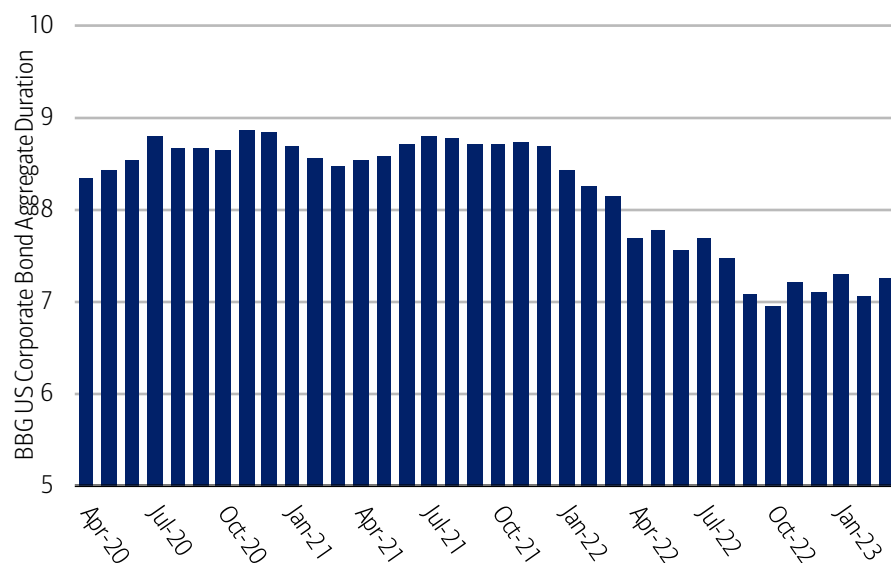
Trading fee backdrop is improving in e-trading and futures

We are more constructive on the fee backdrop in both credit e-trading and futures. In the futures business, CME enacted its biggest price increase on record on February 1, with management guiding to a 4-5% sequential revenue tailwind for the transactional businesses. Meanwhile, ICE is also actively evaluating opportunities to push price in the near future. On the e-trading side (TW), high-grade corporate bond pricing is generally a function of duration, which has modestly increased in the quarter at +1% q/q. Additionally, as interest rates begin to plateau, we expect further tailwinds from pricing given the inverse relationship between rates and duration.



Exhibit 10: Corporate bond duration over time

Bond duration is stabilizing, which bodes well for high-grade fee capture (TW)



Source: Bloomberg, BofA Global Research

BofA GLOBAL RESEARCH

Expect ICE to walk back deal timeline; forecasting a close around year-end

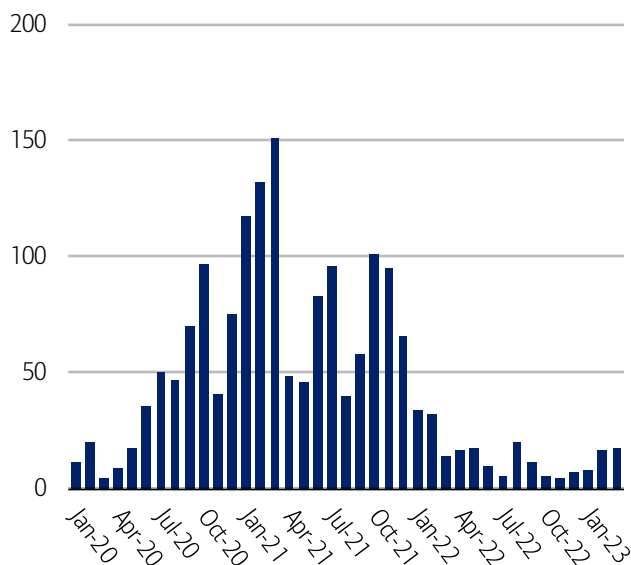
Last month, ICE delayed its timeline for acquiring BKL to 2H23 from 1H23, and we would not be surprised to hear that timeline walked back further to year-end 2023. Although the Federal Trade Commission (FTC) has announced its intention to block the ICE-BKL deal, it has not yet requested a preliminary injunction. We expect the agency to move forward with an injunction once the BKL shareholder vote (April 28) is nearer. After the injunction request is filed, we expect 6-8 months until closing, judging by lawsuits of similar size and complexity. This implies a late 4Q23 close. In our model, we assume that the deal closes at year-end 2023 (revised from 2Q23 quarter-end).

Headwinds to listings revenues in 1Q23 due to delistings and IPO amortizations

We forecast headwinds to listing revenue (ICE, NDAQ) this quarter given the rolling off of initial public offerings (IPOs) and seasonality related to delistings. Listed companies generally pre-pay listing fees in 1Q for the full year and do not receive refunds if they delist/transfer over the course of the year. As a result, there is generally some downward seasonality in 1Q because revenues from the prior year's delisted/transferred stocks are no longer being amortized. Based on the number of delistings and transfers over the course of 2022, we estimate that this headwind will amount to \$5M for each NDAQ and ICE. In addition, we expect the roll-off of initial listing fees from the IPO boom times of 2H20 and 2021 to accelerate this quarter. While NDAQ amortizes the fees over three years, initial listings at ICE can be amortized over 2-3 years depending on the characteristics of the transaction. These dynamics should be offset by 4% headline price increases at both firms. Overall, we expect listing revenue at NDAQ and ICE to be flattish sequentially (versus mid-single-digit % historical CAGR).

Exhibit 11: Number of IPOs by month

Fees from the boom of 2020/21 IPOs are starting to roll off

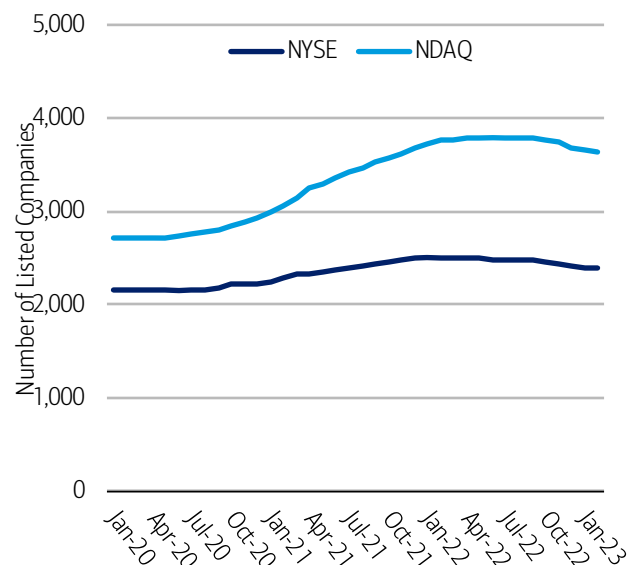


Source: Company reports, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 12: Number of listed operating companies

The issuerbase of NYSE and NDAQ is shrinking



Source: World Federation of Exchanges, BofA Global Research

BofA GLOBAL RESEARCH

Company-specific commentary

CME Group (CME, Underperform): Pulling forward volumes into 1Q23

We raise our 1Q23/2023/2024 EPS estimates to \$2.34/\$8.40/\$8.51 from \$2.14/\$8.35/\$7.99 due primarily to higher-than-expected volumes, particularly in rates. This strength was partially offset by an anticipated deceleration in clearinghouse revenues in light of lower collateral balances intra-quarter. We simultaneously reduce our EPS estimates for 2Q/3Q23 because we expect CME to experience future headwinds due to the excessive volatility this quarter. In particular, our channel checks indicate that futures liquidity has deteriorated, margins are higher, and a meaningful amount of open interest was blown out in the aftermath of the Silicon Valley Bank and Signature Bank closures. Our PO falls to \$156 (from \$160), which is derived from a 17.5x multiple on our newly initiated 2025 EPS estimate of \$8.89. To offset our EPS roll to 2025 from 2024 and account for lower future growth, we lower our multiple from 20x to 17.5x. Our PO implies 14% total downside risk over 12 months.

Intercontinental Exchange (ICE, Buy): Pushing off BKI consolidation to year-end

We raise our 1Q23/2023/2024 EPS estimates to \$1.44/\$5.56/\$6.44 from \$1.31/\$5.38/\$6.03 due to higher-than-expected volumes, particularly in rates and CDS. In addition, we expect (1) a pick-up in growth in fixed income data revenues given the uptick in ASV (annual subscription value) last quarter and (2) higher revenue per trade at ICE Clear Credit given favorable mix shifts and higher clearinghouse revenues. These tailwinds were partially offset by declining clearinghouse revenues on the futures side of the house as well as seasonal weakness in listing and mortgage technology revenues. We also push out our expectation of consolidation of BKI from 3Q23 to 1Q24 and lower our estimate for Empower proceeds, which was a headwind to our 2H23/24 estimates. Our PO rises to \$140 (from \$127), which is derived from a 20x multiple on our newly initiated 2025 EPS estimate of \$6.98. To offset our EPS roll to 2025 from 2024, we lower our multiple from 21x to 20x. Our PO implies 36% 12-month total return potential.

Nasdaq (NDAQ, Underperform): Volumes offset by cyclical/seasonal headwinds

We modestly revise our 1Q23/2023/2024 EPS estimates to \$0.66/\$2.69/\$2.83 from \$0.66/\$2.68/\$2.88 to embed the impact of the delay in the MEMX Options launch date (now 3Q23 from 2Q23), offset by a downward revision to listings revenue. We are also modeling softness in the Workflow & Insights business given management commentary around elongated sales cycles as well as the anti-financial crime business in light of anticipated difficulties in monetizing Tier 1 banks. Separately, we note that Listings, Index, and Marketplace Technology are all seasonally low in 1Q due to (1) fees from delisted companies rolling off, (2) the step-down in NDAQ futures monetization related to the accelerator in NDAQ's contract with CME, and (3) a higher volume of change requests in 4Q. Our PO rises slightly to \$53 (from \$50), which is derived from a 17.5x multiple on our newly initiated 2025 EPS estimate of \$3.03. Our PO implies 1% total downside risk over 12 months.

Tradeweb (TW, Buy): Raising estimates on rates strength

We raise our 1Q23/2023/2024 EPS estimates to \$0.58/\$2.16/\$2.42 from \$0.55/\$2.15/\$2.33 due to higher-than-expected volumes, particularly in rates and equities. Additionally, we note that TW should see less seasonality in compensation given accounting changes as well as higher interest income stemming from its growing cash balance and higher rates. These factors should be partially offset by some downward seasonality in the Refinitiv data contract. Our PO rises to \$91 (from \$82), which is derived from a 32.5x multiple on our newly initiated 2025 EPS estimate of

\$2.81. To offset our EPS roll to 2025 from 2024, we lower our multiple from 35x to 32.5x. Our PO implies 16% 12-month total return potential.

Exhibit 13: Stocks mentioned
Prices and ratings for stocks mentioned in this report

BofA Ticker	Bloomberg ticker	Company name	Price	Rating
CME	CME US	CME Group Inc	US\$ 191.52	B-3-7
ICE	ICE US	Intercontinental	US\$ 104.29	B-1-7
NDAQ	NDAQ US	Nasdaq	US\$ 54.67	B-3-7
TW	TW US	Tradeweb	US\$ 79.02	B-1-7

Source: BofA Global Research

BofA GLOBAL RESEARCH



Price objective basis & risk

CME Group Inc (CME)

Our primary valuation metric for US Exchanges is price to long-term earnings (2025E). We focus on long-term EPS because we prefer to normalize for any near-term factors, and it also provides credit for an additional two years of growth. We apply a 17.5x multiple on our 2025E EPS to derive our \$156 PO. Our multiple is based on the conservative assumption that CME trades in line with its peer group despite its lower growth prospects/earnings quality.

Downside risks are (1) depressed volumes, (2) lower earnings quality due to high transactional revenue composition, (3) mature markets and high market share stifling further growth, (4) trading at a premium to higher growth peers, (5) secular transition away from oil/fossil fuels where CME has high share and (6) regulatory risks (transaction tax, capital requirements).

Upside risks are (1) improving/elevated interest rate volumes due to quantitative tightening/inflation, (2) rebound in energy/metals volumes should there be a resolution in supply chain issues and the Russia/Ukraine conflict, (3) defensive qualities which drive stock outperformance in equity market drawdowns (e.g., 1Q22), and (4) potential for share gains in select markets: base metals after the LME debacle and cash after the DTCC cross-margining proposal is approved (estimated in 1Q23 versus 3Q22 prior target).

Intercontinental Exchange (ICE)

Our primary valuation metric for US Exchanges is price to long-term earnings (2025E). We focus on long-term EPS because we prefer to normalize for any near-term factors, and it also provides credit for an additional two years of growth. We apply a 20x multiple on our 2025E EPS to derive our \$140 PO. Our multiple is equal to ICE's historical average and a small discount to peers despite ICE's superior growth prospects & earnings quality. We look for ICE's valuation to re-rate higher from current levels as: mortgage origination volumes bottom, BKI deal closes by mid-2023. Additionally, ICE's accelerating earnings growth and improve earnings quality support a higher valuation.

Risks include: (1) elevated financial leverage, (2) subdued listings activity, (3) contrarian capital allocation decisions (eBay, BKI).

Nasdaq (NDAQ)

Our primary valuation metric for US Exchanges is price to long-term earnings (2025E). We focus on long-term EPS because we prefer to normalize for any near-term factors, and it also provides credit for an additional two years of growth. We apply a 17.5x multiple on our 2025E EPS to derive our \$53 PO on NDAQ. Our multiple reflects a slight discount on NDAQ's recent historical average given the recent earnings quality reduction and our expectation for decelerating growth.

Upside risks are: (1) a bull market could revive listings activity and drive revenue gains in indexing from beta, (2) a prolonged Democratic administration could enable SEC Chair Gensler to complete his equity market structure reforms and move volumes back onto exchanges, (3) the secular trend toward derivatives (vs. cash) could offset the downward normalization in options trading, and (4) NDAQ's new crypto custody business could enhance growth.

Downside risks are: (1) NDAQ's premium valuation, (2) MEMX's entrance into the options market, (3) retail investor disengagement, (4) decelerating Market Tech sales, (5) SEC

Chair Gensler's inability to complete his market structure agenda during his administration, and (6) volume headwinds as we transition toward a bull market.

Tradeweb Markets Inc. (TW)

Our price objective (PO) for Tradeweb is derived from a price to earnings valuation method. We apply a 32.5x multiple on our 2025E EPS to derive our \$91 PO. Our multiple is supported by TW's recent valuation range and assumes TW maintains a premium to the US exchanges due to higher visibility into its long-term growth trajectory combined with its defensive qualities.

Risks are (1) competitive pressures intensifying (MKTX, Bloomberg, ICE, Trumid), (2) a high mix of transactional revenues, (3) secular pressure to trading commissions (although TW's commissions are still a low % of bid-ask), and (4) a high valuation relative to slower-growth peers.

Analyst Certification

I, Craig Siegenthaler, CFA, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

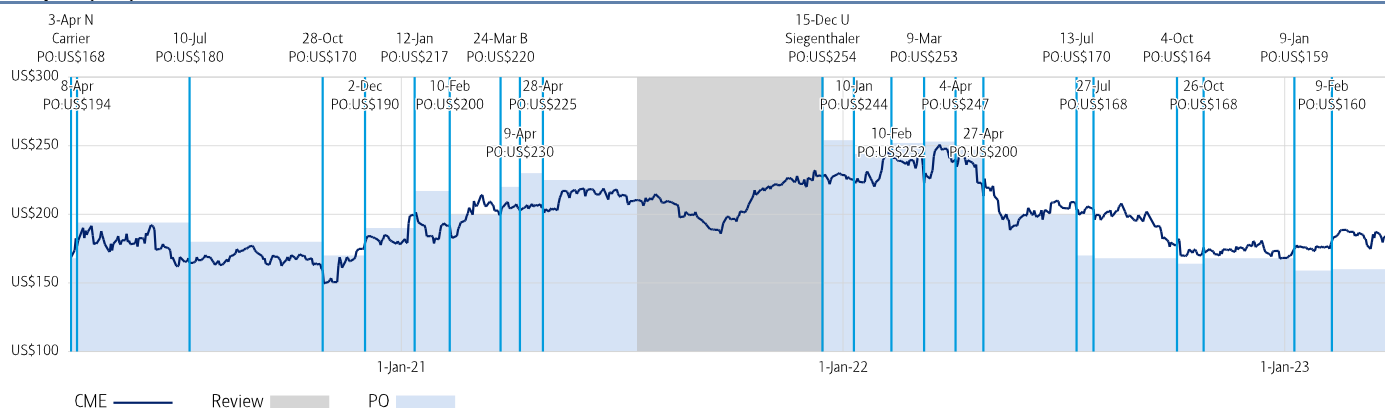
US - Brokers, Asset Managers, & Exchanges Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Ameriprise Financial	AMP	AMP US	Craig Siegenthaler, CFA
	Ares Management Corp	ARES	ARES US	Craig Siegenthaler, CFA
	BlackRock, Inc.	BLK	BLK US	Craig Siegenthaler, CFA
	Blackstone	BX	BX US	Craig Siegenthaler, CFA
	Blue Owl Capital	OWL	OWL US	Craig Siegenthaler, CFA
	Interactive Brokers	IBKR	IBKR US	Craig Siegenthaler, CFA
	Intercontinental Exchange	ICE	ICE US	Craig Siegenthaler, CFA
	KKR & Co. Inc.	KKR	KKR US	Craig Siegenthaler, CFA
	TPG Inc	TPG	TPG US	Craig Siegenthaler, CFA
	Tradeweb Markets Inc.	TW	TW US	Craig Siegenthaler, CFA
	Victory Capital Holdings, Inc.	VCTR	VCTR US	Craig Siegenthaler, CFA
NEUTRAL				
	Affiliated Managers Group	AMG	AMG US	Craig Siegenthaler, CFA
	AllianceBernstein	AB	AB US	Craig Siegenthaler, CFA
	Apollo Global Management	APO	APO US	Craig Siegenthaler, CFA
	Invesco	IVZ	IVZ US	Craig Siegenthaler, CFA
	Janus Henderson Group	JHG	JHG US	Craig Siegenthaler, CFA
	Janus Henderson Group	JUHDY	JHG AU	Craig Siegenthaler, CFA
	LPL Financial Holdings	LPLA	LPLA US	Craig Siegenthaler, CFA
	Patria	PAX	PAX US	Craig Siegenthaler, CFA
UNDERPERFORM				
	Charles Schwab Corp.	SCHW	SCHW US	Craig Siegenthaler, CFA
	CME Group Inc	CME	CME US	Craig Siegenthaler, CFA
	Franklin Resources	BEN	BEN US	Craig Siegenthaler, CFA
	Nasdaq	NDAQ	NDAQ US	Craig Siegenthaler, CFA
	Robinhood Markets	HOOD	HOOD US	Craig Siegenthaler, CFA
	T. Rowe Price	TROW	TROW US	Craig Siegenthaler, CFA
	The Carlyle Group	CG	CG US	Craig Siegenthaler, CFA
RSTR				
	Focus Financial Partners	FOCS	FOCS US	Craig Siegenthaler, CFA

Disclosures

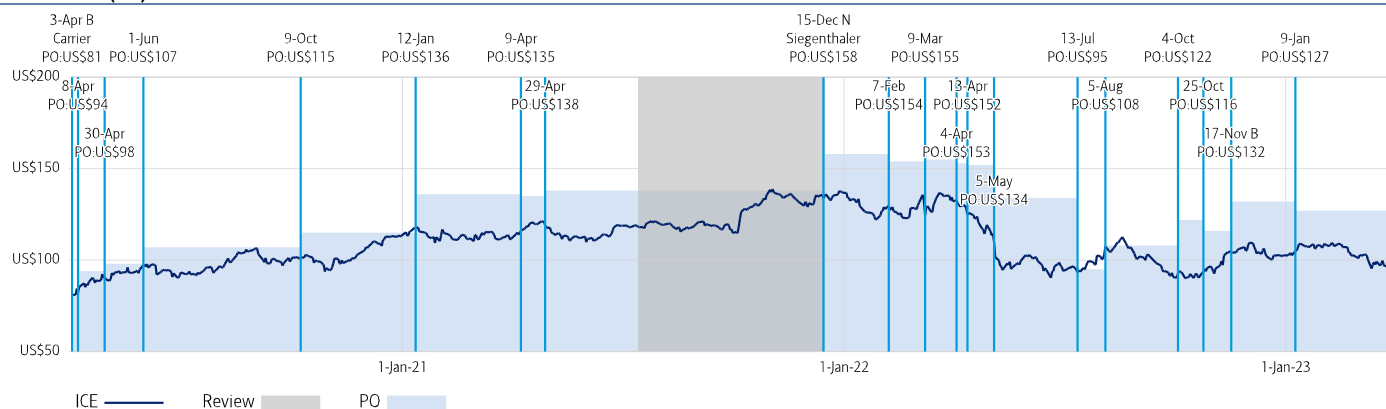
Important Disclosures

CME Group Inc (CME) Price Chart



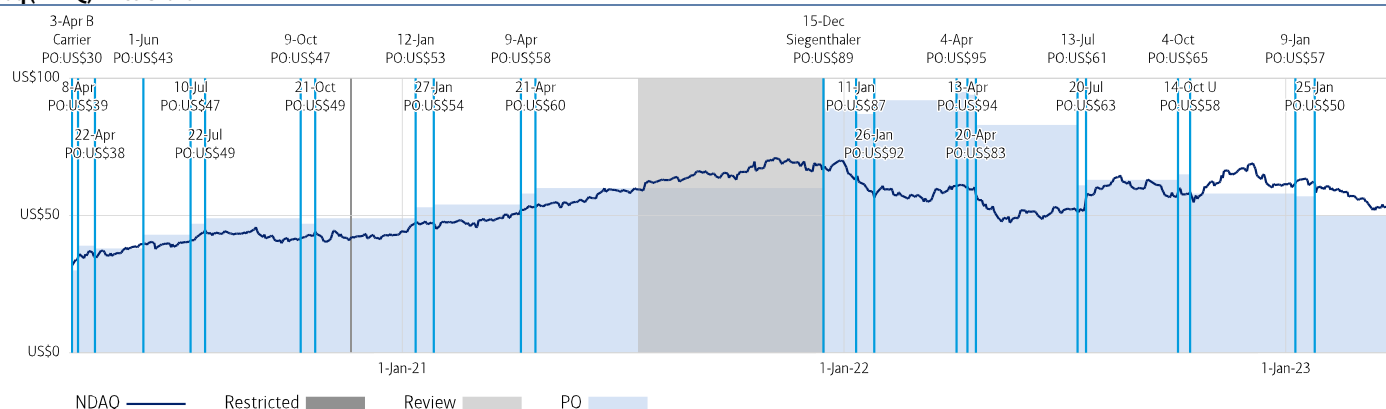
B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

Intercontinental (ICE) Price Chart

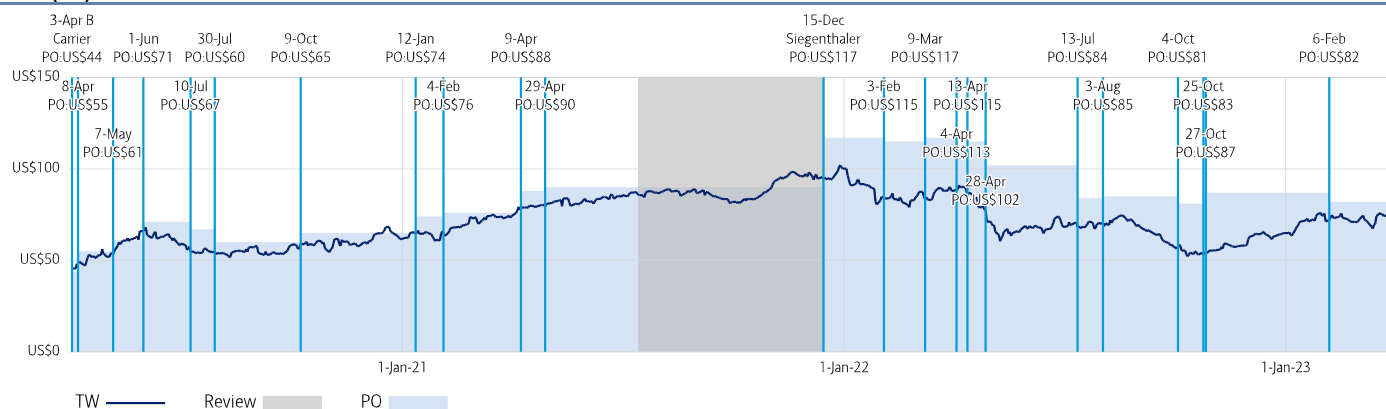
B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

Nasdaq (NDAQ) Price Chart

B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

Tradeweb (TW) Price Chart

B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

Equity Investment Rating Distribution: Financial Services Group (as of 31 Mar 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	152	52.41%	Buy	92	60.53%
Hold	73	25.17%	Hold	44	60.27%
Sell	65	22.41%	Sell	41	63.08%

Equity Investment Rating Distribution: Global Group (as of 31 Mar 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	1869	53.01%	Buy	1030	55.11%
Hold	827	23.45%	Hold	476	57.56%
Sell	830	23.54%	Sell	389	46.87%

^{R1} Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. **INVESTMENT RATINGS** reflect the analyst's assessment of both a stock's: absolute total return potential as well as its attractiveness for investment relative to other stocks within its *Coverage Cluster* (defined below). There are three investment ratings: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster ^{R2}
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

^{R2} Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. *Coverage Cluster* is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

Price Charts for the securities referenced in this research report are available on the [Price Charts website](#), or call 1-800-MERRILL to have them mailed.

BofAS or one of its affiliates acts as a market maker for the equity securities recommended in the report: CME Group Inc, Intercontinental, Nasdaq, Tradeweb.

BofAS or an affiliate was a manager of a public offering of securities of this issuer within the last 12 months: Intercontinental.

The issuer is or was, within the last 12 months, an investment banking client of BofAS and/or one or more of its affiliates: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

BofAS or an affiliate has received compensation from the issuer for non-investment banking services or products within the past 12 months: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

The issuer is or was, within the last 12 months, a non-securities business client of BofAS and/or one or more of its affiliates: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

BofAS or an affiliate has received compensation for investment banking services from this issuer within the past 12 months: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

BofAS or an affiliate expects to receive or intends to seek compensation for investment banking services from this issuer or an affiliate of the issuer within the next three months: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

BofAS together with its affiliates beneficially owns one percent or more of the common stock of this issuer. If this report was issued on or after the 9th day of the month, it reflects the ownership position on the last day of the previous month. Reports issued before the 9th day of a month reflect the ownership position at the end of the second month preceding the date of the report: Intercontinental.

BofAS or one of its affiliates is willing to sell to, or buy from, clients the common equity of the issuer on a principal basis: CME Group Inc, Intercontinental, Nasdaq, Tradeweb.

The issuer is or was, within the last 12 months, a securities business client (non-investment banking) of BofAS and/or one or more of its affiliates: CME Group, Intercontinental, Nasdaq, Tradeweb Markets Inc.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

Refer to [BofA Global Research policies relating to conflicts of interest](#).

"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.

Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and

regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofam.com/BofASEdiscclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofA Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information: has been prepared for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclosures](#) for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

BofA ESGMeter Methodology:

ESGMeter is a proprietary metric based on quantitative analysis and fundamental analyst inputs that reflects our assessment of a company's Environmental, Social and Governance-related

attributes. The ESGMeter is intended to indicate a company's likelihood of experiencing stronger financial stability (higher return on equity and lower earnings and price volatility) over the next three years relative to peer group. There are three ESGMeter levels - Low, Medium, and High - which indicate whether a company has attributes most likely to translate into superior financial stability (in the case of a High level) or weaker financial stability (in the case of a Low level) over the next three years relative to its peer group. A Medium level suggests that a company exhibits ESG characteristics that are likely associated with financial stability results in line with its peer group over the next three years. Full details of our methodology, financial stability definition and disclaimers are available at [BofA ESGMeter methodology](#). ESGMeter is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of the BofA Global Research fundamental equity analyst's investment rating, volatility risk rating, income rating or price objective for that company.

Copyright and General Information:

Copyright 2023 Bank of America Corporation. All rights reserved. iQDatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS or any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Subject to the quiet period applicable under laws of the various jurisdictions in which we distribute research reports and other legal and BofA Securities policy-related restrictions on the publication of research reports, fundamental equity reports are produced on a regular basis as necessary to keep the investment recommendation current.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.