Stock Exchanges - Asia Pacific

Asia Pacific stock exchanges and markets fact book v4

Industry Overview

03 January 2024

Equity
Asia Pacific
Stock Exchanges

We published the first three versions of our "Asia Pacific stock exchanges and markets fact book" in 2017/19/21 and here is the updated version, based on the latest data.

Asia Pacific stock exchanges and markets

Asian markets witnessed substantial changes in 2022/23, the first rate-hike cycle in the past decade when the FED and the other major central banks globally hiked benchmark rates rapidly, except for China and Japan. Rate changes led to fund inflow/outflow in different markets, and macro economy and geopolitics were also the key drivers impacting market performance, IPO fund raising size, and turnover. The revival of Japan and the rise of India were the two key themes in the region in the past two years and are expected to be the focus in 2024 when investors expect the current rate hike cycle to end, and uncertainties of the next step emerge.

Market cap: market cap is mainly impacted by market performance and new fundraising, including both IPOs and other activities. Shanghai Stock Exchange exceeded Japan's market cap in 2020, driven by active IPO fundraising and stable market performance before the COVID outbreak and the macro slowdown in China. Though it still led Asian peers in 2022, the strong market rebound in Japan with overseas fund inflows will likely help the market reclaim the top spot. Similar ups and downs occurred between Hong Kong and India as the overseas fund outflow from Hong Kong improved the liquidity in other emerging markets.

Turnover: the total turnover in China and Hong Kong dropped in 2022 and 2023 – two years in a row. Shanghai and Shenzhen remain the markets with the highest turnover in Asia, only next to the U.S. Exchanges globally. India exceeded Hong Kong in turnover in late-2023 for the first time in history. While Shanghai and Shenzhen still led in velocity, the trend in Japan, Korea and Taiwan was more positive in 2023.

IPO fund-raising: traditional leaders in IPOs are the U.S., China, and Hong Kong which is backed by Chinese company IPOs. Non-US developed markets, from continental bourses to Japan and Singapore and smaller emerging markets, were not in the spotlight. The rank of Hong Kong slid to No. 6 or 7 in 2023 (according to World Federation of Exchange) as more companies got listed in India and the Middle East. Though China's IPO market was close to a full suspension in 4Q23, Shanghai and Shenzhen still topped peers in IPO activities. The potential rate cuts in 2024 are expected to re-inject liquidity to global stock markets and drive the recovery of IPO activities.

Michael Li >>
Research Analyst
Merrill Lynch (Hong Kong)
+852 3508 7381
m.li@bofa.com

Christiane Holstein >>
Research Analyst
Merrill Lynch (Australia)
+61 2 9226 5840
christiane.holstein@bofa.com

Anuj Singla >>
Research Analyst
BofAS India
+91 22 6632 8674
anuj.singla@bofa.com

Shinichiro Nakamura >>
Research Analyst
BofAS Japan
+81 3 6225 8824
shinichiro.nakamura@bofa.com

Jeehoon Park >>
Research Analyst
Merrill Lynch (Seoul)
+82 2 3707 0532
jeehoon.park@bofa.com

Brooksley Kang >>
Research Analyst
Merrill Lynch (Hong Kong)
+852 3508 7023
brooksley.kang@bofa.com

Susie Liu, CFA >>
Research Analyst
Merrill Lynch (Hong Kong)
+852 3508 8456
susie.liu@bofa.com

Pujita Pasumarthi >>
Research Analyst
BofAS India
+91 81 8502 7080
pujita.pasumarthi@bofa.com

Yuki Yaginuma >>
Research Analyst
BofAS Japan
+81 3 6225 7192
yuki.yaginuma@bofa.com

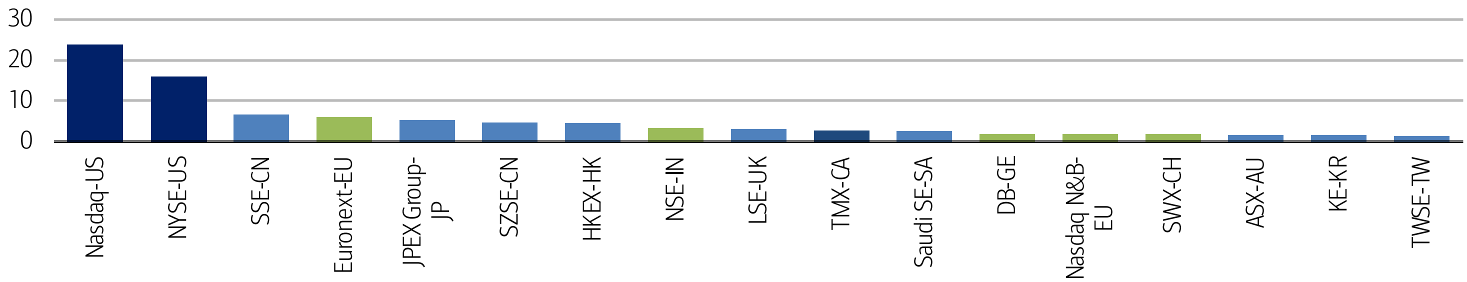
Jisun Lee >>
Research Analyst
Merrill Lynch (Seoul)
+82 2 3707 0418
jisun.lee@bofa.com

Timestamp: 02 January 2024 10:16PM EST

Stock market in Asia Pacific

By end-2022, the total market cap of the stock market in Asia Pacific countries, including Japan, amounted to US$33tn, down 17% YoY from US$39tn in end-2021, vs US$45tn in North/Latin Americas, mainly the U.S. and Canada, and US$24tn in EMEA, mainly the LSE and Euronext. The market cap expansion trends reversed as the global rate hikes started in 2022. Some markets recovered in 2023, including Nasdaq and some saw significant re-rating, including Japan, but some still suffered, including Hong Kong.

Exhibit 1: Global exchanges by market cap by end 2022 (US$ tn)
US market remains significantly larger than other markets

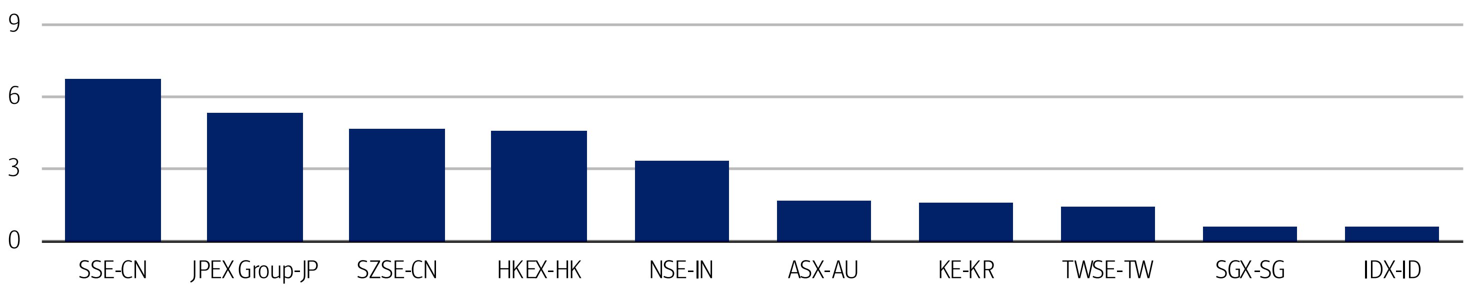


Source: WFE

BofA GLOBAL RESEARCH

Per data from the World Federation of Exchanges (WFE), there were 23 stock exchanges (groups) in 19 countries/regions. Shanghai/Japan/Shenzhen/Hong Kong exchanges were the largest among peers with a US$5-8tn market cap each by end-2021, followed by India/Korea/Taiwan/Australia with a US$2-4tn market cap each. Though the Japan market's performance was stronger than peers' in 2023, the JPY's depreciation kept its market cap lower than Shanghai's, which struggled in the past two years.

Exhibit 2: Top 10 Asia Pacific exchanges by stock market cap by end 2022 (US$ tn)
While China/Japan/Hong Kong remain the largest exchanges in Asia Pacific, the gap between Hong Kong and India narrows



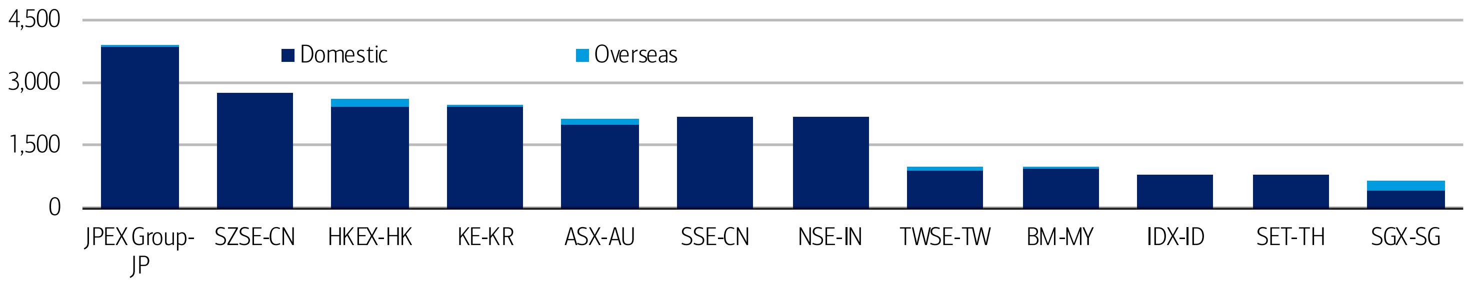
Source: WFE

BofA GLOBAL RESEARCH

There were 3,871 listed companies in Japan, followed by 2,743 in Shenzhen, 2,497 in Hong Kong and 2,468 in Korea. The combined number of listed companies in Shanghai and Shenzhen was 4,917, growing fast in the past two years with more listed SMEs and the SSE STAR Market launch. The stock markets in Japan/China/India, the largest economies in Asia Pacific, are dominated by local companies, while Singapore is the most internationalized market, with 35% of the listed companies from overseas, followed by Taiwan/Hong Kong/Australia with 7-9%.

Hong Kong remains the financial center in Asia Pacific in terms of size and internationalization, but the leadership faced increasing challenges in 2022/23 when geopolitics and China's economy became the key concerns of foreign investors with fund outflows and weak IPO activities.

Exhibit 3: Asia Pacific exchanges by number of listed companies by end-2022
Singapore and Hong Kong/Australia are the most internationalized markets in Asia Pacific

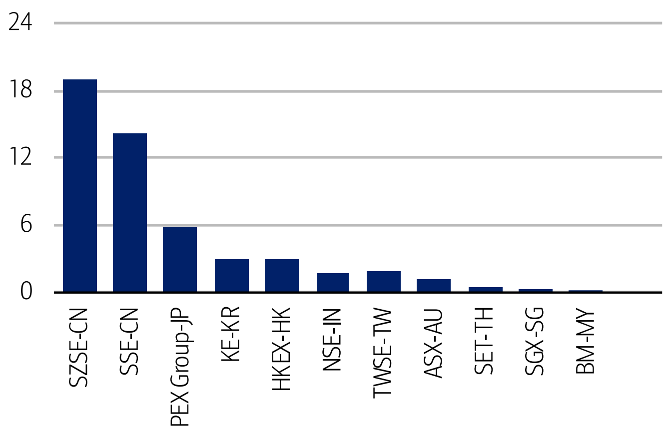


Source: WFE

BofA GLOBAL RESEARCH

The market turnover in China remained much higher than in the rest of Asia Pacific, except for Korea. The market turnover in Asia Pacific in 2022 amounted to US$51tn and China markets, including Shenzhen and Shanghai, accounted for 65% of the total, followed by Japan/Hong Kong/Korea. The total turnover in the region fell 21% YoY in 2022 due to the weak performance and sentiment in the major markets. Consequently, dominated by retail investors with higher trading frequency, the turnover ratios in Shenzhen/Shanghai were higher than in other markets at 403%/211% in 2022. The only market in the region that could exceed Shanghai was Korea with a 182% turnover ratio.

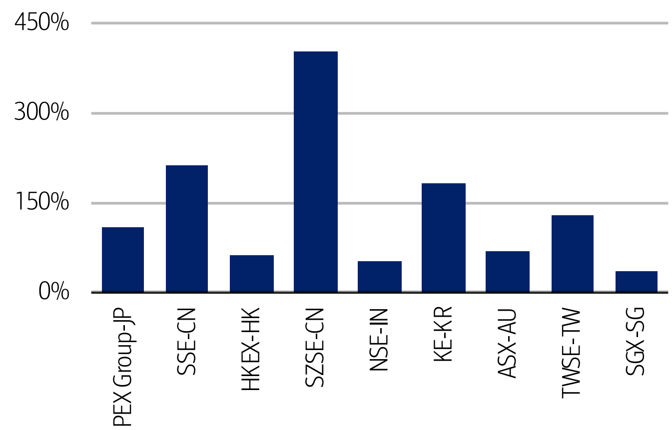
Exhibit 4: Asia Pacific market turnover in 2022 (US$ tn)
Shenzhen and Shanghai led in turnover...



Source: WFE

BofA GLOBAL RESEARCH

Exhibit 5: Asia Pacific market turnover ratio in 2022
...as well as in turnover ratio, but Korea caught up in 2022



Source: WFE

BofA GLOBAL RESEARCH

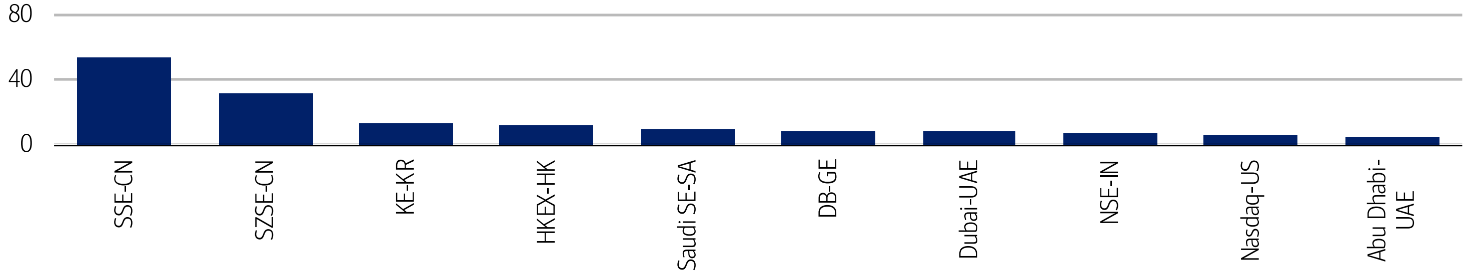
The IPO market changed significantly in 2022. Due to the rate hikes in most markets, the stock market suffered from correction and the IPO fundraising size shrank in the previously leading markets, such as the U.S.'s Nasdaq and Hong Kong. The only major market to report a YoY fundraising size growth was China. Shanghai and Shenzhen together raised more funds than the sum of the eight markets following it.

Hong Kong lost its IPO fundraising top spot, not only to the domestic China peers, but also to Korea. Middle East markets in Saudi Arabia and the UAE, including Dubai and Abu Dhabi, were ranked among the top-10 markets by IPO fundraising size for the first time in history.

While the U.S. market recovered in 2023, Hong Kong market IPO activities remained weak and YoY decline continued. Though HKEX's IPO pipeline was solid, IPO companies chose to wait for better timing to raise funds from investors. China also saw IPO deceleration as the market turned weak. Regulators in China suspended some IPOs in 2H23 to lower the potential impact on liquidity.

Exhibit 6: IPO fund raising size in 2022 (US$ bn)

Only China reported IPO fund raising size growth in 2022



Source: HKEX

BofA GLOBAL RESEARCH

Australia

The Australian stock market is dominated by the ASX, which holds c. 89% of cash market traded value. CBOE Australia (which acquired Chi-X in Jun-21) also operates as an alternative exchange for ASX-listed securities. Both exchanges are licensed and regulated by the Australian Securities and Investments Commission (ASIC).

Market cap and listed companies

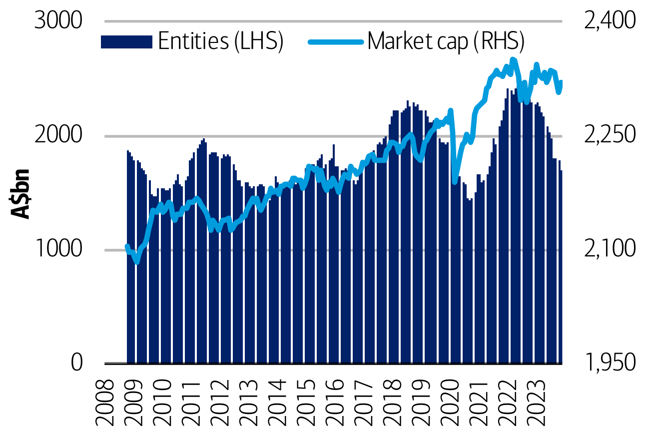
The combined market cap of Australian equities was A$2.5tn (c.US$1.6tn) as of Nov-23, having declined after the Mar-22 peak of $2.7tn. The number of listed entities has continued to decline, driven by interest rate uncertainty and subdued market conditions. However, we expect listings activity to improve in 2H24 as the interest rate outlook improves, with the ASX having highlighted a "solid pipeline of corporates looking to list on ASX when market conditions improve" (see our Sept 15 ASX note).

Capital raising has been volatile over the past 15 years, and largely driven by secondary capital raisings (approximately half of total capital raised). IPO and secondary activities have declined since the pandemic. However, there was a recent improvement of +1.6x 1H23 YTD YoY, albeit inflated by the Newcrest acquisition in Oct-23.

Initiatives designed to bolster listing volumes in recent periods include: 1) Appealing to foreign companies (240+ foreign listings in Jun-23); 2) Sector development with a recent focus on technology and healthcare companies; 3) Product expansion, including ETFs and unlisted managed funds; and 4) post-listing support.

Exhibit 7: ASX listed entities and market capitalisation

ASX listed entities have remained steady, and market capitalization has demonstrated growth since 2008. Both experienced a drop at the beginning of COVID-19, and have since displayed recovery

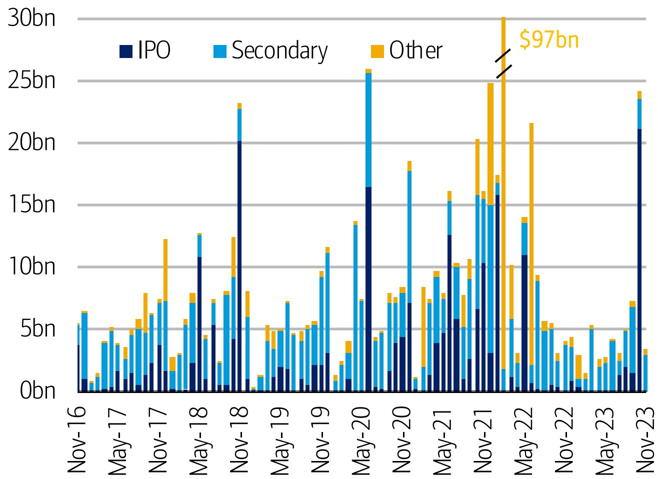


Source: BofA global research, company report

BofA GLOBAL RESEARCH

Exhibit 8: ASX: capital raised

IPO and secondary +1.6x 1H24 YTD Y/Y, inflated by Newcrest acquisition



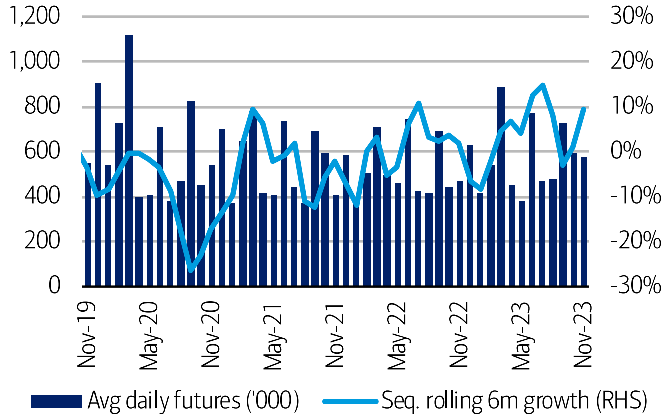
Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Derivatives

Market activity within short-term futures has continued to recover following the unwinding of the YCC, with long-term futures seeing a slower recovery due to rate rise uncertainty. Management expects "ongoing recovery of futures in the rising interest-rate environment, particularly at the short end," with average daily futures growth of 16.5% 1H24 YTD Y/Y. Recovery remains largely driven by short-term futures; however, we have seen improving momentum within longer-dated futures. We expect recovery across futures to continue as rate-rise uncertainty eases.

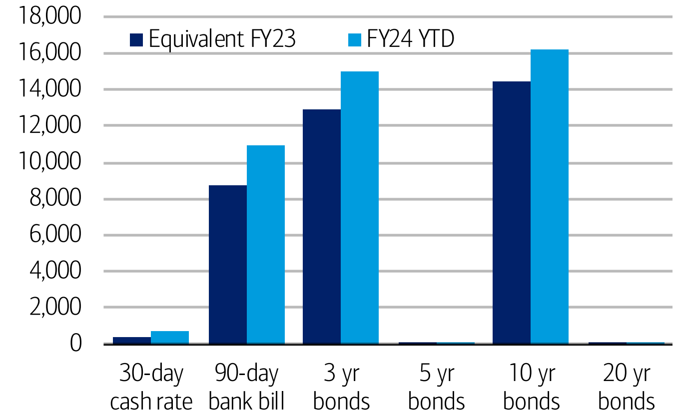
Exhibit 9: Average daily futures and options on futures
Average daily futures +16.5% 1H24 YTD Y/Y



Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Exhibit 10: Futures volumes FY24 YTD (Jul-Oct) vs Y/Y
Short term and 10yr futures have improved, with 5 and 20 year weak



Source: BofA Global Research, company report

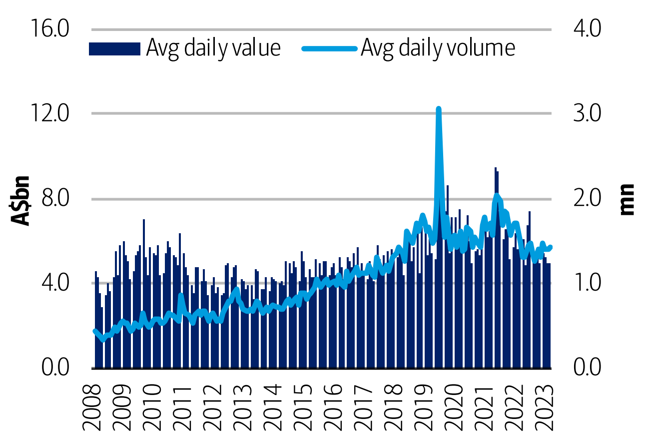
BofA GLOBAL RESEARCH

Turnover and turnover ratio

The average daily turnover for Australian cash markets (equities, rates, and warrants) was A$4.9bn in Nov-23. The average value per trade has generally been stable at around A$3,000-5,000 since 2016, despite a steady decline over the past 15 years. In trade volume terms, the daily average increased consistently from 2014 to early-2020, with a spike in early 2020 due to increased trading at the beginning of the pandemic. Daily volumes have since stabilized, with 1.4m daily trades on Nov-23.

The trading turnover ratio increased during COVID-19 and has since lowered to 56.3% at Nov-23. The ASX market share has fallen slightly since 2013 (from 92% to 89%), but still accounts for the largest share of average on-market traded value.

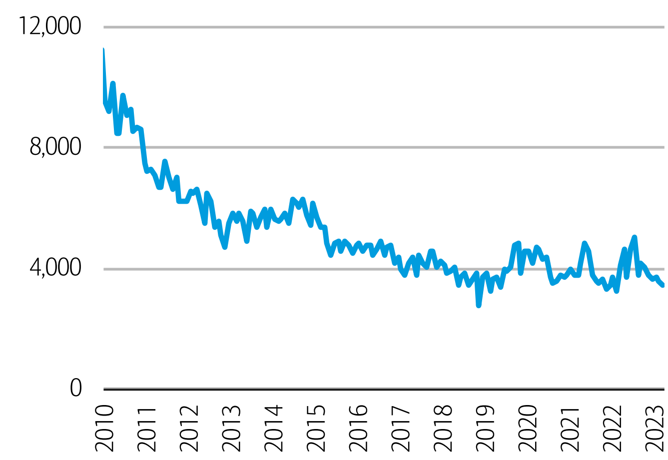
Exhibit 11: Cash market average daily volume and value
Average daily volume and values have displayed steady growth over the past decade, with spikes in activity at the beginning of the pandemic



Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Exhibit 12: Average value per trade
Steady decline over the past decade

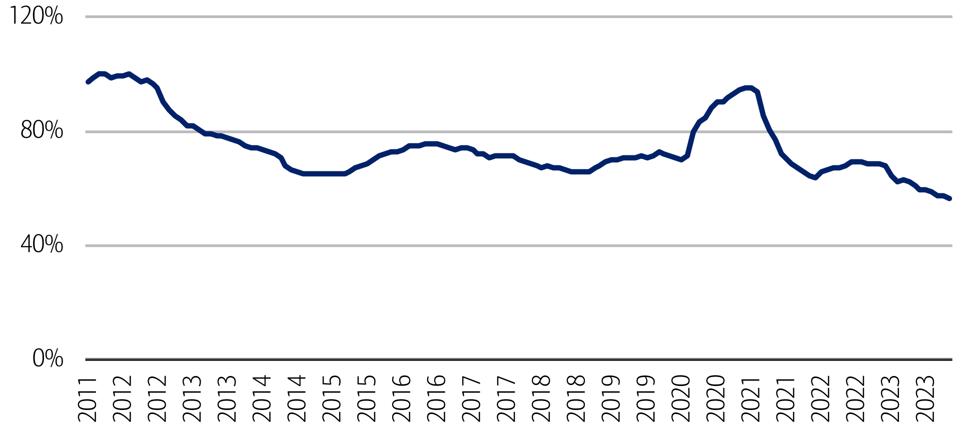


Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Exhibit 13: Trading turnover ratio (rolling 12m)

The trading turnover ratio has slightly declined to 56.3% of the average ASX market cap

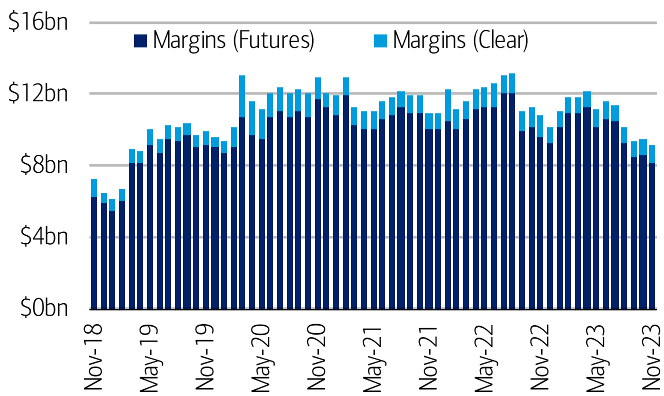


Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Exhibit 14: Margin balances

Margin balances have been relatively stable since COVID-19

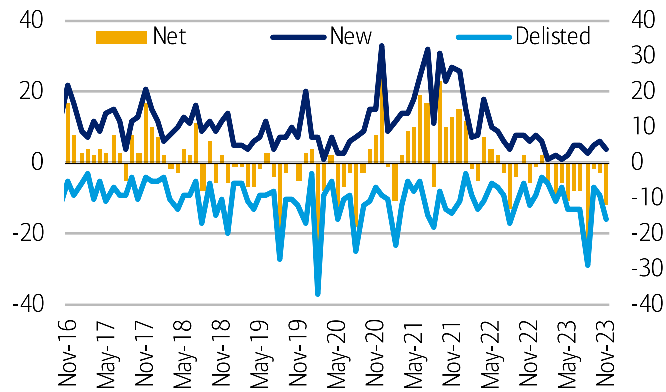


Source: BofA Global Research, company report

BofA GLOBAL RESEARCH

Exhibit 15: ASX listed entities

Total listed entities -3.9% at Nov-23 Y/Y



Source: BofA Global Research estimates, company report

BofA GLOBAL RESEARCH

China (Shanghai and Shenzhen)

There are two key stock exchanges in Mainland China. Traditionally, Shanghai, as the economic center of China, attracts most large-/mid-cap companies, both SOEs and private companies, while Shenzhen, the center of innovation, focuses more on SMEs and start-ups with its SME Board and ChiNext Board. With the launch of the SSE STAR Market in Jul 2019, Shanghai also targets start-ups in TMT, healthcare and advanced manufacturing sectors, and Shenzhen merged its Main Board and SME Board in 2021 to better target larger companies. Both exchanges are not listed and are regulated by the CSRC (China Securities Regulatory Commission).

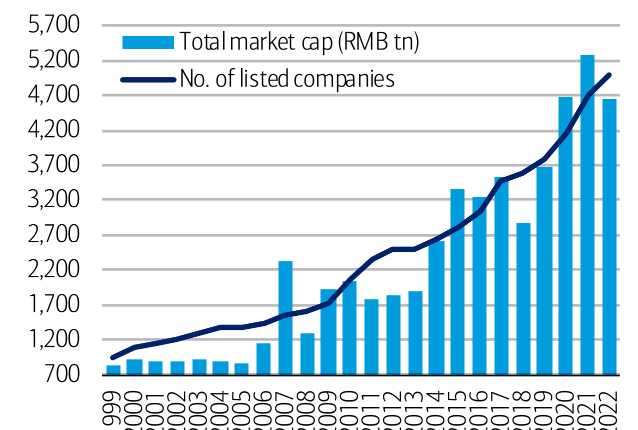
Market cap and listed companies

The total stock market cap in China, including both Shanghai and Shenzhen, grew from <RMB4tn in 2002 to RMB79tn by end-2022. During the same period, the total number of listed companies also rose from 1,224 to 4,991. Compared with the market 18 years ago, the innovative companies on ChiNext Board and STAR Market accounted for 22% of the 2022 total market cap.

Cash brokerage remains the major form of trading, a number of new products, including index futures, warrants, ETFs, margin financing and stock lending, and equity repos, have been introduced in the past 10 years. After the market slump in 2015, China regulators were cautious in innovation for three years until 2019 when they loosened the control on derivatives and other new products. In August 2023, with a goal to revive the China stock market, the CSRC loosened the margin financing ratio for the first time after 2015, with the new cap set at 80%.

Fund raising activities, previously dominated by IPOs, are more balanced with an increasing mix of follow-on offerings. The size of IPOs reached a peak in 2007, driven by mega-SOE IPOs, and in 2010 by SME IPOs, but dropped due to suspensions in 2012-13. After reopening in 2014, the IPO size recovered from its trough. China started the IPO registration reform in 2019 from the newly established STAR Market and later in 2020, expanded the reform to the larger ChiNext Board. The reform accelerated the IPO process and the total IPO fundraising size increased to a record high of RMB588bn in 2022, vs RMB250bn in 2019 when the IPO reform first started. In early 2023, all A-share IPOs have become registration-based after the main board underwent the latest reform. However, since 4Q23, IPOs in Shanghai and Shenzhen Stock Exchanges have come to an almost full suspension at <RMB10bn per month.

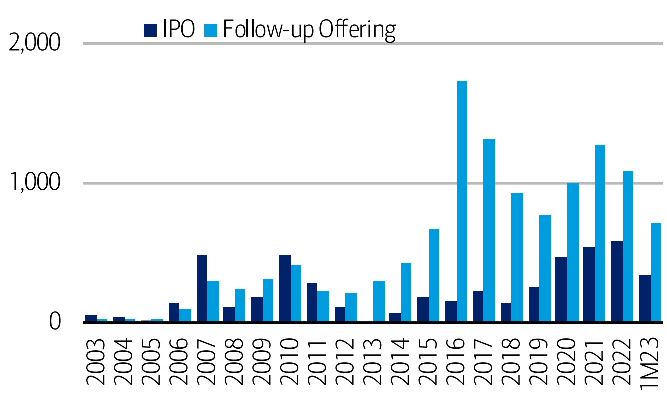
Exhibit 16: A-share market cap and No. of listed companies
The number of listed companies rose to historical high



Source: BofA Global Research, SSE, SZSE

BofA GLOBAL RESEARCH

Exhibit 17: Fund raising activities in domestic stock market(RMB bn)
IPO fund raising size reached record high in 2022



Source: BofA Global Research, SSE, SZSE

BofA GLOBAL RESEARCH

Investor profile

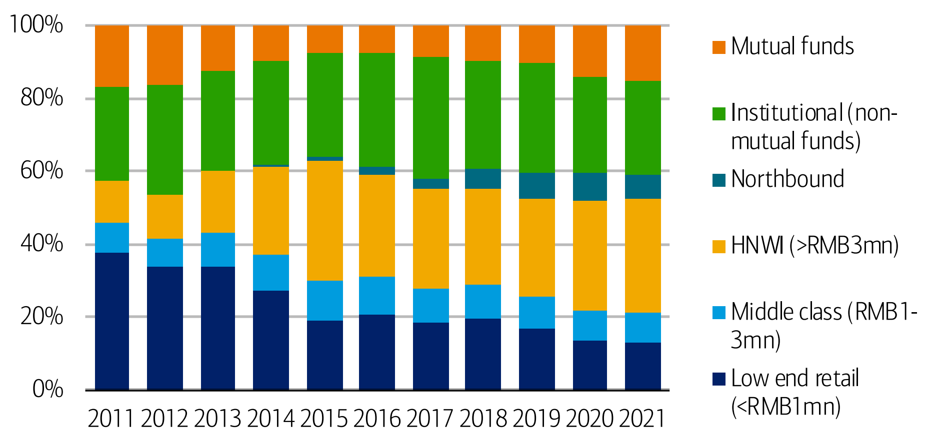
Retail investors are still the major force in the domestic market with ~52% free-floating market cap, based on SSE's 2021 annual report. Institutional investors, including insurers, mutual funds, and private funds, increased their market share in the past five years but remained smaller in size and turnover.

The mix of retail investors has been declining since 2015. Low-end retail investors with stock assets <RMB1mn accounted for 13% of the total tradable market cap in Shanghai by end-2021, down from 38% by end-2011. While the middle-class group remained largely stable at 8-9%, the rise of the HNWI (High Net Worth Individual) group, from 11% in 2011 to 31% in 2021, indicates that the retail market in China keeps evolving and low-end retail investors are no longer dominant. According to Caixin, A-share turnover contributed by retail investors also dropped to 61% in 9M22, from 87% in 2015, driven by the rise of institutional investors.

The market is usually more volatile and short-term due to the investor mix; the exchanges in China benefit from such a structure as retail investors are more active in trading and contribute more commissions, though the turnover and sentiment of retail investors could be changing rapidly. Institutionalization in China accelerated with increasing overseas funds, as well as expanding mutual fund, hedge fund, and quant fund sizes. The mix of institutional investors could continue to grow as Chinese residents increase their financial asset allocations.

Exhibit 18: Mix of tradable market cap by investors in SSE

Institutional investor mix should have further risen in 2022 as mutual and quant funds increased



Source: BofA Global Research, SSE

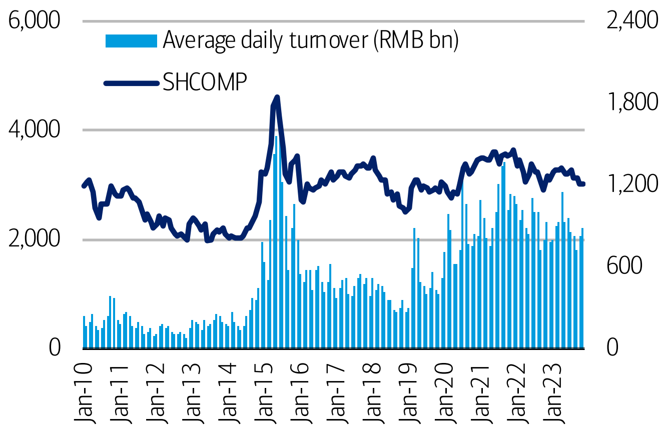
BofA GLOBAL RESEARCH

Turnover and turnover ratio

The market turnover in China started to rise in 4Q14 after China cut its benchmark interest rates and entered another round of loosening cycle. The average daily turnover in 2011-13 was at RMB100-300bn and surged to >RMB1tn in 1H15 until the market turmoil in 2H15 and 1Q16. The major drivers of the surge included retail investors and the use of margin financing and other leverage tools. Even after the market crash in 2H15, the average daily turnover in China remained at RMB454bn in 2016-18 and rebounded to RMB500-800bn in 2019-20, and RMB900-1,000bn in 2021-22, driven by quality IPOs, and major inflows from overseas, institutional and retail investors. In 11M23, the average daily turnover edged down to <RMB900bn amid a weak stock market and overseas fund outflow pressure.

Compared with other major markets, the turnover ratios in Shanghai and Shenzhen are both much higher. The overall A-share turnover ratio (full year turnover/year-end total market cap) was at 339% in 2022. As the total market cap in China includes the ~50% locked shares and shares held by large shareholders, primarily governments and SOE groups. The actual turnover ratio could be even higher than 600%.

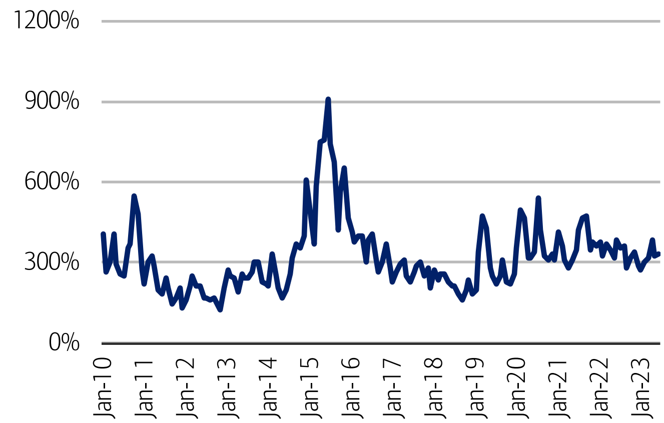
Exhibit 19: Average daily turnover changes in China
Daily market turnover rose to RMB925bn in 2022



Source: BofA Global Research, SSE, SZSE

BofA GLOBAL RESEARCH

Exhibit 20: Annualized market velocity changes in China
Market turnover ratio remained stable



Source: BofA Global Research, SSE, SZSE

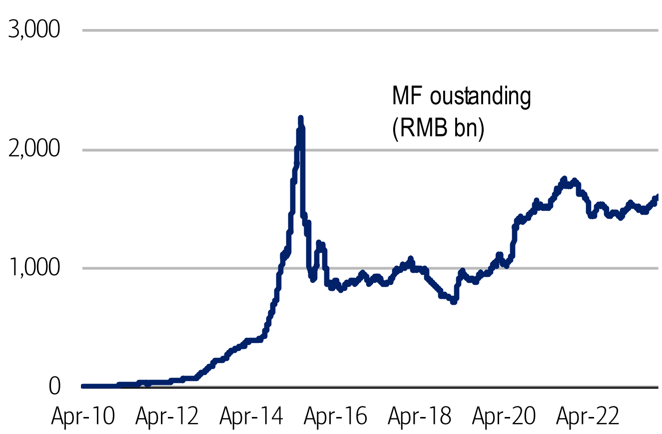
BofA GLOBAL RESEARCH

Margin financing

The impact of margin financing size is meaningful for the A-share market due to its larger size and the participation of both institutional and retail investors. China launched margin financing in Mar 2010, and it was the first official product for investors to use as leverage to trade A-share stocks. After the rise and fall of margin financing in 2015, the overall size remained stable in 2016-19 at <RMB1tn. As the market rebounded and market liquidity improved due to the loosening policies in 2020, the outstanding margin financing balance also steadily increased to the RMB1.6tn level in 2021 and then stayed at the RMB1.5tn level in 2022 and 1H23 post-market correction. Outstanding balance rebounded to RMB1.6tn towards end-2023 after the margin ratio cap was loosened to 80% from 100% in August. The market leverage ratio, calculated as margin financing investment as a proportion of total market cap, troughed at 4.4% in 2018, then gradually rebounded to 6.6% in 2021, and normalized to 5.8-6.1% since 2022.

We also follow the indicator of margin financing turnover as a % of total turnover to track if the market is overheated and if regulators will potentially come out to cool down the market. We set the alert level at 11-12% based on the experience from previous cycles. In the past few months, the ratio was stable at 8%.

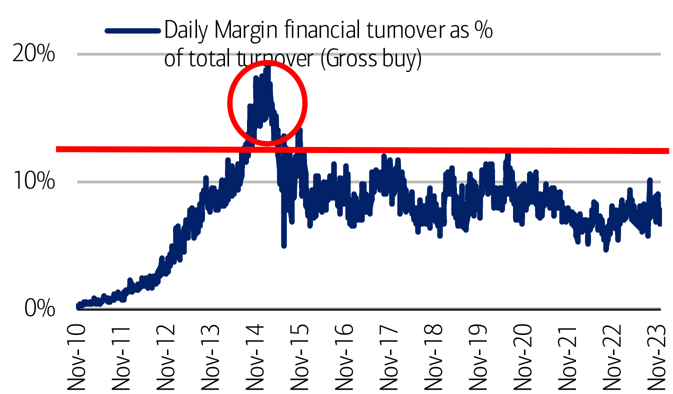
Exhibit 21: Margin financing balance
Margin financing balance stood at RMB1.6tn by end-Nov 2023



Source: BofA Global Research, Wind

BofA GLOBAL RESEARCH

Exhibit 22: Margin financing as % of total turnover
The ratio stood at 8% by end-Nov 2023



Source: BofA Global Research, Wind, China Securities Finance Corp

BofA GLOBAL RESEARCH

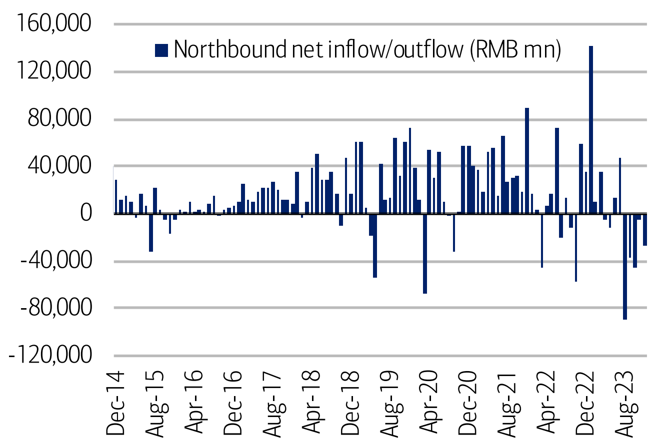
Stock Connect

China started to allow overseas investors to invest in the A-share market via Stock Connect with Hong Kong in 2014. Before the launch of Stock Connect, only QFII investors could trade A-shares.

As MSCI started to include A-shares in its indices, the net fund inflow from overseas investors also increased. The annual inflow rose from RMB200bn in 2017 to RMB484bn in 2021, but dropped to RMB89bn in 2022 and RMB27bn in 2023 YTD as overseas investors reduced their China exposure on RMB depreciation, weak macro expectations and geopolitical tension. While Jan 2023 recorded a new high in monthly inflow from overseas investors at RMB141bn, as expectations on consumption recovery turned weaker later in the year, in Aug 2023, northbound outflow reached a record monthly high at RMB90bn.

Northbound (overseas investors invest in A-share via Stock Connect) turnover as % of total A-share turnover also increased from 1-2% in 2016 to 5-7% in 2023. As domestic investors keep tracking the investment of overseas investors and believe northbound inflow and outflow are the largest moving part in A-share's daily trading, the impact of northbound funds is much larger than its mix.

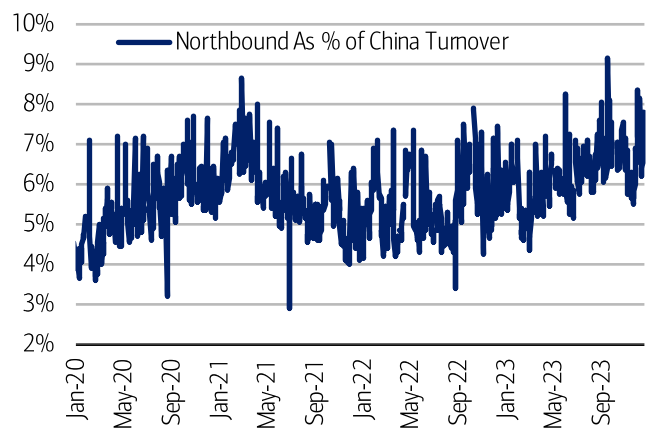
Exhibit 23: Northbound net inflow/outflow
Northbound net outflow since Aug 2023



Source: BofA Global Research, HKEX

BofA GLOBAL RESEARCH

Exhibit 24: Northbound turnover as % of total A-share turnover
Northbound turnover accounts for >5% of A-share turnover



Source: BofA Global Research, HKEX, SSE, SZE

BofA GLOBAL RESEARCH

Hong Kong

Hong Kong's total market cap size dropped from No.3 in Asia Pacific to No.4 as the performance was weak in 2022, and new listings boosted the market cap growth in Shenzhen. Though Hong Kong remains almost the only offshore market for Chinese companies to get listed and overseas investors to invest in them, the concerns on geopolitics and China's decelerating economic growth make the market less outstanding among peers in terms of turnover and fundraising. Mounting uncertainties that are beyond the control of HKEX and local government make the near-term growth of the market less visible.

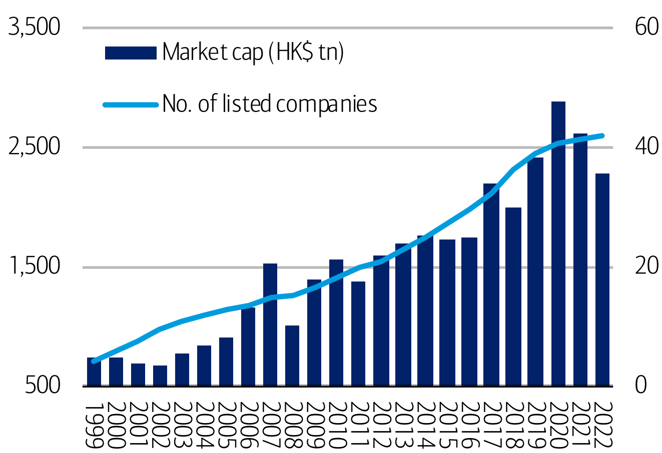
Market cap and listed companies

The total stock market cap in Hong Kong, including the Main and GEM Board, amounted to HK$36tn by end-2022, down from 2020's peak of HKD48tn. While the lack of large IPOs was one of the reasons, the declining market cap was driven mainly by the stock prices drop in the past two years. The total number of listed companies was 2,597 by end-2022, up slightly from 2,538 in 2020. The GEM Board is small in Hong Kong with a low turnover as the majority trading and listed companies are in the Main Board.

Fund raising activities in Hong Kong mainly include IPOs and follow-up offerings (FPOs) via placement and rights issue. The size of IPOs hit a peak in 2010, driven by mega China IPOs. And in the past decades, Chinese companies in different sectors were the key growth driver for IPO fund raising in Hong Kong. However, the strict regulation on overseas listings, including pre-IPO scrutiny by Chinese regulators and the weak market sentiment for new listings, led to the sharp decline of IPO fundraising size in Hong Kong in 2022 from HKD331bn in 2021 to HKD105bn in 2022, and the trend continued in 2023. The fund-raising size of FPO also saw similar drop in 2022 and 2023. Though there are still ~100 companies waiting for IPOs in Hong Kong, the weak market makes the visibility of IPO timing and sizing very low.

HKEX revised IPO rules in the past five years to allow secondary listing and listing of biotech companies that are not yet profitable. The measures did attract multiple companies to get listed in Hong Kong and HKEX also tried to attract similar tech companies. However, the key issue making potential companies reluctant to choose Hong Kong is the liquidity in the market, especially for small cap stocks.

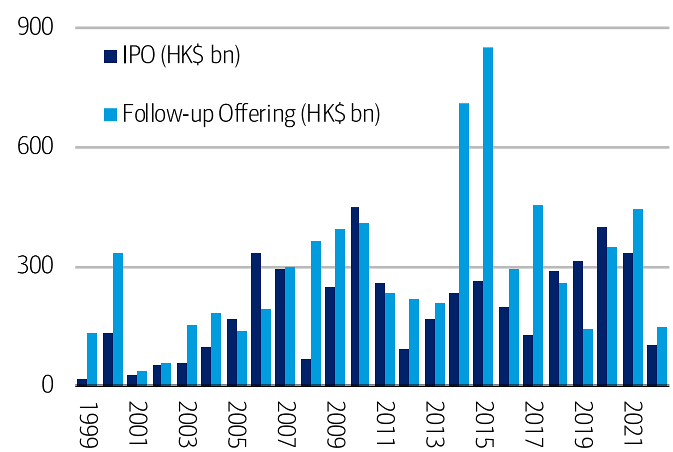
Exhibit 25: Hong Kong market cap and No. of listed companies
Market cap dropped in 2021 and 2022



Source: HKEX

BofA GLOBAL RESEARCH

Exhibit 26: Fund raising activities in Hong Kong stock market
IPO fund raising size sharply declined in 2022



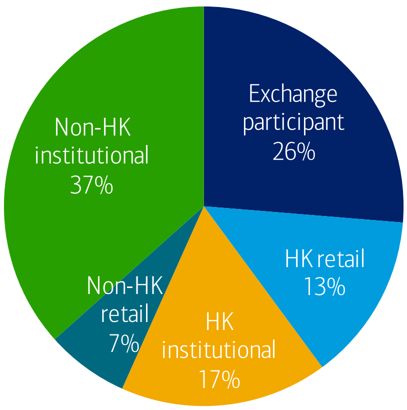
Source: HKEX

BofA GLOBAL RESEARCH

Investor profile

The Hong Kong market is diversified in terms of investor types. Based on the study of HKEX, institutional investors, including exchange participants, contributed 80% of the total cash equity turnover in Hong Kong in 2019, rising from 70-75% in the past 10 years, while the mix of retail investors dropped. The major increase was in the non-HK institutional investor and exchange participants segments, driven by increasing activities of the Stock Connect. Among non-local investors, Asian investors accounted for 42%, including the Mainland China investors.

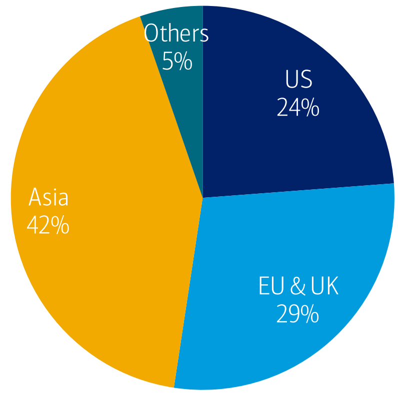
Exhibit 27: Hong Kong turnover by investor type (2019)
Non-HK institutional investors accounted for 37% of the total turnover



Source: HKEX

BofA GLOBAL RESEARCH

Exhibit 28: non-local investor turnover (2019)
Asian investors contributed 42% of the total turnover by non-HK investors



Source: HKEX

BofA GLOBAL RESEARCH

Hong Kong local investors contributed 30% of the total cash equity turnover in 2019. As Stock Connect was launched in 2014 and 2016 and investors from Mainland China became the new driver in the market, the mix of Hong Kong local investors could further decline.

Investors from the U.S., UK and EU accounted for ~60% of the total non-HK investors in the past 10 years in terms of market turnover. The mix declined to 53% for the first time in 2019, due partially to the rise of Mainland China investors. The further decline took place in the past two years when concerns about geopolitics mounted. Though the fund outflow size is not available, the trend is clear from the performance of stocks held by overseas investors.

Turnover and turnover ratio

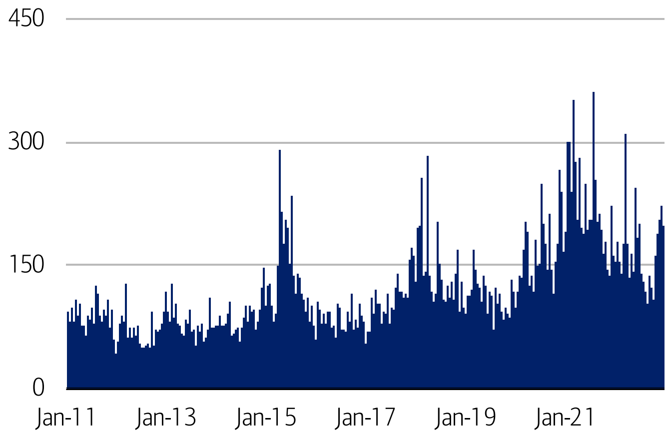
The total market turnover in Hong Kong amounted to HK$31tn in 2022, down from HK$41tn in 2021, and the third-highest in the history. The average daily turnover in 2022 also dropped to HK$125bn from HK$168bn in 2021.

Before 2017, except for 2015, the average daily turnover in Hong Kong remained largely stable at HK$60-70bn as the turnover ratio and trading strategy of institutional investors are more stable and consistent, compared with that of retail investors. However, the rise of Stock Connect investors and new economy companies that investors trade more frequently lead to an increase of the average daily turnover.

However, the uptrend reversed in 2022. The market slump during the tight control on COVID also led to fund outflows from Hong Kong and the turnover dropped subsequentially. The drop of turnover ratios in 2022 might not have fully reflected the picture as trading continued during the outflow, and the shrinking market cap, to some extent, distorted the ratios.

The low velocity in Hong Kong is mainly due to 1) a lower mix of new economy stocks, especially before 2019; 2) a high mix of institutional investors; 3) a low mix of high frequency trading due to high trading costs, which is even higher now; and 4) lack of mid-cap companies that have growth potentials to attract investors. In addition, overseas fund outflow in 2023 further hurt the liquidity in Hong Kong.

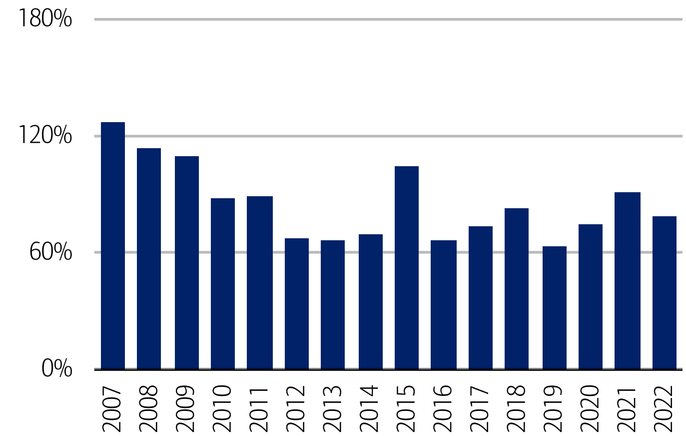
Exhibit 29: Hong Kong daily turnover changes
Average daily turnover dropped in 2022



Source: Bloomberg

BofA GLOBAL RESEARCH

Exhibit 30: Turnover ratio in Hong Kong
Turnover ratio dropped in 2022 and further in 2023



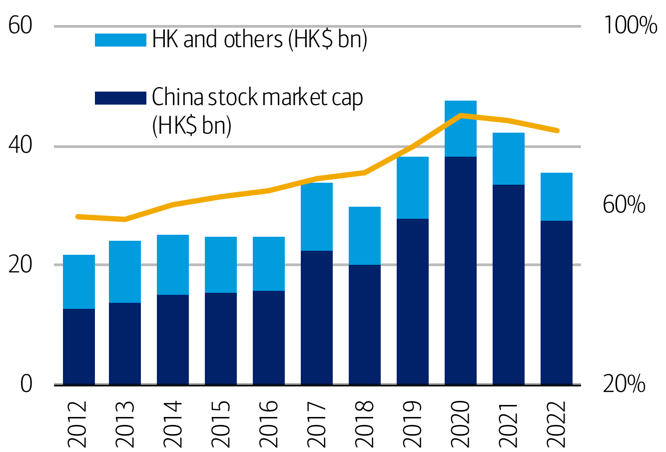
Source: Bloomberg

BofA GLOBAL RESEARCH

China impact

China's impact on Hong Kong market has been increasing since 2006 when more large Chinese companies, such as banks, were listed in Hong Kong. By end-2020, China-related stocks, including H-shares, Red Chip stocks and privately-owned companies shares, accounted for 80% of the total market cap of the Main Board in Hong Kong. The mix rose from 57% by end-2013 and continued growing in the past eight years. However, in 2021/22, as the drop in the market cap of China stocks was more significant than that of non-China stocks, the mix declined to 79% and 77%.

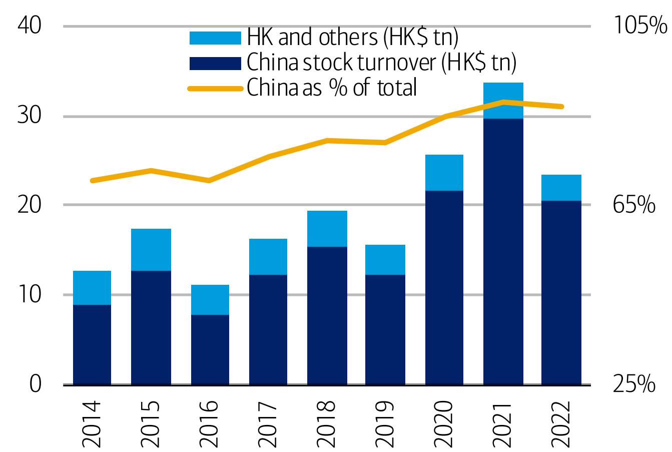
Exhibit 31: China stock market cap at 77% of total Main Board
China stocks dropped more than non-China stocks



Source: HKEX

BofA GLOBAL RESEARCH

Exhibit 32: China stock turnover at 87% of total cash equity turnover
China turnover and turnover ratio higher than average



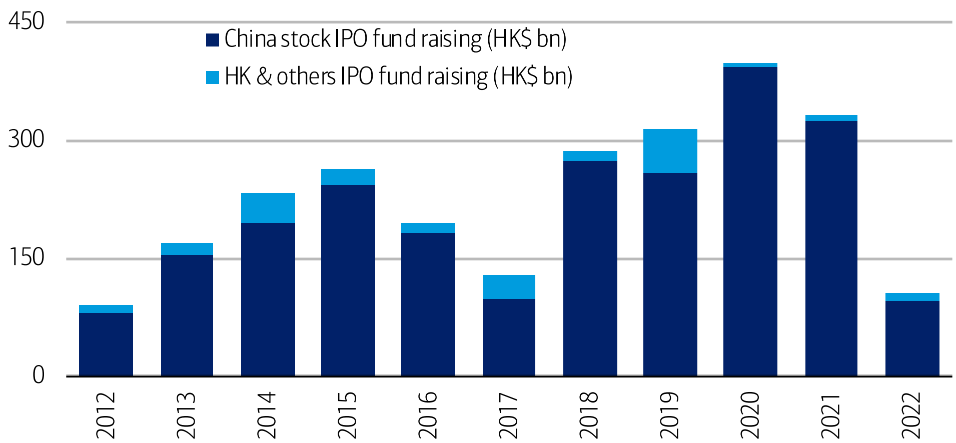
Source: HKEX

BofA GLOBAL RESEARCH

China-stock-related turnover accounted for 87% of the cash equity turnover in Hong Kong in 2022 and the mix could further rise due to the boost from Stock Connect as well as more active trading when the overseas fund outflew from Hong Kong. The market connects were launched in Nov 2014 between Shanghai and Hong Kong and Dec 2016 between Shenzhen and Hong Kong, allowing Mainland China investors to buy stocks in Hong Kong and overseas/Hong Kong investors to buy A-share stocks. When Mainland China investors buy Hong Kong stocks, southbound turnover contributes to the total turnover in Hong Kong. In 2022, southbound turnover accounted for 12.0% of the total Hong Kong turnover, up from 2.6% in 2016. China investors could be more interested in Hong Kong due to the demand of global asset allocation and other reasons. However, the rise of the mix was also due partially due to the mix decline of overseas investors.

Chinese companies continue to play major roles in Hong Kong IPOs. In 2022, Chinese company IPOs accounted for 92% of the total fund raised via IPOs in Hong Kong. As Hong Kong is less likely to attract foreign companies in the current environment and local unlisted Hong Kong companies remain small, Chinese companies, if IPOs recover, will continue to be the key driver of Hong Kong market.

Exhibit 33: China company IPOs fund raising size accounted for >90% of total IPO fund raising size
The mix dropped to 92% in 2022



Source: HKEX

BofA GLOBAL RESEARCH

India

India has three main stock exchanges (i) National Stock Exchange (NSE), (ii) Bombay Stock Exchange (BSE), and (iii) Metropolitan Stock Exchange of India (MSEI). Indian exchanges are vertically integrated, in contrast to global exchanges, with service offerings across the whole value chain, including execution, clearing, settlement and data offerings. With the Indian equity markets doing well recently, the Indian stock exchanges have gained significant scale, with NSE now being the eighth-largest exchange globally and fifth in the Asia Pacific (APAC) region, based on cumulative market capitalization of listed equities. NSE was also ranked among the top 10 APAC exchanges in 2022, in terms of (i) market turnover, (ii) market turnover ratio, and (iii) IPO fundraising size.

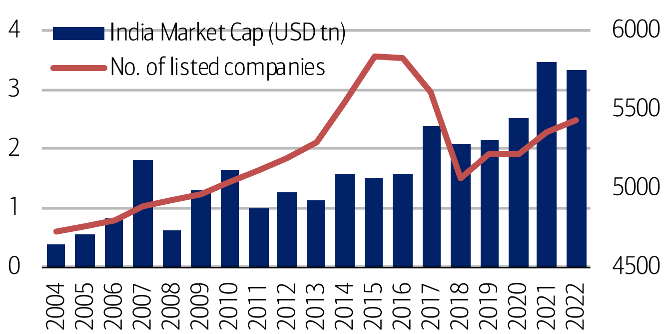
We highlight the key comparisons of Indian exchanges vs. global peers as below:

- **Significant scope to expand the revenue streams:** Transaction revenues (execution and post-trade) still constitute a major part of the revenue stream of Indian exchanges with strong potential to generate revenue from other underpenetrated areas, such as data services, index products, technology, and offerings. In contrast, exchanges in developed countries have already exploited the key revenue-generating opportunities with a well-diversified revenue stream. In addition, Indian exchanges have created other non-core areas for revenue generation, such as interest income, investment income and rentals, which are unique to the Indian market.
- **Low operating cost** with cost to income ratio for Indian exchanges much lower vs global peers and has among the lowest operating cost per trade.
- **Globally competitive pricing** with transaction, execution and post-trade services priced favorably vs international peers.
- On profitability metrics, Indian exchanges are comparable to global exchanges with the impact of lower pricing offset by a favorable cost structure.

Market cap and listed companies

India's market capitalization has grown at a 17% CAGR during 2004-22 to INR275tn (13% CAGR in USD terms to USD3.3tn), with the number of listed companies as well rising to 5,433 vs. 4,725 in 2003. During this period, market capitalization as a % of GDP rose to 105.73 vs 45.21 in 2003, with further tailwinds for near-term growth on rising retail investor participation, strong IPO activity and FII/DII flows.

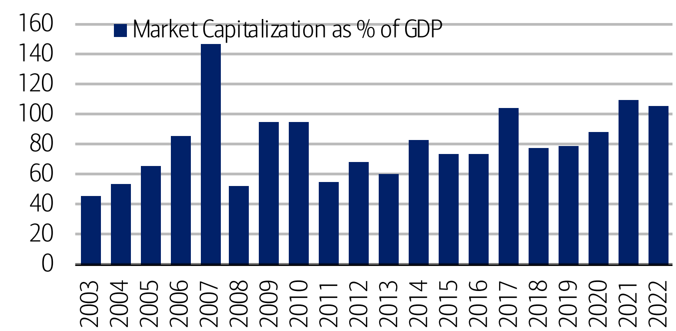
Exhibit 34: Market Capitalization and number of listed companies
India market cap grew at a 13% CAGR during 2004-22 to USD3.3tn



Source: Bloomberg, World Bank, SEBI, BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 35: Market capitalization as % of GDP
Historically, market capitalization to GDP has been a very volatile ratio



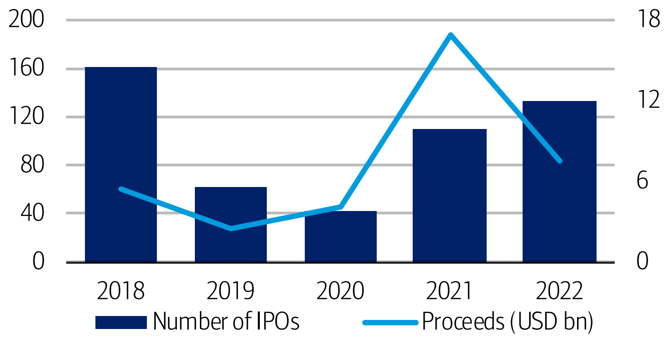
Source: Bloomberg

BofA GLOBAL RESEARCH

India leads global markets in IPO volumes in 2023

Indian stock exchanges (BSE, NSE; issuances including SMEs) ranked third in the world in terms of the number of IPOs (133) in 2022, with consumer products and retail, technology, and diversified industrial sectors being the most active sectors. However, the market delivered mixed post-IPO returns compared to strong performance in 2021, due to elevated geopolitical volatility and concerns about global growth. In 2023, India led globally with 150 IPOs (constituting 15% of global IPOs), with the market witnessing a surge in activity on positive domestic and foreign investor sentiment, and companies enthusiastic on filing for IPOs in the run-up to the general elections in India.

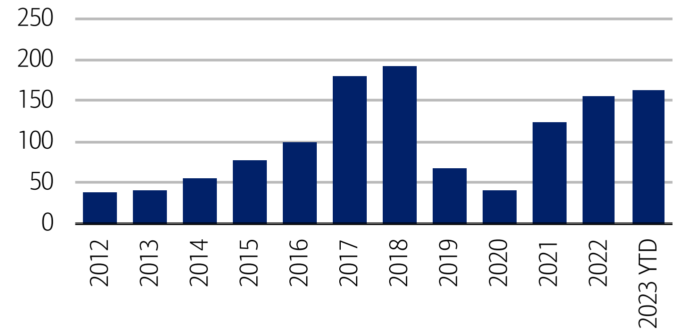
Exhibit 36: IPOs (Main market +SME) in NSE and BSE
IPOs are on a rising trajectory in India...



Source: Media articles, consulting reports

BofA GLOBAL RESEARCH

Exhibit 37: IPOs announced
...while the trends were mixed with respect to proceeds



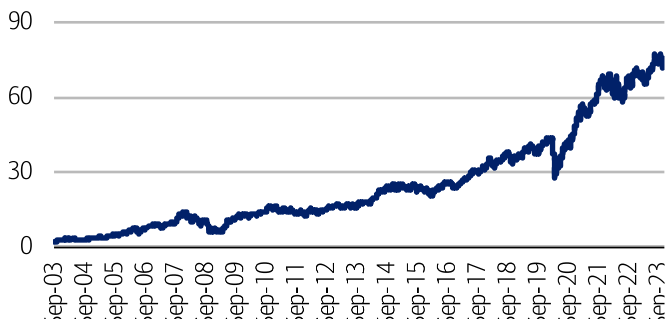
Source: Bloomberg

BofA GLOBAL RESEARCH

Free float levels are rising on dilution in promoter shareholding

India's free-float market capitalization is 51% of its full market capitalization for the benchmark S&P BSE Sensex Index. Historically, the higher promoter shareholding was the key reason for lower free float levels in India. The ratio has improved over time on reduction in promoter holding with regulator SEBI raising the minimum share public shareholding to 25%, though the ratio still lags global peers'. Free-float levels are likely to continue improving with tailwinds from (i) plans around divesting government stakes in PSUs, and (ii) a rise in the listed securities with IPOs adding significant value.

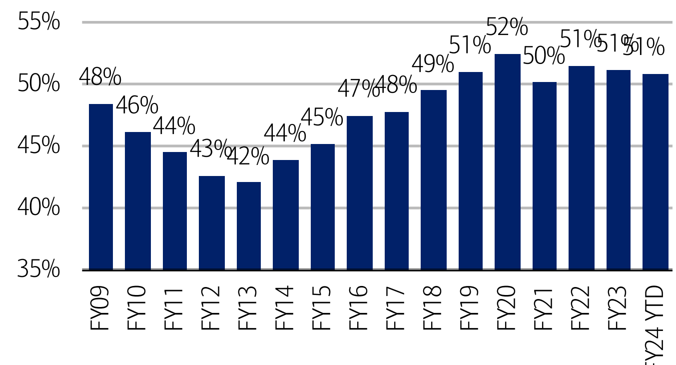
Exhibit 38: S&P BSE SENSEX Free Float (INR mn)
Free Float market cap for S&P BSE SENSEX saw a steep increase post-COVID



Source: Bloomberg

BofA GLOBAL RESEARCH

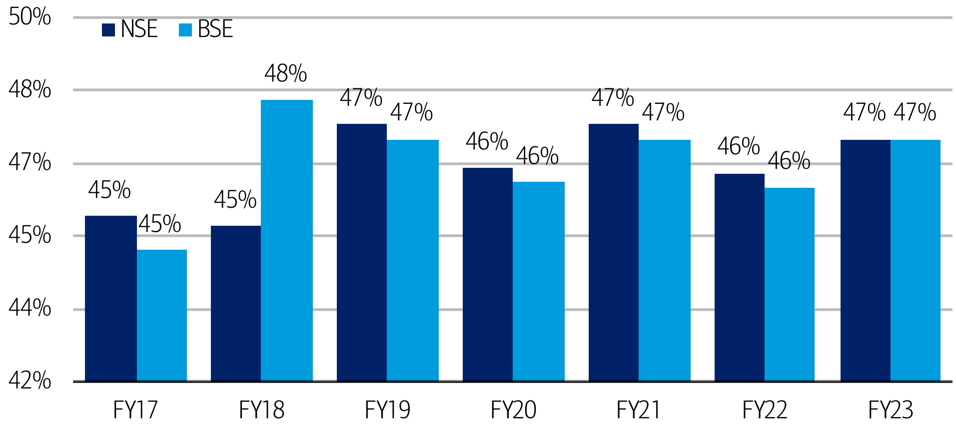
Exhibit 39: S&P BSE SENSEX – Free Float to Market Capitalization (%)
Free float as a % of market cap improved to 51% from FY12-13 lows



Source: Bloomberg, BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 40: NSE and BSE Free Float to Market Capitalization (%)
Free float to total market capitalization for NSE improved by 200bp over the last 5 years



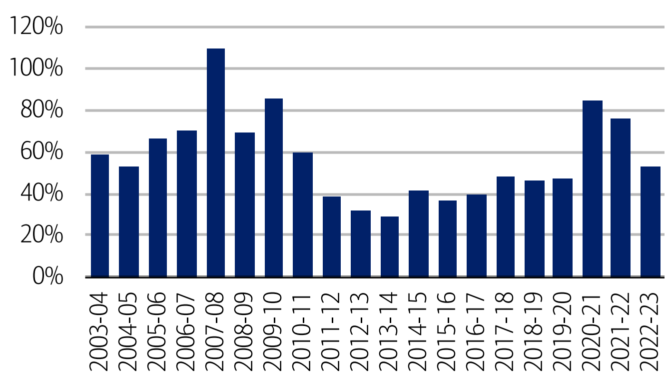
Source: SEBI

BofA GLOBAL RESEARCH

Turnover velocity lower vs global peers

NSE had a turnover velocity of 50% in FY23, significantly lower vs. major stock exchanges globally (>100%). This is primarily due to larger cap stocks dominating the trading volumes (with lower churn), higher promoter shareholding as well as lower retail participation. We believe the improving equity share in financial assets of Indian households post-COVID, growing retail participation and rising interest of foreign investors in the Indian markets should provide a huge opportunity for Indian exchanges to grow their trade volumes multifold.

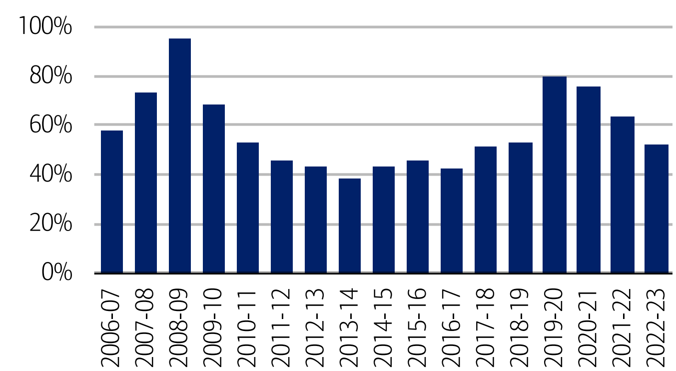
Exhibit 41: Cash Segment in India – Total Turnover to GDP Ratio
Total Turnover to GDP ratio is still moderated vs historical levels...



Source: SEBI

BofA GLOBAL RESEARCH

Exhibit 42: NSE – Turnover to Market Capitalization (%)
...with turnover velocity lagging vs global peers



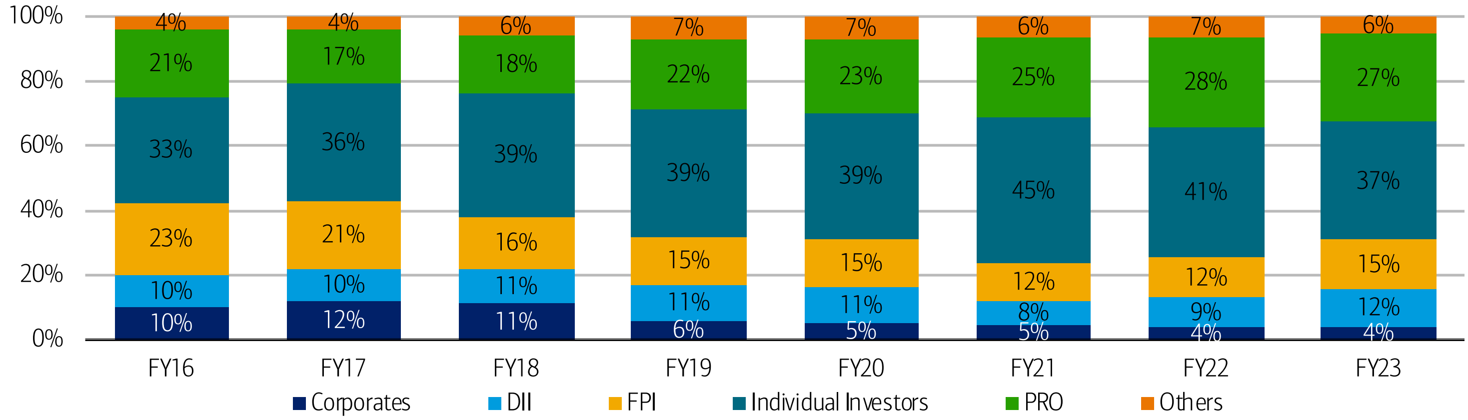
Source: SEBI

BofA GLOBAL RESEARCH

Retail participation is rising in total turnover

NSE's total turnover mix in the cash segment underwent significant changes during FY16-23 with the individual investor share rising significantly post-COVID in FY21 to 45% (vs 33% in FY16), offsetting the decline in FPI, DII and the corporate share. This was driven by rising new investor registrations facilitated by the scale up of new-age digital stock broking platforms, such as Zerodha, Groww, Angel One, etc., over the last decade. However, the share of individual investors moderated in FY22-23 on marginal improvement in the FII and DII share with global uncertainties positioning India as a better investment destination.

Exhibit 43: Trends in share of client participation in Capital Market at NSE
The share of individual investors rose to 45% in FY21 post COVID, but moderated in FY22-23 on rising FPI/DII flows



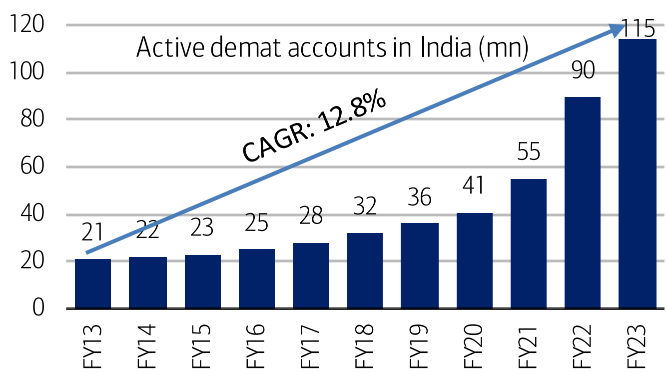
Source: NSE Pulse

BofA GLOBAL RESEARCH

...reflected in rising demat account penetration and exchange volumes

During FY13-23, demat accounts in India grew steadily at a 12.8% CAGR, with the total active client accounts at 115mn in FY23. India is a largely underpenetrated market with the demat account penetration (as a % of the population) at 6.4% in FY23 vs. around 14%/32% for China/USA. During the same period, trade volumes grew at a 13.3% CAGR at NSE, with a rising share of financial assets in total household savings on the back of improving financial literacy in the country. Also, a significant uptick in SIP registrations during the last 5-6 years confirms a similar trend, with the total outstanding accounts growing at a 29% CAGR during FY17-23.

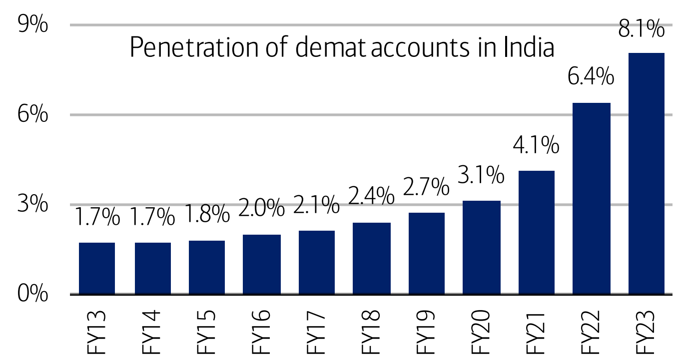
Exhibit 44: Active Demat accounts in India (mn)
Demat accounts have witnessed a steady growth over the last decade...



Source: Company presentations

BofA GLOBAL RESEARCH

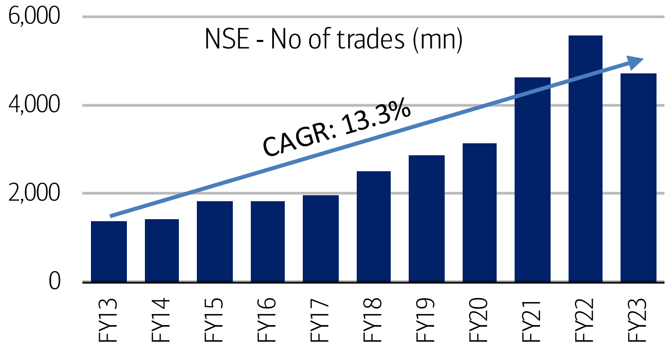
Exhibit 45: Demat account penetration in India (%)
...with penetration rising from 1.7% in FY13 to 8.1% in FY23



Source: Company presentations

BofA GLOBAL RESEARCH

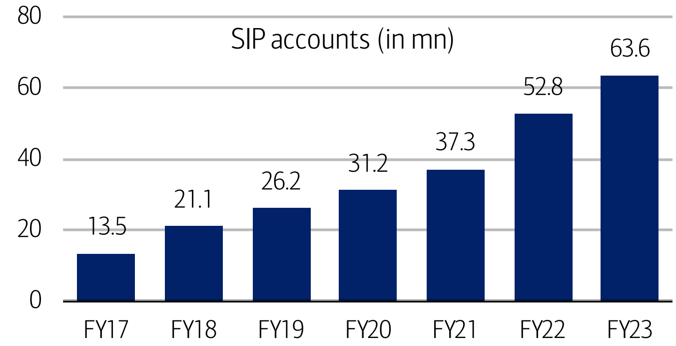
Exhibit 46: Number of trades (in mn) at NSE
Trade volume at NSE grew at a 13% CAGR over the last decade



Source: SEBI

BofA GLOBAL RESEARCH

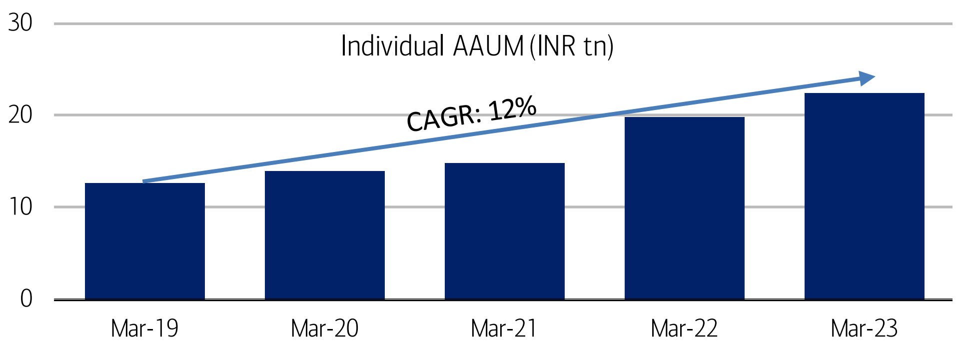
Exhibit 47: SIP accounts outstanding (in mn)
SIP accounts grew at a 29% CAGR during FY17-23



Source: AMFI

BofA GLOBAL RESEARCH

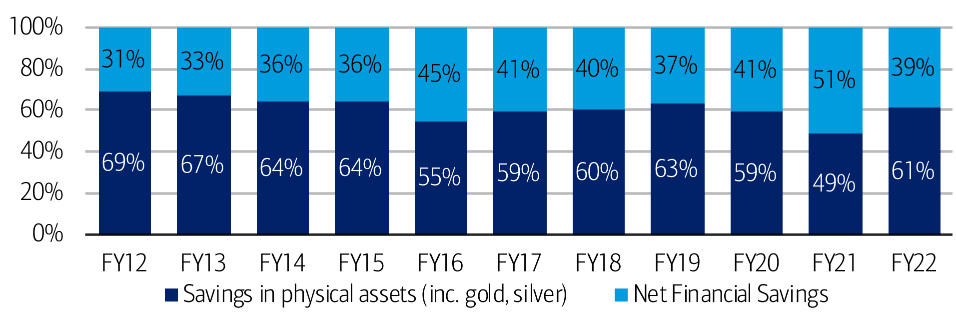
Exhibit 48: Indian Mutual Funds – Individual AAUM (INR tn)
Individual AAUM in Indian mutual fund industry rose at a 12% CAGR during FY19-23



Source: AMFI

BofA GLOBAL RESEARCH

Exhibit 49: Trend of household savings in India
The share of net financial savings in total household savings improved to 39% in FY22 vs 31% in FY12



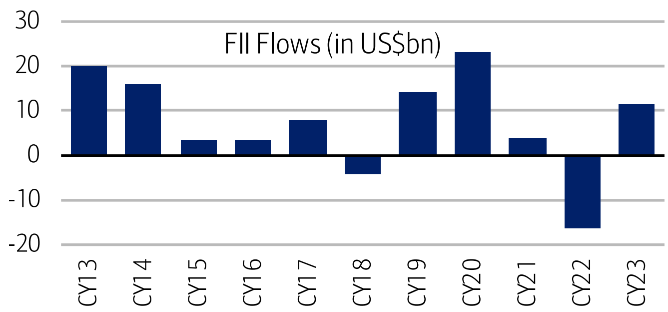
Source: Handbook of Statistics on Indian Economy, RBI, MOSPI, CRISIL MI&A

BofA GLOBAL RESEARCH

FII flows experiencing volatility while DII flows holding up well

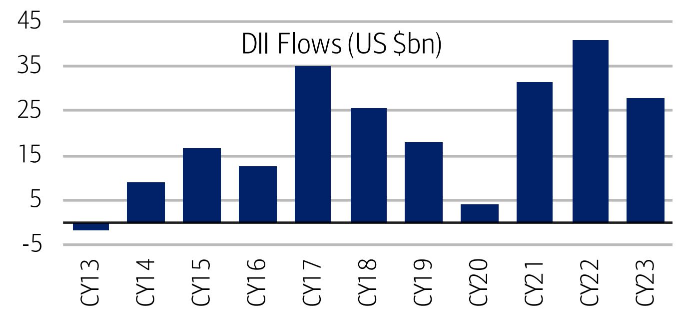
FII flows into Indian capital markets experienced volatility over the last decade, with their share in NSE cash equities turnover moderating to 15% in FY23 from 23% in FY16. However, DII flows held up well during this period, with their turnover share remaining broadly stable at 12% in FY23 vs 10% in FY16.

Exhibit 50: Net FII flows (US$bn)
FII flows experienced volatility over the last decade with moderation in Indian capital market turnover share...



Source: NSDL
BofA GLOBAL RESEARCH

Exhibit 51: Net DII flows (US$bn)
...with DII flows holding up well and share in capital market turnover broadly stable

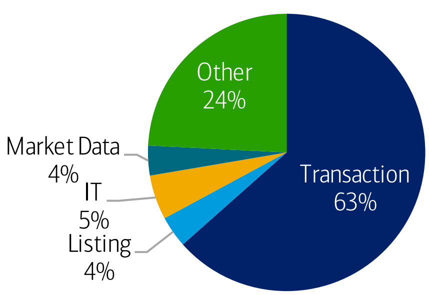


Source: AMFI
BofA GLOBAL RESEARCH

Scope for diversification with revenue mix dominated by transaction services

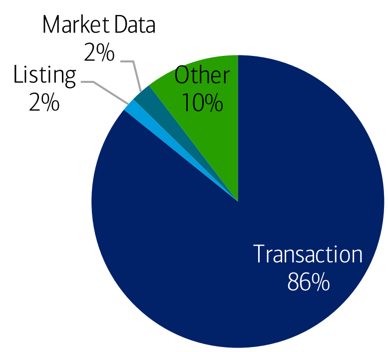
Still a major portion of NSE's operating revenue comes from transaction services, whereas global exchanges grew their revenue from non-core services like IT and market data segments over the years. This provides an opportunity for Indian exchanges to expand their earnings book by focusing on the underpenetrated revenue streams.

Exhibit 52: NSE Revenue mix based on services (FY17)
Transaction services constitutes major portion of revenue, and rose from 63% in FY17...



Source: Company, BofA Global Research estimates
BofA GLOBAL RESEARCH

Exhibit 53: NSE Revenue mix based on services (FY23)
...to 86% in FY23



Source: Company, BofA Global Research estimates
BofA GLOBAL RESEARCH

Japan

Japan Exchange Group (JPX; 8697) was formed in January 2013 via the merger of the Tokyo Stock Exchange (TSE), which operates the cash equity market, and the Osaka Stock Exchange (OSE), which operates the derivatives market. The Tokyo Commodity Exchange (handles commodities futures and other transactions) became JPX's subsidiary in October 2019. In addition to cash equity and derivative trading, the JPX group also includes Japan Exchange Regulation, which conducts the screening and administration activities required to maintain the quality of the market, and provides comprehensive securities trading functions, including settlement and clearing. JPX accounts for around 90% of listed stock trading value in Japan. Despite the entry of domestic and overseas Proprietary Trading System (PTS), JPX remains the core exchange in Japan.

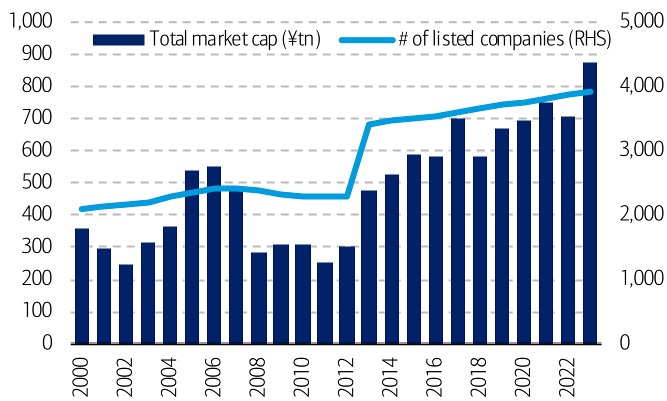
Market cap and listed companies

Market cap ¥875tn, 3,920 listed firms; Second-largest Asian exchange

The aggregate market cap of companies listed on the TSE, which operates JPX's cash equity markets, was ¥875tn as of end-Nov 2023 (YTD+24%; JPY-based). The TSE market cap has been moving beyond its historic peak. As of end-Nov 2023, there were 3,920 stocks listed on the TSE. The market cap of TSE-listed firms as of end-2022 was second only to the New York Stock Exchange (NYSE), NASDAQ, and the Shanghai Stock Exchange (in USD terms).

Exhibit 54: TSE: Market cap and number of listed firms

The leading exchange after NYSE, NASDAQ, and the Shanghai Stock Exchange, with market cap of ¥875tn and 3,920 listed companies



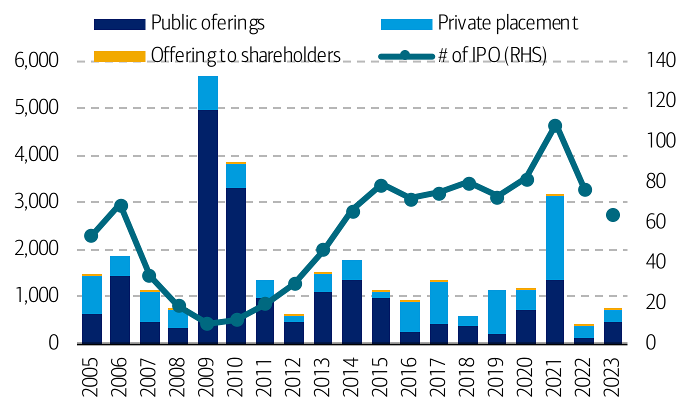
Note: Source data lacks continuity between 2012 and 2013, due to 2013 merger of OSE cash equity market with TSE. The latest value is as of end-Nov 2023.

Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 55: TSE Equity financing trends (¥bn)

The number of IPOs trends at an annual pace of about 80 companies



Source: JPX, BofA Global Research. Note: The latest value is as of October.

BofA GLOBAL RESEARCH

incentives to enhance corporate value in both quantitative and qualitative terms

In March 2023, JPX made a request entitled "Action to Implement Management that is Conscious of Cost of Capital and Stock Price" to all listed companies in the Prime and Standard Markets. It requested listed companies to take a series of actions on an ongoing basis, namely, to understand their cost of capital and return on capital accurately, to analyze and evaluate the current situation regarding their cost of capital, return on capital, and valuation at their board meetings, to formulate and disclose plans for improving those figures, and to update their efforts thereafter through dialogue with investors. JPX plans to improve its competitiveness by encouraging listed companies to enhance their corporate value on both quantitative and qualitative yardsticks.

Equity financing trends: Around 80 IPOs per year

FY22 equity financing was ¥403bn, down 87% YoY. This reflects a reactionary decline in equity financing due to the absence of large-sized financing we saw in FY21, which were partially driven by measures of the COVID-19 pandemic. The number of new listings in FY22 decreased by 32 firms vs. FY21, to 77. Though around 80 firms per year have been listed since 2015 on average, there have been 64 companies listed in FY23.

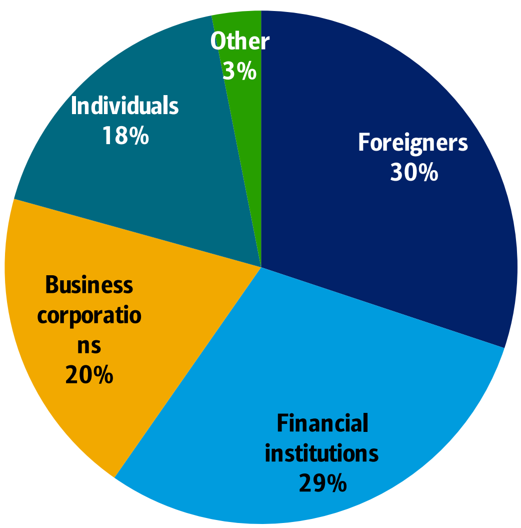
Around 82% of FY22 equity financing was either new share issuance or secondary offerings by already listed companies, with around 18% from IPOs. This reflects the fact that many IPOs were relatively small firms listing on the Growth Market for startups, with only a limited amount of capital raised per offering. We note that current Japanese rules do not allow firms to list on the TSE via Special Purpose Acquisition Company (SPACs), but discussions on deregulation are underway.

Investor profile and stock market turnover

Main shareholders are overseas investors/financial institutions

Exhibit 56 shows end-2022 share ownership ratios by investor type. The main owners of TSE-listed stocks were overseas investors at 30%, financial institutions at 30%, business corporations at 20%, and individuals at 18%. Financial institutions include pension funds and investment trusts' shareholdings via trust banks, and in underlying terms, overseas investors are the largest holders of Japanese stocks. We would highlight the downtrend in retail investors' ownership ratio vs. an uptrend in that for investment trusts. Overseas investors, the largest shareholders, have maintained their 30% ownership ratio despite fluctuations caused by market conditions.

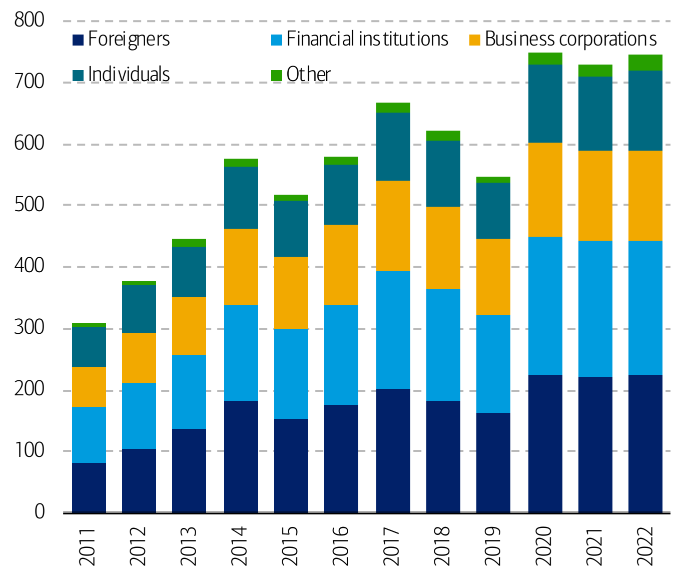
Exhibit 56: TSE: Ownership ratios by investor type (2022, value basis)
Overseas investors are effectively the largest asset owners; the figure for financial institutions includes holdings through pension funds and investment trusts



Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 57: TSE: Ownership value by investor type
Overseas investors have an ownership ratio of around 30%; among financial institutions, the ownership ratio of investment trusts has been rising



Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Trading remains upbeat; 2022 average daily trading value around ¥3.6tn

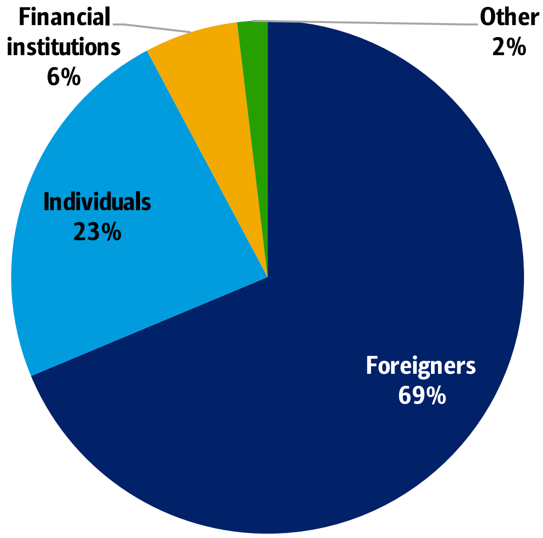
The TSE reported 2022 stock trading value of ¥647tn, down 15% YoY. Additional government fiscal support and accommodative monetary policy in response to the COVID-19 pandemic drove sustained high levels of trading. The average daily trading value on the TSE was around ¥3.4tn in FY21 and ¥3.6tn in FY22. We saw an increase in average daily trading value of ¥4.0tn in year-to-date of FY23 (Jan-Oct).

Trading mainly by overseas and retail investors

Exhibit 58 shows FY22 trading data by investor segment. Trading value (aggregate of buying and selling) by investor type breaks down to 69% for overseas investors, 23% for retail, 6% for financial institutions (including investment trusts), and 2% for nonfinancial companies. Overseas and retail investors are the mainstays, with the former accounting for around 70% of trading value. Overseas investors have continued to represent around 70% of trading value since 2016, making them the TSE's largest investor category.

Exhibit 58: TSE: Trading value by investor type (2022)

Overseas investors and individuals are the major trading entities on the TSE

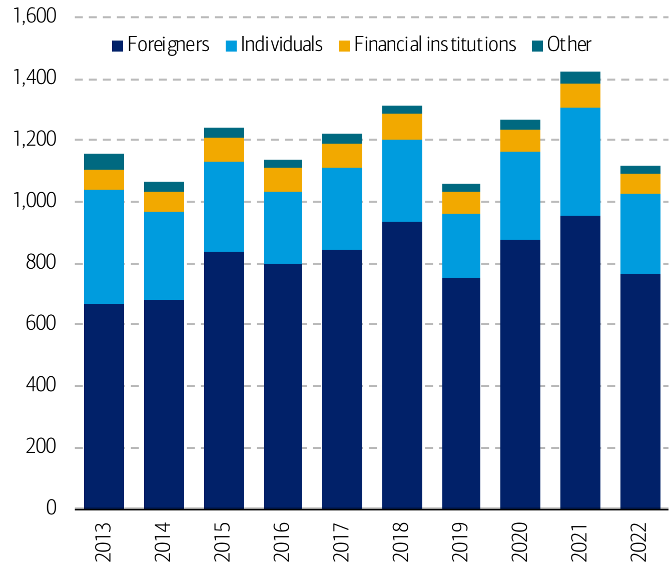


Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 59: TSE: Trading value by investor type

Overseas investors have consistently accounted for about 70% of trading value

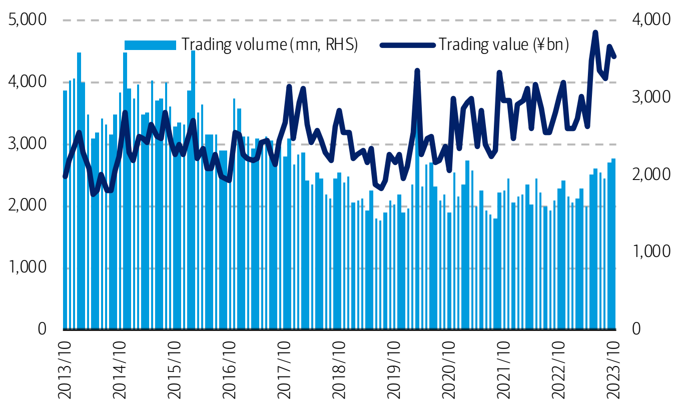


Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 60: TSE: Daily average trading volume and value

Approximate average daily trading value on the TSE was ¥3.4tn in FY2021 , ¥3.6tn in FY2022, and ¥4.0tn in FY2023(Jan-Oct).



Note: Total of TSE 1st, 2nd, Mothers, JASDAQ is shown between Oct 2013 to Mar 2022. Total of TSE Prime, Standard, Growth market is shown Apr 2022 and after.

Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 61: TSE: Turnover ratio (value basis)

The value-based turnover ratio rose to about 180% in 2013, since when it has remained in a range of about 100-130%

Source: JPX, BofA Global Research

BofA GLOBAL RESEARCH

Korea

Korea Exchange (KRX) is currently the sole securities exchange in Korea, established in 2005 from the consolidation of prior exchanges (Korea Stock Exchange, Korea Futures Exchange, KOSDAQ Stock Market). It provides a wide range of services for the capital market, including trading and market data services, clearing and settlement services for securities and derivatives, market surveillance, and listing and disclosure. The exchange is not listed.

Market cap and listed companies

Market cap of U$1.8tn; Korea constitutes around 11.8% of MSCI EM index

The total stock market cap of KRX, which includes KOSPI, KOSDAQ, and KONEX markets, amounted to KRW2,304tn (US$1.8tn) in 2023, up from <KRW1,000tn till 2006 and the trough in 2008 during the GFC at KRW613tn. The number of listed companies steadily increased, growing from 1,700-1,800 levels during 2008-2013 to over 2,760 firms in 2023. Korea constitutes around 11.8% of the MSCI EM Index as of October 2023.

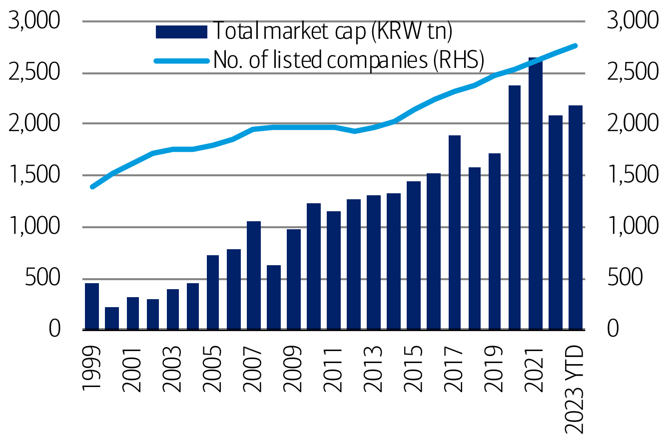
Three major markets – KOSPI, KOSDAQ, and KONEX

The KOSPI market, the main benchmark stock index with major global corporations, constitutes most of the market cap (KRW1,909tn vs KRW391tn/KRW4tn at KOSDAQ/KONEX). The KOSDAQ market, composed of SMEs and startup companies mainly in areas of tech and bio, has the highest number of listed firms at 1,682 in total, followed by 952/129 firms at KOSPI/ KONEX.

Sharp rise in IPO activities in 2021 and 2022

The size of IPO activities in Korea hit a record high level in 2021, followed by a series of mega IPOs including Krafton (KRW4.3tn), KakaoBank (KRW2.6tn), SK IE Technology (KRW2.3tn), Kakaopay (KRW1.5tn), SK Bioscience (KRW1.5tn) and HD Hyundai Heavy Industries (KRW1tn). As a result, the total number of companies that went public in 2020 reached 98 from 82 in 2020, up 19.5% YoY, and IPO market size reached the peak of W14.5tn from W3.8tn in 2020, up 281.6% YoY. While both the IPO count/market size decreased in 2022 to 85 companies/KRW13.4tn due to increased market uncertainties arising from inflation, tightening monetary policy, and geopolitical risks, the IPO market size was still well sustained, supported by the KRW12.8tn IPO of LG Energy Solution – the largest IPO deal in Korean history.

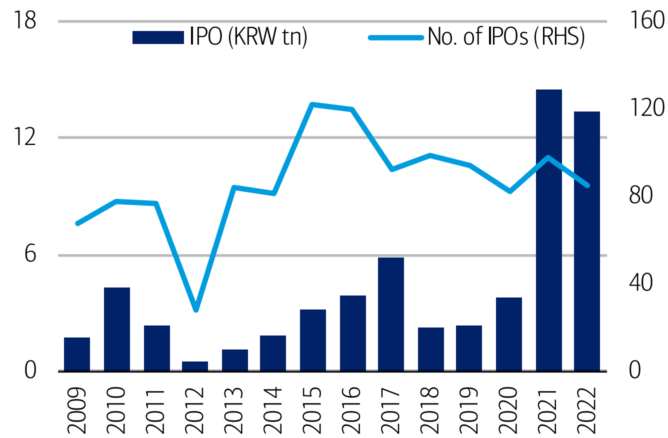
Exhibit 62: Number of listed companies steadily on rise
KRX total market cap and number of listed companies



Source: KRX, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 63: IPO market size reached its peak in 2021
IPO activities in the Korean stock market



Source: FSS, BofA Global Research

BofA GLOBAL RESEARCH

Investor profile and stock market turnover

55% of turnover from retail investors, followed by 26% from foreign investors

The Korean market is diversified in terms of investor profile. In 2023, retail investors continued to be the major market participants of KOSPI, contributing 55% of total market turnover, followed by foreign investors (26%) and domestic institutional investors (18%). Among domestic institutions, pension funds, financial investment companies, and investment trusts make up most of the trading value.

22% foreign ownership of KOSPI; 15% foreign ownership of KOSDAQ

Foreign ownership of KOSPI increased to historical high levels of 38-39% during the late 2019 to early 2020 but has declined to 22% level as of November 2023 – even below the previous troughs of 30-31% in early 2016. For KOSDAQ, foreign ownership was at 10-12% level during the late 2019 but increased to 15% level as of November 2023.

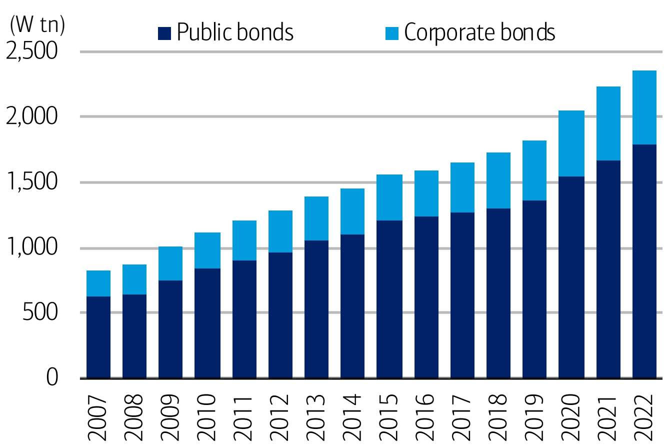
U$6.4bn (KRW 9.7tn) average daily turnover for KOSPI during 2023 YTD

KOSPI's total market turnover came at KRW 2,186tn in 2022, down from KRW 3,743tn in 2021 and KRW 2,912tn in 2020, but way higher than the turnover seen during the pre-COVID era. The average daily turnover was KRW 6.4tn (U$5.4bn) in 2018, while it fell to KRW 4.9tn (U$4.1bn) in 2019.

Bond market

In 2022, the total listed amount of bonds in Korea came at KRW 2,353tn, including KRW 1,793tn public bonds and KRW 560tn corporate bonds. The total trading value for bonds stood at KRW 957tn in 2022, down from the peak of W3,245tn in 2016. Government bonds (Korea Treasury Bonds, Monetary Stabilization Bonds, etc.) take up more than 90% of the total trading value. The outstanding balance of KTBs/MSBs amount to KRW938tn/113tn in 2022. Foreign investors hold 9.7% of total listed bonds in Korea as of October 2023, and 21.5%/12.6% of total KTBs/MSBs, as of September 2023.

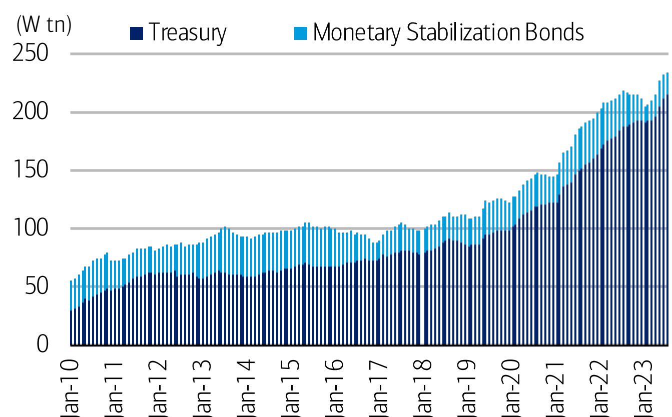
Exhibit 64: Total listed amount of bonds in Korea shows rising trend
Total listed amount of Korean bonds



Source: BoK, BofA Global Research

BofA GLOBAL RESEARCH

Exhibit 65: Foreign holdings of KTB has shown steady growth trend
Foreign holdings of KTB and MSB



Source: FSS, BofA Global Research

BofA GLOBAL RESEARCH

Philippines

The Philippine Stock Exchange (PSE) is a product of a merger between the Manila and Makati exchanges in 1992. The PSE remains a largely cash-driven exchange. In Nov-2023, the exchange commenced short-selling, limited to the 30-stocks that comprise the benchmark PSE index (PSEi). Member-brokers facilitate a modest amount of margin trading. The exchange indicated that index futures may commence in 2025.

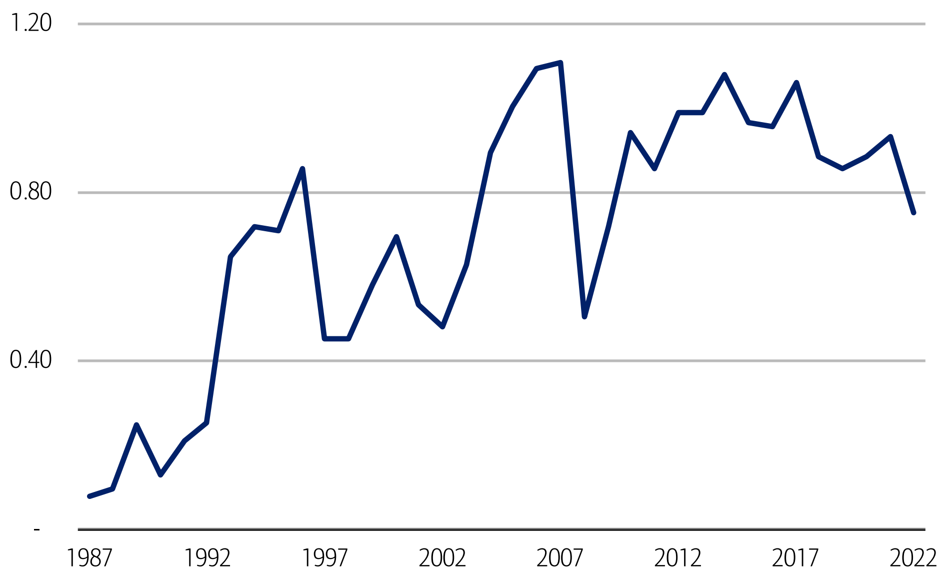
The PSE is represented by a 30-member index, known as the PSE Index. Today, members of the PSE Index aggregate close to 70% of the PSE's total market capitalization; with 10 of the 30 stocks comprising 67% of the index capitalization. Sector representation has favored conglomerates (36%), property (19%), and financials (19%). Weights of telcos, power and utilities have markedly decreased since 2010.

Market cap / listed companies

PSE's market capitalization grew nearly sevenfold over two decades, from $44bn in end-2000 to a peak of $348bn in early 2018 and has since receded to $296bn by late 2023. Most of the gains were realized post-Global Financial Crisis, which coincided with strong economic growth – the Philippine economy sustained GDP growth of >6% per annum. Despite this, the PSE remains one of the smallest exchanges in APAC.

The PSE had 268 listed companies at end-2022. All but three stocks in the exchange are domestic companies. Growth in the number of listed companies has been more modest, as there were 225 already at end-2000. This is partially explained by a lackluster IPO pipeline, with few IPOs exceeding US$1bn in offer size. Capital raising was instead driven by rights offers – led mostly by the banks. Each of the big banks tapped the equity market at least two/three times post-2010, as loan growth was sustained at the mid-teens, all while the central bank also raised the minimum capital requirements.

Exhibit 66: Market capitalization to GDP (x)
Peaked around 1.1x in 2006-07 and was at 0.75x by 2022



Source: CEIC data, PEP estimates

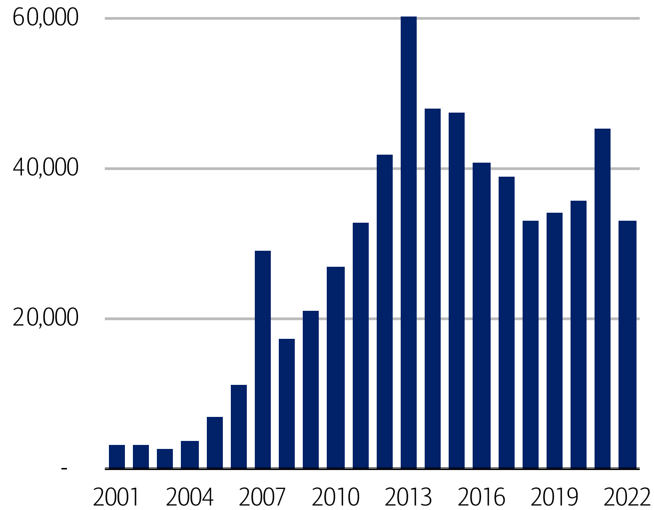
BofA GLOBAL RESEARCH

Turnover / investor profile

The ADTV peaked at $243mn in 2013. The turnover averaged $162mn in 2022 and fell further to $120mn through 9M23.

The weak turnover profile may partially be explained by a spate of foreign outflows, as foreigners have unwound >$7bn over the last seven years, including some US$750mn outflows through 9M23. The share of foreigner turnover to market turnover has averaged 45% in 2023 breaking the largely stable 50-50 split between the domestic-foreign turnover in 2013-19. Retail participation is estimated at around a quarter of the total turnover in 2023, down from a peak of nearly 40% in early 2021.

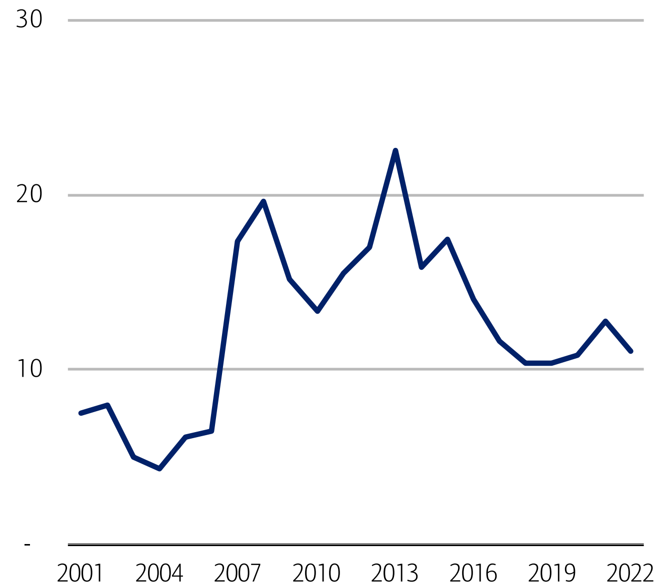
Exhibit 67: Annual turnover (mn US$)
Peaked in 2013



Source: CEIC data, PEP estimates

BofA GLOBAL RESEARCH

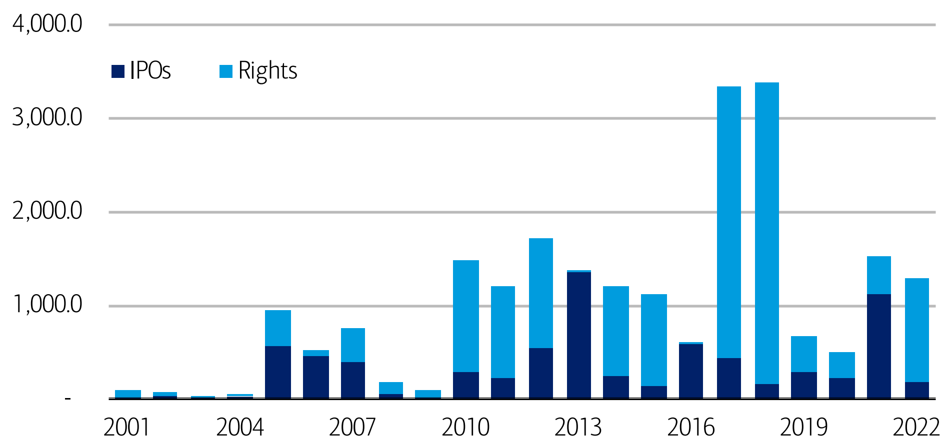
Exhibit 68: Turnover ratio (value turnover/mkt-cap, in %)
Liquidity has thinned; some 8% of market cap was traded in 2022



Source: CEIC data, PEP estimates

BofA GLOBAL RESEARCH

Exhibit 69: Capital raised via rights issues and IPOs (in US$ mn)
IPOs raised more than US$1bn in 2013 and 2021; more capital has been raised by existing companies through rights issues than by new companies via IPOs



Source: CEIC data, PEP estimates

BofA GLOBAL RESEARCH

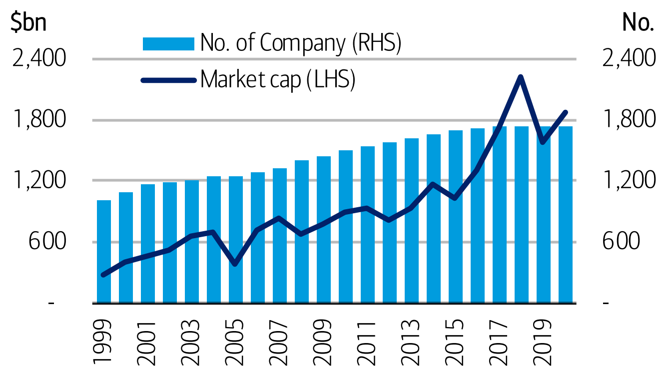
Taiwan

Taiwan has two stock exchanges: Taipei exchange (OTC market, TPEx) and Taiwan Stock Exchange (TWSE). TWSE is 10x bigger than TPEx in terms of market capitalization. In evaluating the market turnover and market cap, we use aggregate of both as the Taiwan Stock Market (TPEx and TWSE).

Market cap and listed companies

The Taiwan Stock Market capitalization grew from US$280bn in 2000 and US$840bn in 2010 to US$1,700bn in 2020 and stays at a similar level into 2023. The number of listed companies also grew from 800 in 2000 to 1,700 in 2023. IPO counts in Taiwan passed their hot years in early 2000s with 100-200 IPOs per year. As of 2022/1H23, IPO count in Taiwan was 45/17. In Taiwan, 1,300 of the 1,700 listed companies paid dividend to shareholders. The Taiwan Stock Exchange has long been known as a rich dividend market, with average dividend yield of 3-5%. Even in the last bull market, the average dividend yield was around 2.99% in 2020.

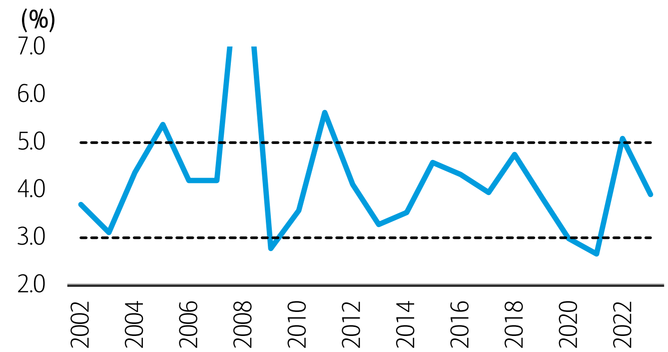
Exhibit 70: Taiwan stock market cap and number of listed company
Both market cap and number of companies are at relatively high level in its history



Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 71: Taiwan stock market average dividend yield
Long-term average dividend yield of 3-5%



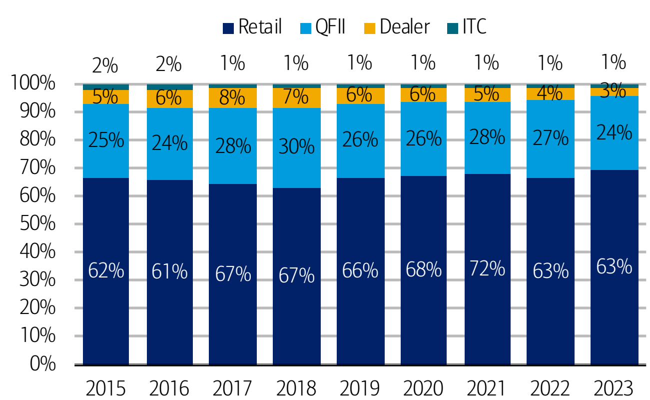
Source: TEJ

BofA GLOBAL RESEARCH

Investor profile

Over 60% of the market turnover is from retail investors, while 20-25% is from QFII. Looking back since 2000, the peak of retail participation was 90% of total market turnover in 2000-02.

Exhibit 72: Taiwan Stock Market turnover by investor profile
Majority of market turnover is from retail investor



Source: TEJ, BofA Global Research

BofA GLOBAL RESEARCH

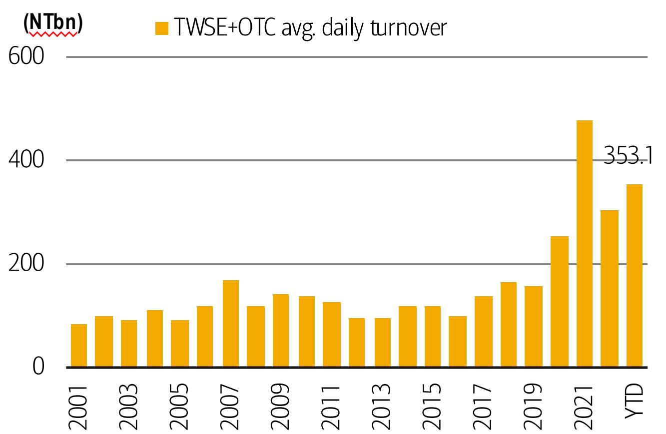
Turnover and turnover ratio

The average daily turnover in TAIEX has grown from NT$100-130bn in early 2000s to NT$250bn in 2020 and NT$350bn in 2023. The peak monthly turnover happened in the 2021 bull market at NT$700bn. The TWSE index also walks along, with turnover rising to reach 17k points in 2023, from the recent lows in 2022. Retail turnover has also tracked the increase in market turnover. Considering the market velocity (turnover ratio), TAIEX appears to be relatively muted. The turnover ratio dropped to 119% vs. 180% in 2021.

Sector-wise, tech used to enjoy the major chunk of the market turnover (60-70%) and non-tech shared the remaining 30-40%. We saw a divergent trend during 2021-22. The tech sector re-claimed the previous high level of importance after the AI-fever in 2023.

Exhibit 73: Taiwan stock market average daily turnover

NT$350bn Turnover rebounded in 2023 from 2022, not far from record high of NT$500bn in 2021.

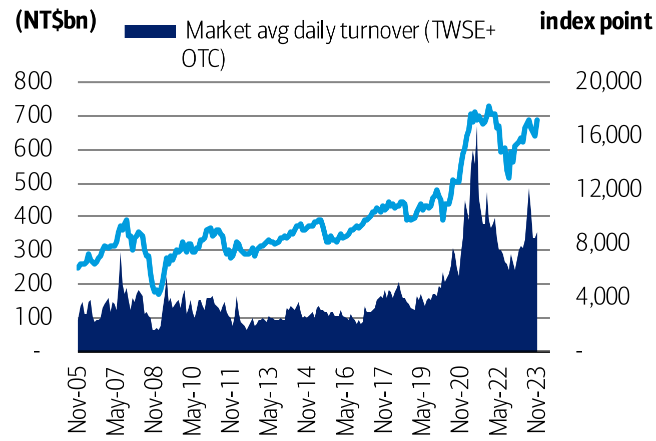


Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 74: Average daily turnover vs. TWSE index

TWSE index currently is around 17k index point.

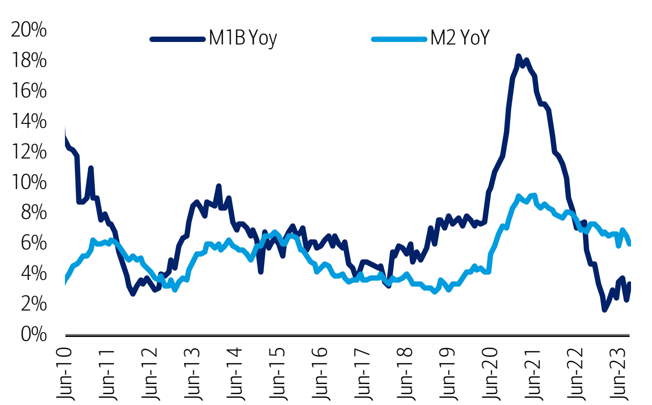


Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 75: Taiwan: Money Supply (since 2010)

M1B growth has dropped sharply since 2021

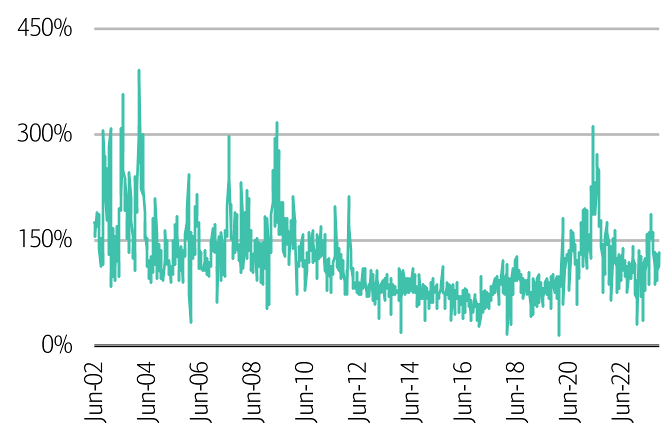


Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 76: Taiwan stock market velocity

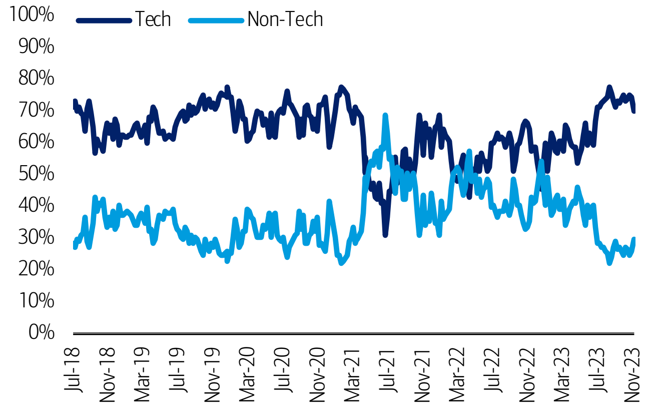
Market velocity is weaker in 2023 of 119% vs. hot year in 2021 of 180%



Source: Bloomberg, TEJ

BofA GLOBAL RESEARCH

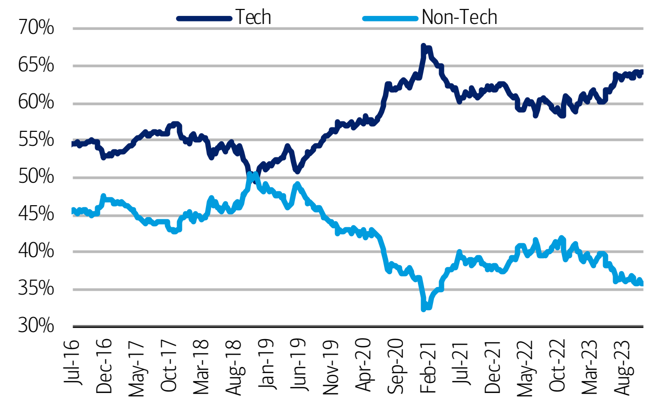
Exhibit 77: Turnover by sector
Tech sector accounts for 70% of total marker turnover



Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 78: Market cap by sector
Tech sector accounts for 64% of total market cap



Source: TEJ

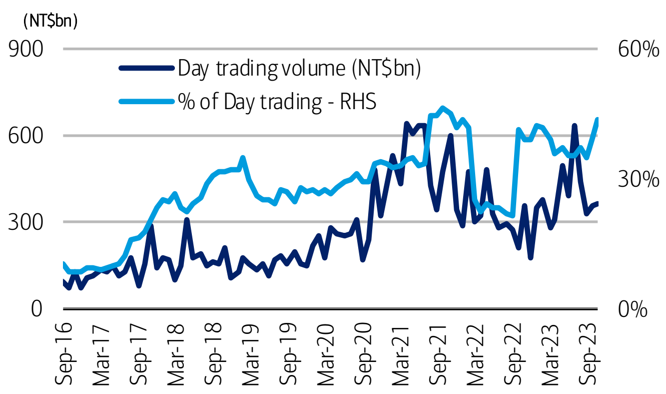
BofA GLOBAL RESEARCH

Margin financing, short-selling, and day trading

The day trading volume dropped sharply in the past two years to NT$366bn vs. the 2020-21 high of NT$800bn. Despite the drop in volume, the percentage of day trading remains at 30-50% of total market turnover.

Margin financing as a percentage to turnover stood at around 4-6% since 2017 vs 10% in early 2010s. Short-selling balance shows seasonality during the year, as short interest has to be covered before the AGM (normally in June for Taiwan-listed companies). Short-long ratio (short-selling to margin financing) reflects the overall short-selling activities, and at times provides insights into potential short squeeze. Short-selling and Short-long ratio (short-selling to margin financing) both point to low short-selling activities in the Taiwan stock market. Short selling is low in 2023 at 0.4% vs. usually 0.5-1% of market turnover.

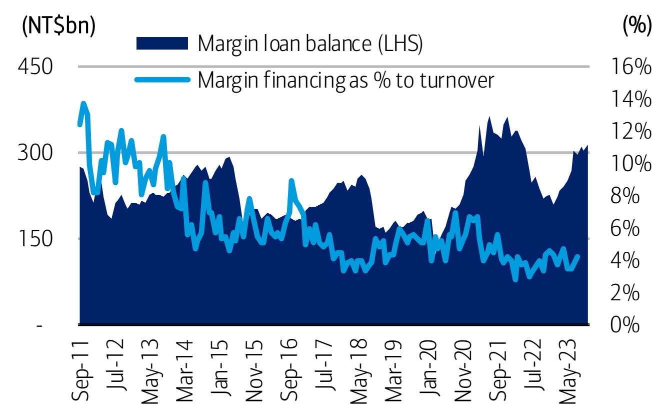
Exhibit 79: Taiwan Stock Market day trading activity
Percentage day trading fluctuates at 30-50% of turnover



Source: TEJ

BofA GLOBAL RESEARCH

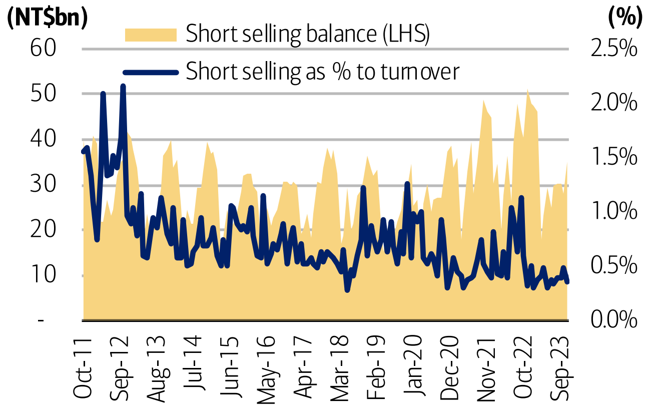
Exhibit 80: Taiwan stock market margin loan activity
Margin financing is stable at 4-6% of market turnover



Source: TEJ

BofA GLOBAL RESEARCH

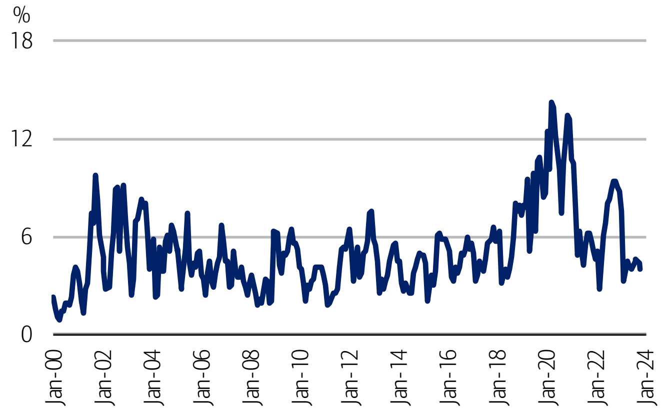
Exhibit 81: Taiwan stock market short selling activity
Short selling is low in 2023 at 0.4% vs. usually 0.5-1% of market turnover



Source: TEJ

BofA GLOBAL RESEARCH

Exhibit 82: TWSE leveraged trading: Short/Long ratio (since 2000)
Higher short/long ratio reflects higher short-selling activities



Source: TEJ

BofA GLOBAL RESEARCH

Special Disclosures

In accordance with the SEBI (Foreign Portfolio Investors) Regulations, 2019 and with guidelines issued by the Securities and Exchange Board of India (SEBI), foreign investors (individuals as well as institutional) that wish to transact the common stock of Indian companies must have applied to, and have been approved as per SEBI (Foreign Portfolio Investors) Regulations, 2019. Each investor who proposes to transact common stock of Indian companies will be required to obtain Foreign Portfolio Investor (FPI) registration as per SEBI (Foreign Portfolio Investors) Regulations, 2019. Certain other entities are also entitled to transact common stock of Indian companies under the Indian laws relating to investment by foreigners. BofA Securities reserves the right to refuse to provide a copy of research on common stock of Indian companies to a person not resident in India. American Depositary Receipts (ADR) representing such common stock are not subject to these Indian law restrictions and may be transacted by investors in accordance with the applicable laws of the relevant jurisdiction. Global Depository Receipts (GDR) and the Global Depository Shares (GDS) of Indian companies, Indian limited liability corporations, have not been registered under the U.S. Securities Act of 1933, as amended, and may only be transacted by persons in the United States who are Qualified Institutional Buyers (QIBs) within the meaning of Rule 144A under the Securities Act. Accordingly, no copy of any research report on Indian companies' GDRs or GDSs will be made available to persons who are not QIBs.

BofA Securities India Limited (BofAS India) is regulated by the Securities and Exchange Board of India (SEBI) and provides the following services in India: Research, Equity Sales & Trading, Futures & Options, Electronic Trading, Equity Capital Markets, Debt Capital Markets and M&A. SEBI Registration Nos. Research Analyst: INH000000503, Stock Broking: INZ000217333 (Trading and Clearing Member of NSE and BSE – Capital Markets and Equity Derivatives), Merchant Banker: INM000011625, CIN U74140MH1975PLC018618. Registration granted by SEBI and certification from National Institute of Securities Markets (NISM) in no way guarantee performance of the intermediary or provide any assurance of returns to investors. BofAS India's registered office is at Ground Floor, A Wing, One BKC, G Block, Bandra Kurla Complex, Bandra (East), Mumbai 400 051, India, Tel: +91 22 6632 8000 and the contact details of its Compliance Officer (Shervin Purohit) are: Tel: (91-22) 6632 8853, Email: shervin.purohit@bofa.com. For specific grievances, if any, please contact the Grievance Officer (Amish Shah) and contact details are: Tel: (91-22) 6632 8000, Email: dg.rsch_in_complaint@bofa.com. Investment in securities market are subject to market risks. Read all the related documents carefully before investing.

Disclosures

Important Disclosures

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). Our investment ratings are: 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. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. 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[R1]
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

[R1] 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.

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.bofaml.com/BofASEdisclaimer; 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 (HKSFC); 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 Canadian Investment Regulatory Organization; 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; BofAS 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 approved 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 HKSFC; 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 Disclaimers 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.

Copyright and General Information:

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 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.

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.