SIFMA Insights

Market Structure Compendium

Recapping 2021 Market Metrics & Looking to 2022 with Our Market Structure Survey

March 2022

Market Metrics (2021 average, Y/Y change)

- Volatility & Volumes: VIX 19.66, -32.8%; equity ADV 11.4B shares, +4.4%; listed options ADV 38.7M contracts, +33.1%
- Markets: S&P 500 4,272.97, +32.8%; DJIA 34,055.29, +26.6%; Nasdaq 14,371.66, +40.9%; Russell 2000 2,242.89, +47.2%
- Capital Formation: total $435.8B, +11.6%; secondaries $224.7B, -13.0%; preferreds $58.0B, +24.4%; IPOs $153.1B, +79.2%; SPACs $162.4B, +94.9%;

Market Structure Survey

- Volatility & Volumes estimates: VIX high teens-low 20s (49.0% of responses); Equity ADV ~10B shares (74.0% of responses); listed options ADV mid-high 30s (52.1% of responses)
- Markets estimates: tie b/t continue to expand at a slower pace and decline somewhat (38.0% of responses each); upside risks The Fed, COVID, inflation; downside risks inflation, the Fed, regulation
- Retail Investor participation estimates: Equities 20-30% both years (58.3% of responses); options 30-40% (48.9% of responses); $0 commissions #1 factor for growth and maintaining

Contents

SIFMA Insights can be found at: https://www.sifma.org/insights

Disclaimer: This document is intended for general informational purposes only and is not intended to serve as investment advice to any individual or entity. The information in the survey was provided for information purposes only to gauge an estimate of respondents' opinions on future events. It should not be relied upon and can change at any time without notice. The survey was conducted before the geopolitical events involving Russia and Ukraine began.

SIFMA is the leading trade association for broker-dealers, investment banks and asset managers operating in the U.S. and global capital markets. On behalf of our industry's nearly 1 million employees, we advocate on legislation, regulation and business policy, affecting retail and institutional investors, equity and fixed income markets and related products and services. We serve as an industry coordinating body to promote fair and orderly markets, informed regulatory compliance, and efficient market operations and resiliency. We also provide a forum for industry policy and professional development. SIFMA, with offices in New York and Washington, D.C., is the U.S. regional member of the Global Financial Markets Association (GFMA). For more information, visit http://www.sifma.org.

Executive Summary

Almost two years after the COVID-driven peak in market turmoil, the U.S. economy and markets were humming along nicely. Even as inflation remained elevated – December CPI +7.1%, core CPI +4.9% – markets continued to climb on strong company fundamentals. The S&P 500 index ended 2021 up 32.8% versus the prior year. Companies had strong balances sheets, which they were able to shore up in 2020 with $2.3 billion in corporate bond issuance. This helped them weather the COVID-driven storm and post good earnings results in 2021, driving equity markets higher.

Equity capital formation had another banner year, with IPO deal value (excluding SPACs) at $153.1 billion, +79.2% Y/Y (# deals 393, +88.0%). This increase came on top of a very strong IPO year in 2020, with $85.4 billion in deal value, +75.1% Y/Y (# deals 209, +38.4%). These two strong years for IPOs reversed the long-term decline seen since the early 2000s. In fact, the $153 billion this year beats the 1999 and 2000 peak years of around $107 billion by +43.0%. We have also seen a reversal in the trend for number of listed companies, ending the year at 6,203, +20.2% Y/Y. This brings us back to levels not seen since 2002.

While not the same as seen at the COVID peak, markets were not without their drama last year. In January, meme stock GameStop (ticker: GME) jumped to a $350 price from $17.25 to start the year, driven by excitement of investors on the WallStreetBets investor forum. This in turn drove up volatility, with the VIX peaking at 37.21 on January 27 and posting a 24.91 average for the month, up from 22.37 in December (+49.4%). Equity volumes increased as well, finishing January with an ADV of 15.6 billion shares, the same as seen in March 2020 and up from 11.0 billion in December (ADV peaked on January 27 at 24.5 billion shares).

Although markets settled from the start of the year, volumes and volatility remained elevated to historical levels, and market participants expect this to continue. Inside this report, we first recap 2021 market metrics for volatility, market performance, volumes (equities, off-exchange trading, ETFs, and listed options), and capital formation. We also highlight key themes seen across each of these sectors. We then look ahead to 2022, gauging what could be the new normal with results from our market structure survey.

Recapping 2021: Market Metrics

Before we can look to the future, we must assess the past. Inside this note, we analyze 2021 trends for volatility, volumes (U.S. cash equities, off-exchange trading levels, ETFs, multi-listed options), market performance, and capital formation.

We highlight the following metrics and themes for the year:

- Volatility (VIX): average 19.66 (-32.8 Y/Y); peak 37.21, trough 15.01
- Volumes (ADV)
  - Equities: average 11.4B shares (+4.4% Y/Y); peak 24.5B shares, trough 7.4B shares
  - Equities off-exchange trading: average 43.6% of total volumes (+2.2 pps Y/Y); peak 50.5%, trough 33.6%
  - ETFs: average 1.7B shares (-14.2% Y/Y); peak 3.6B shares, trough 1.0B shares
  - Listed Options: average 38.7M contracts (+33.1% Y/Y); peak 59.3M contracts, trough 26.7M contracts
- Market Performance (Y/Y change): S&P 500 +32.8%; DJIA +26.6%; Nasdaq +40.9%; Russell 2000 +47.2%
- Capital Formation: total $435.8B, +11.6% Y/Y; IPOs $153.1B, +79.2% Y/Y; SPACs $162.4B, +94.9% Y/Y

Looking to 2022: Market Structure Survey

With volatility and volumes in both equities and multi-listed options remaining at higher than historical levels, market participants are (still) wondering what will be the new normal. Carrying on a tradition we began last year, we questioned market participants – members of our equity markets and listed options trading committees, representatives of U.S. equity and multi-listed options exchanges – about where they saw 2022 market metrics heading, as well as their views on retail investor participation.

We highlight the following survey trends:

- Volatility (VIX)
  - Majority says? High teens to low 20s range, 49.0% of responses
  - Return to historical levels? Very few people, 8.2% of responses
- Equity Volumes (ADV)
  - Majority says? Around 10 billion shares, 74.0% of responses
  - Return to historical levels? Very few people, 10.0% of responses
- Listed Options Volumes (ADV)
  - Majority says? Mid-high 30s million contracts, 52.1% of responses
  - Return to historical levels? Very few people, 4.2% of responses
- Market Performance (S&P 500)
  - Majority says? Split between continue to expand but at a slower pace and decline somewhat, 38.0% of responses each
  - Upside risks? Fed policy (rates, getting it right), COVID under control (endemic), managing inflation
  - Downside risks? Runaway inflation, Fed policy (rates, doing it wrong), market regulation (unintended consequences)
- Retail Investor Participation
  - Top response for equities?
    - 2021 volumes 20-30%, 58.3% of respondents
    - 2022 expectations to decrease somewhat, 43.8% of respondents

  - Top response for listed options?
    - 2021 volumes 30-40%, 48.9% of respondents
    - 2022 expectations to decrease somewhat, 36.7% of respondents
  - Why did retail grow? $0 commissions, technology/access to platforms, continued work from home
  - What will keep retail engaged? Maintaining $0 commissions, positive investing experience, continued upward momentum in markets

We also compare trends across asset classes and to last year's survey:

- Volumes (ADV)
  - There is a higher conviction in estimating the new normal for equities ADV: with the top answer returning 74.0% of responses equities and 52.1% for listed options
  - Equities – same top response both years (~10 billion shares), but the conviction came down: 74.0% of responses this year, 83.9% last year
  - Listed Options – this year the top response was mid-high 30s million contracts, up from high 20s-low 30s last year; however, conviction came down: 52.1% of responses this year, 77.4% last year
- Retail Investor Participation
  - Equity ADV – same top response both years (20-30%), but the conviction came down: 58.3% of responses this year, 84.4% last year
  - Listed Options – this year the top response was 30-40%, up from 20-30% last year, and conviction went up: 48.9% of responses this year, 31.0% last year
  - $0 commissions moved to the top spot for both factors explaining the increase in participation and maintaining these levels (#3 for each last year)

Looking to 2022: The Future for Markets

Now that we have heard from our survey respondents, we look to estimates from equity strategists and a common financial theory as to where markets could go from here.

- Equity strategy estimates – upside potential for the S&P 500 +9.3%
  - Energy estimated to remain the leading sector in 2022 (+22.3% upside)
  - Real estate moving to the bottom (+1.3% upside)
  - Technology estimated to fall to #6 (-3 spots to last year)
- Reversion to the mean – this concept states that returns for a security will eventually revert to the long-run average historical level
  - Average annual return since 1990 = +9.3%
  - Average annual return since 2010 = +13.6%, +4.3 pps increase to the long-run return
  - Reversion to the mean implies markets should not be able to keep up the pace seen since the GFC
  - Turning off of the Fed money faucet could support this theory

Recapping 2021: Market Metrics

The Changing Landscape in 2021 versus 2020

Almost two years after the CVOID-driven peak in market turmoil, the U.S. economy is humming along nicely. Markets remained resilient, fighting through inflation (December CPI 7.1% and core CPI 5.5%), the Delta and Omicron variants, and supply chain constraints, attributing this to solid earnings results outweighing macro concerns. Markets have settled from the spring 2020 peaks, but many metrics remain elevated to historical levels. In this section, we analyze market metrics for volatility, market performance, volumes, and capital formation.

Before delving deeper into each piece of the market, we compare the changing landscape in 2021 vs. 2020 across sectors:

- **Volatility**: The VIX has come down from 2020 levels, -32.8% Y/Y; remains elevated to historical levels, +27.7%, albeit to a lesser extent than the prior year
- Volumes continue to grow
  - **Equity** ADV: another 4.4% Y/Y increase in 2021, after a 55.4% Y/Y increase in 2020
  - **Options** ADV: another 33.1% Y/Y increase in 2021, after growing 52.5% Y/Y in 2020
  - The gap to historical levels continues to widen, particularly in options, +102.9%

Volatility & Volumes

	VIX	Equity ADV	Options ADV
2021	19.66	11.4	38.7
2020	29.25	10.9	29.0
2019	15.39	7.0	19.1
Y/Y Changes			
2021/2020	-32.8%	4.4%	33.1%
2020/2019	90.1%	55.4%	52.5%
Vs. Historical			
2021/2019	27.7%	62.2%	102.9%
2020/2019	90.1%	55.4%	52.5%

Source: Cboe Global Markets, Bloomberg, SIFMA estimates
Note: Equity ADV in billion shares, options in million contracts

- Markets continued to climb higher despite macro concerns
- **S&P 500**: +32.8% Y/Y in 2021, ~3x the increase in the prior year
- **DJIA**: +26.6% Y/Y in 2021, ~13x the increase in the prior year
- **Nasdaq**: +40.9% Y/Y in 2021, ~1.5x the increase in the prior year
- **Russell 2000**: +47.2% Y/Y in 2021, recovering from a slight decline in the prior year

Markets

	S&P 500	DJIA	Nasdaq	Russell 2000
2021	4,272.97	34,055.29	14,371.66	2,242.89
2020	3,217.86	26,890.67	10,201.51	1,523.99
2019	2,913.36	26,379.54	7,940.13	1,546.16
Y/Y Changes				
2021/2020	32.8%	26.6%	40.9%	47.2%
2020/2019	10.5%	1.9%	28.5%	-1.4%
Vs. Historical				
2021/2019	46.7%	29.1%	81.0%	45.1%
2020/2019	10.5%	1.9%	28.5%	-1.4%

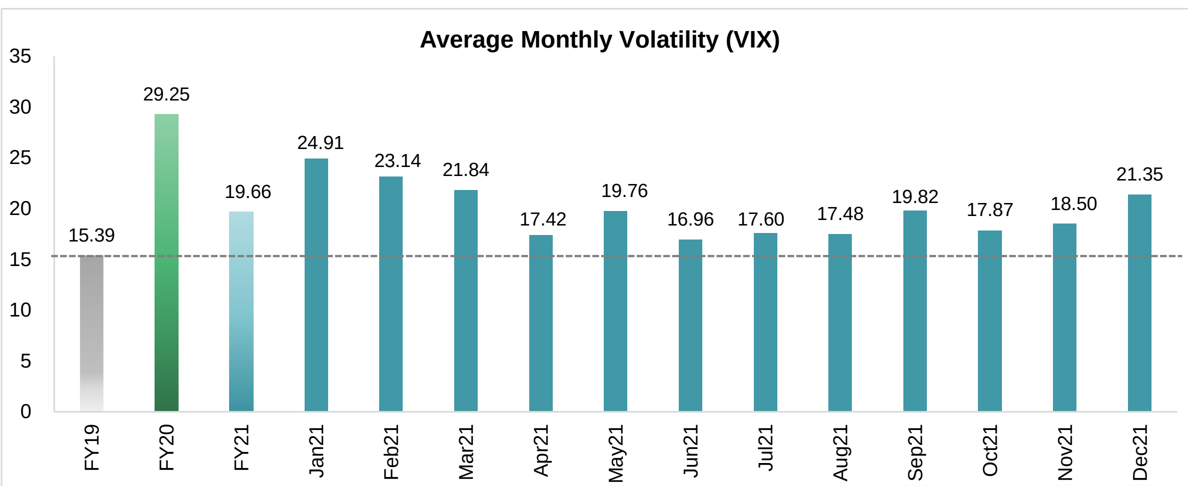
Source: Bloomberg, SIFMA estimates

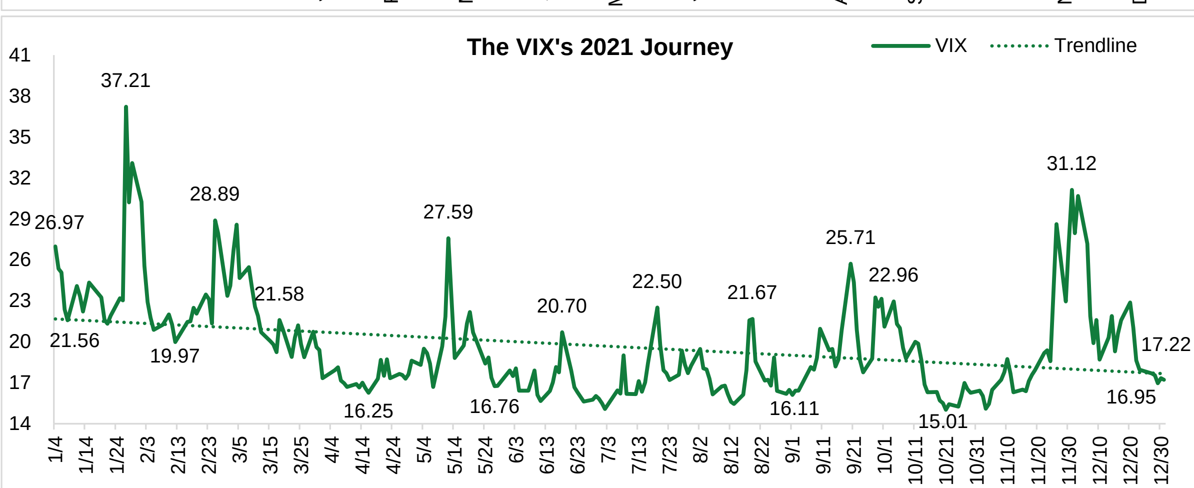
Volatility Metrics

Volatility remains elevated to historical levels at 19.66 on average in 2021, +27.7%, yet down significantly from last year, -32.8% Y/Y. While the overall trendline for the VIX in 2021 was downward sloping, we saw some spikes to start and end the year. To end the year, the month of December also saw peaks and valleys, with the daily VIX coming down to the 16-18 range at the end of the month.

We highlight the following trends:

- 2021 average 19.66
    - -32.8% Y/Y
    - +27.7% to historical levels
- 2021 peak 37.21 on January 27; 2021 trough 15.01 on October 21
- Monthly trends
    - Average monthly level 19.72
    - Highest month January at 24.91
    - Lowest month June at 16.96



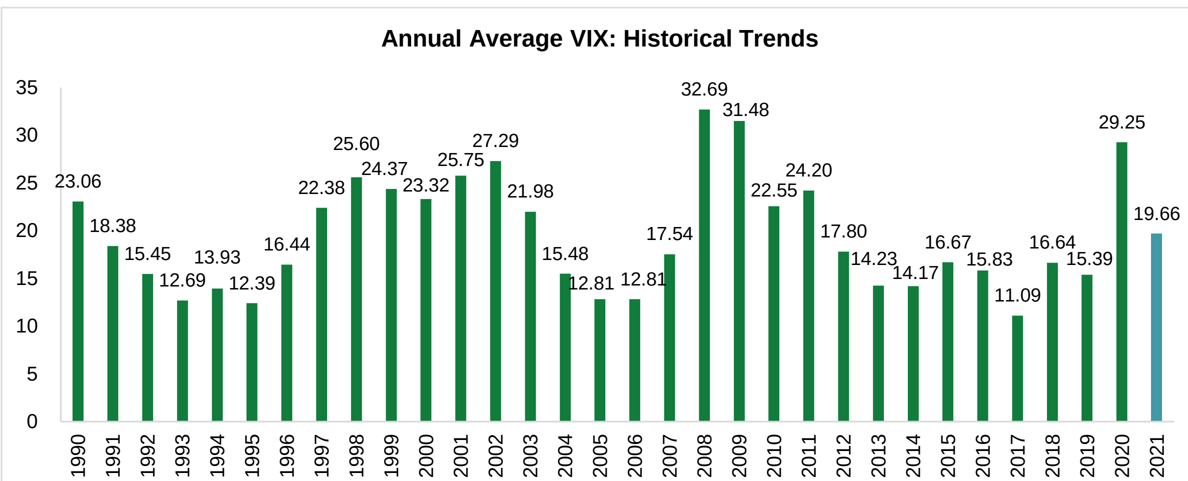


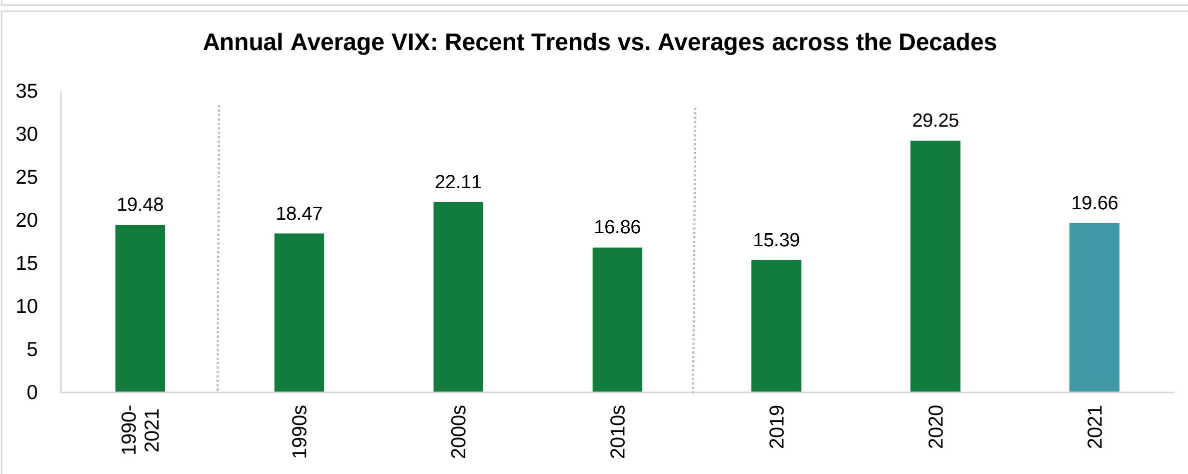
Source: Bloomberg, SIFMA estimates

Average VIX

As discussed above, the 2021 average annual VIX has come down significantly from last year, 19.66 in 2021 versus 29.25 in 2020. Looking at this another way, we analyze the VIX time series back to 1990. While last year the COVID ravaged average VIX ranked #3 – behind only the global financial crisis impacted years of 2008 and 2009 – the 2021 average VIX ranked #14.

The 2021 average VIX was in line with the 1990-2021 time series average of 19.48. Looking across decades, the 2010s had come down from the 2000s average by 23.8%. This is more pronounced when looking across the first versus second half of the decade – the average VIX for the first half of the 2010s was 18.59, dropping to 15.12 for the second half. 2019 continued this lower level at 15.39. And then COVID spiked volatility in 2020, and the GameStop event and some year-end volatility kept the 2021 average VIX elevated, reversing back to the 1990s/2000s levels.

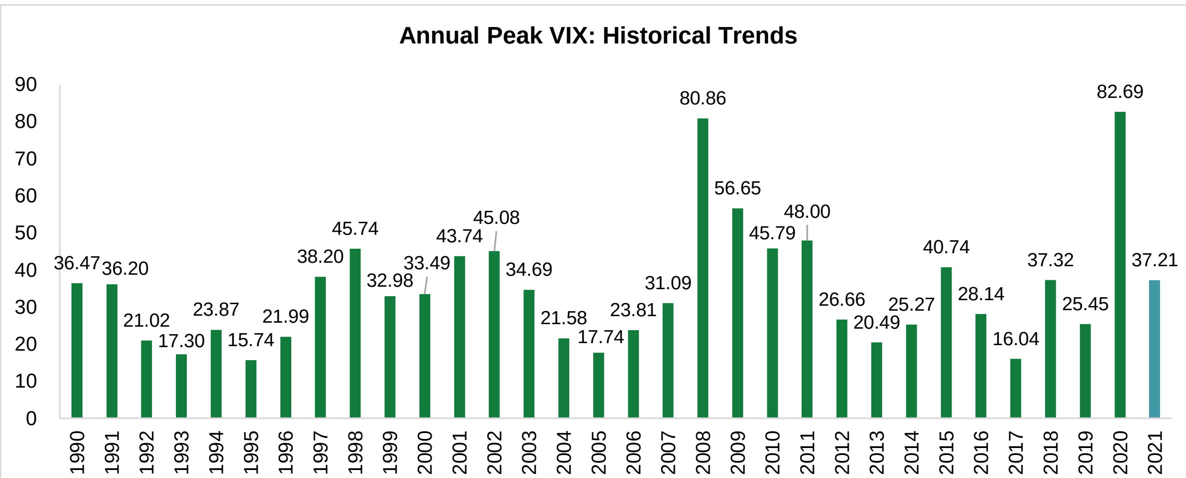


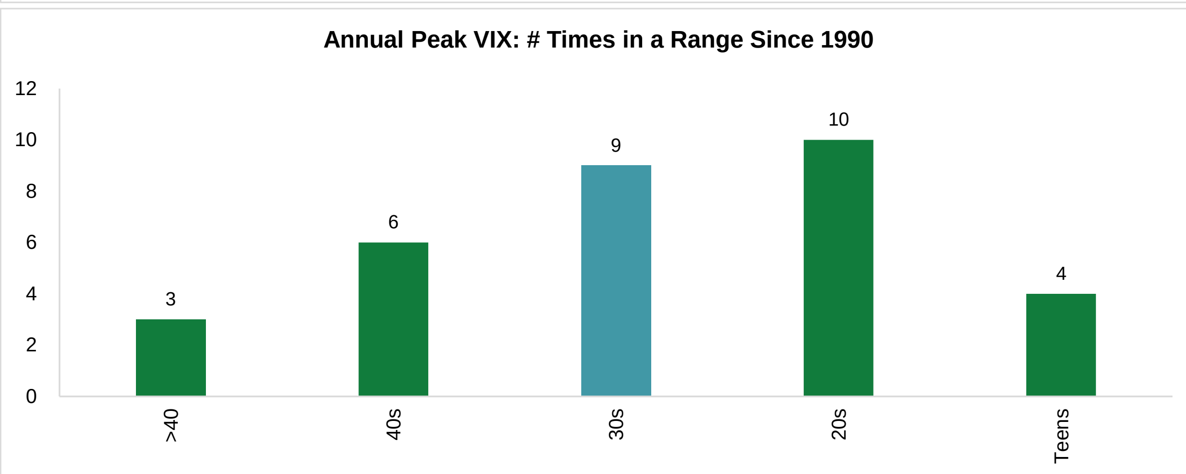


Source: Bloomberg, SIFMA estimates

Peak VIX

Looking at peaks for the VIX across the years, the GameStop driven peak for 2021 ranked #12 in the time series from 1990 to 2021. While still high, it is down substantially from last year which posted the #1 peak VIX (beating out the global financial crisis). Years where the annual peak VIX was in the 30s range, as in 2021, happened 9 times in the time series. This is right behind the 20s range, which occurred 10 times.





Source: Bloomberg, SIFMA estimates

Volatility Themes

The GameStop Event

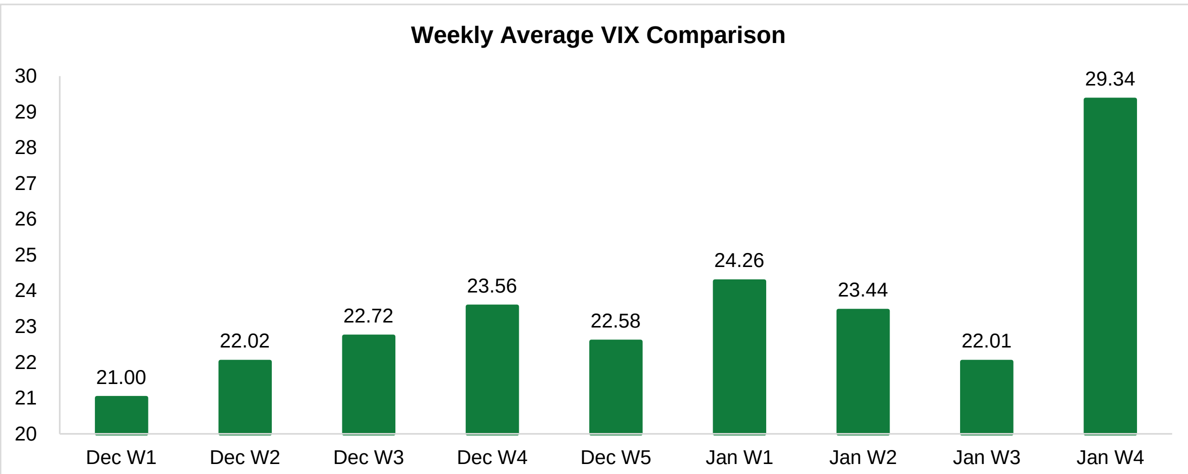
The most significant event for volatility in 2021 was the GameStop event. Like many other industries before them, the securities industry experienced the full power of social media sites. At the end of January, members of the group WallStreetBets (WSB) on the message board site Reddit joined together to squeeze short sellers in a handful of stocks. WSB, known as a subreddit, is a forum for participants to discuss stock and listed options trading strategies. The last week of January, WSB came together to execute short squeezes on several stocks.

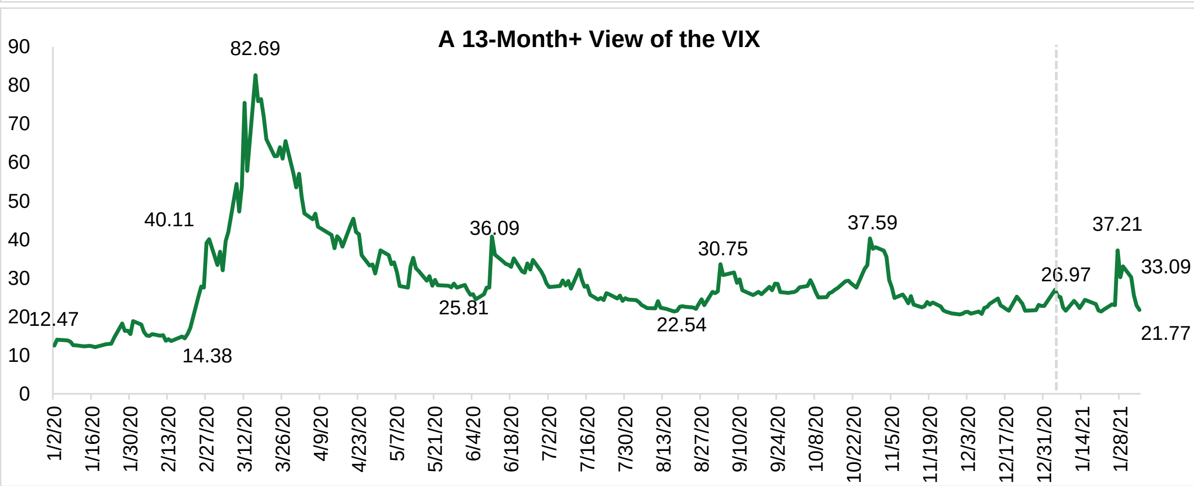
Short sellers borrow shares of a stock they believe is overvalued. Their analysis indicates a stock price should decline to move in line with fundamentals. This would then enable the short sellers to buy the shares at a lower price. A short squeeze is when the stock price climbs sharply higher, forcing short sellers to buy the stock to cover their short positions at this higher price. This in turn creates additional upward pressure on the stock price, as well as increasing liquidity needs to cover these short positions.

These short squeezes drove up volumes and volatility moved sharply higher. What was unusual was the why behind the market volatility. It was not a response to a monetary policy announcement, poor earnings results (earnings season actually saw the opposite, for the most part) or any negative macro-economic news. It was driven in that last week of January by the WSB short squeeze trades.

For the most part, the short positions targeted by WSB were in the stocks of companies with disrupted business models, whether from new technologies, COVID, or both. The poster child for the event became GameStop (ticker: GME), a video game and consumer electronics retailer. Once known as the largest video game retailer, sales had declined since the emergence of video game streaming, where players download games directly from the online services, such as PlayStation. (The trading also involved a handful of other stocks, such as movie theater chain AMC Entertainment, ticker: AMC. AMC's business in 2020, like many other leisure and entertainment companies, was crushed by the global pandemic. Theaters were shut down in many states during the lockdowns, and people also self-selected an avoidance of this nonsocial distancing friendly activity.)

The 2021 VIX trend began in a downward sloping pattern from the end of the prior year, that is until the final week of January when the GameStop event occurred. The average VIX for the last week of January was 29.34, +8.8% to the start of the year and +31.2% to the December 2020 average. This weekly average was in line with the average for all of 2020, a year that included months of elevated VIX levels at the height of the global pandemic. However, it was well below the 2020 peak of 82.69. Additionally, after peaking at 37.21, the VIX began to come back down, settling at 19.66 on average for the year (-32.8% to 2020).



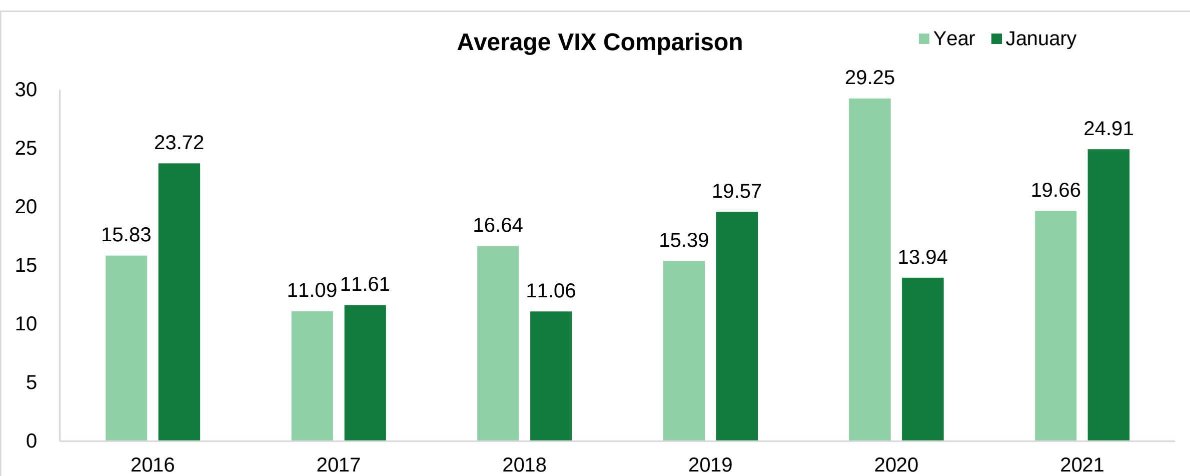


Source: Bloomberg, SIFMA estimates

How unusual was the January volatility pattern? At an average of 24.91, 2021 posted the highest January VIX since 2016, increasing from the December average (+11.3%). In the prior five years (not including January 2021), January VIX was elevated to the prior December average around two and a half times (we say a half because January 2020 was only a 1% increase). January ranked as the lowest volatility month in a year two times in our analysis, but also the highest two times. For the fifth year in our analysis January ranked #4. There is a similar pattern when comparing the January average to the average VIX for the year: two times January was well below the annual average, two times well above and one time more in line with the annual VIX. Therefore, we conclude that it is not unusual to see a tick up in volatility to start the year, albeit the circumstances in January 2021 were unusual.

In comparing January averages, we highlight the following:

- 2021 January average 24.91; elevated heading into the year, +11.3% to prior year December
    - January +26.7% to the annual average
    - Highest average monthly VIX for the year
- 2020 January average 13.94; slighted elevated heading into the year, +1.3% to prior year December
    - January -52.3% to the annual average
    - Lowest average monthly VIX for the year
- 2019 January average 19.57; decreased into the year, -21.6% to prior year December
    - January +27.2% to the annual average
    - Highest average monthly VIX for the year
- 2018 January average 11.06; increased into the year, +7.8% to prior year December
    - January -33.5% to the annual average
    - Lowest average monthly VIX for the year
- 2017 January average 11.61; decreased into the year, -6.9% to prior year December
    - January +4.7% to the annual average
    - Fourth highest monthly VIX for the year
- 2016 January average 23.72; increased into the year, +31.6% to prior year December
    - January +49.9% to the annual average
    - Highest average monthly VIX for the year



Source: Bloomberg, SIFMA estimates

Market Performance Metrics

As we entered the second half of 2021, market participants' concerns grew around inflation and corresponding rising interest rates. Bond yields impact equity valuations, as bond yields are used as the risk-free rate when calculating the cost of capital. When bond yields go up, the cost of capital increases and future cash flows are discounted at a higher rate. This in turn compresses stock valuations. As such, interest rate cuts are viewed as positives for markets, while rate hikes are viewed negatively. With inflation high and supply chain issues persisting, markets (correctly, as we now know) became concerned that the Fed would have to move up its timeline begin raising rates earlier into 2022. This took its toll on markets, with technology stocks particularly vulnerable. Technology stocks have high valuations (for the most part), which have been supported by expectations of a prolonged period of low interest rates. When the rate story changed, investors had to recalculate valuations and position portfolios accordingly.

Additionally, market participants had to digest two waves of COVID variants (Delta, Omicron), making market participants rethink their estimates for economic growth, or at least re-consider which sectors and stocks would be impacted should the variants persist and people once again retreat from COVID-impacted activities (travel and leisure, eating out, etc.). In other words, markets had to reassess what the variants could mean for a full return to (the new) normal.

Despite this, markets finished the year strong, albeit with differences across indexes. In this section, we analyze percent changes for the full year averages, as well as how the performance changed from the first to second half of the year. We also look at the composition of the indexes, noting sector weights for technology and consumer discretionary – Amazon and Tesla are classified here but are included in the tech trade, and Tesla falls under the ESG play as well – and identify higher market cap and popularly traded names in the top 10 constituents.

Key Metrics

	S&P 500	DJIA	Nasdaq	Russell 2000
% Change				
2021 Avg/2020 Avg	32.8%	26.6%	40.9%	47.2%
Dec. 31/Peak	-0.6%	-0.4%	-2.6%	-8.1%
First Half	16.1%	14.2%	14.2%	18.7%
Second Half	10.9%	5.3%	7.9%	-2.8%
Change (pps)	(5.2)	(8.8)	(6.4)	(21.6)
% Total Market Cap				
Technology	29.2%	22.4%	51.7%	11.3%
Sector Rank	#1	#1	#1	#5
Consumer Discretionary	12.5%	15.4%	n/a	14.5%
Sector Rank	#3	#4	n/a	#4
Technicals				
Correlation to VIX	(0.4791)	(0.6367)	(0.4077)	(0.6090)
Trendline Slope	2.6551x	13.653x	7.6586x	0.2353x

Source: Bloomberg, SIFMA estimates
Note: The Nasdaq splits consumer by services and goods rather than discretionary and staples, ranked #2 at 16.0% and #3 at 8.3% respectively. Russell 2000 percentages are estimated

Select Top 10 Constituents

S&P 500	DJIA	Nasdaq	Russell 2000
AAPL	MSFT	AAPL	AMC
MSFT	AAPL	MSFT	SYNA
AMZN	(Financials)	AMZN	LSCC
GOOGL	(Cons Disc)	FB	(Real Estate)
TSLA	(Financials)	TSLA	(Cons Disc)
GOOG	(Cons Stap)	NVDA	(Industrials)
FB	(Healthcare)	GOOG	(Industrials)
NVDA	(Healthcare)	GOOGL	(Energy)
(Financials)	(Cons Stap)	CSCO	(Healthcare)
(Healthcare)	(Healthcare)	AVGO	(Industrials)

Source: Company websites, Bloomberg, SIFMA estimates
Note: Nasdaq as estimated from the Nasdaq 100 company list
AAPL = Apple, MSFT = Microsoft, AMZN = Amazon, GOOGL/GOOG = Alphabet (Google), TSLA = Tesla, FB = Meta (Facebook), NVDA = Nvidia, CSCO = Cisco Systems, AVGO = Broadcom, AMC = AMC Entertainment, SYNA = Synaptics, LSCC = Lattice Semiconductor

- **S&P 500**: At a 29.2% technology weighting and with 8 of the top 10 stocks in the index (by market cap) being the higher market cap and popularly traded names, this index saw a slowdown in the second half of the year, +16.1% in the first half versus +10.9% in the second half. Yet, being a broad-based index, it posted a strong full year performance (+32.8% Y/Y). Its trendline was upward sloping for the year, albeit with a lessor slope than DJIA or Nasdaq.

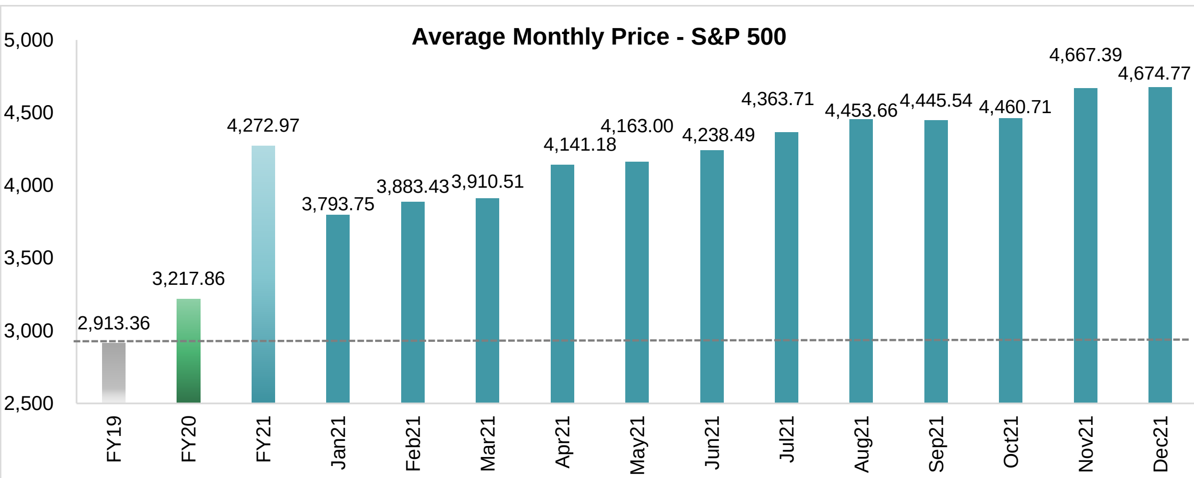
- **Dow Jones Industrial Average (DJIA)**: This index has the smallest number of constituents, 30 stocks, and only two technology names are in the top 10, AAPL and MSFT. It is still 22.4% weighted to technology, which may be a surprise to some people. Though, with AAPL and MSFT both being $2-3 trillion market cap stocks, the top two stocks alone represent over 40% of the DJIA's $11.8 trillion total market cap. This index also posted a strong performance at +26.6% Y/Y and saw a deeper slowdown than the S&P 500 across the year – first half +14.2%, second half +5.3%. Its trendline was upward sloping for the year, with the highest slope of all the indexes.
- **Nasdaq Composite**: This is the technology heaviest index at 51.7% of total market cap. All 10 of the top 10 stocks are technology stocks, and 8 of those are the higher market cap and popularly traded names. Despite some ebbs and flows throughout the year as market participants digested news on inflation and Fed policy toward interest rates, it was upward sloping for the year, with the second highest slope of all the indexes. It too saw a slowdown in the second half, as first half growth came in at +14.2% versus +7.9% in the second half but finished the year +40.9%.
- **Russell 2000**: The Russell 2000 is a small cap index, where companies are much more economically sensitive than large cap stocks, meaning they rise and fall by a greater magnitude through an economic cycle. As such, it did not see the rebound in 2020 that the other indexes experienced (2020 versus 2019 -1.4%). This index saw its recovery in 2021 instead, +47.2%. However, that was limited to the first half of the year, +18.7%. Once inflation, supply chain, COVID variants, and interest rate concerns began to weigh on markets in the second half of the year, the performance of the Russell 2000 turned negative, -2.8% for the second half of the year. It has the lowest slope for its trendline, though still upward sloping for the year.

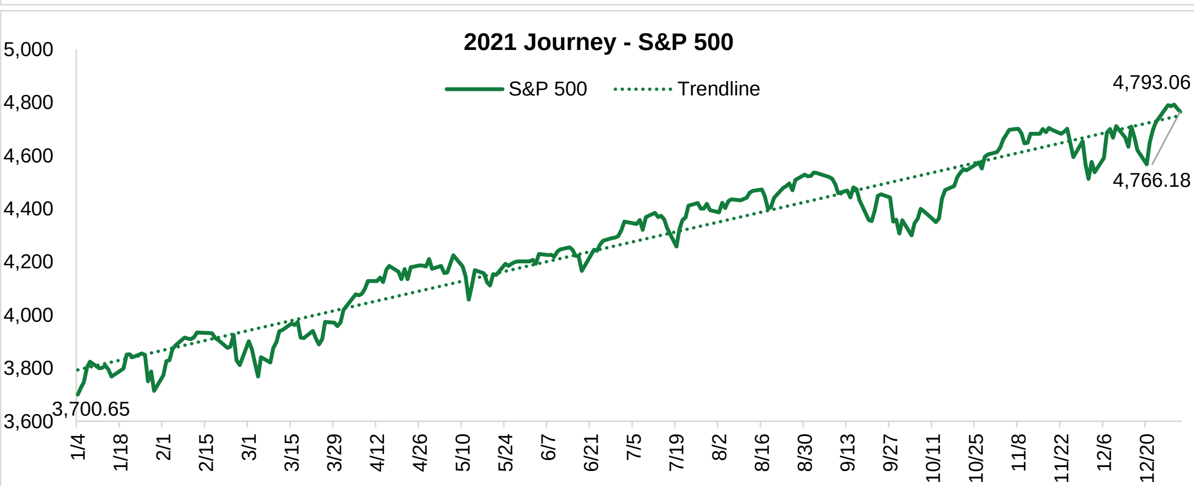
  It is interesting to note the impact from the GameStop event on this index. AMC Entertainment Holdings (ticker: AMC) – one of the names heavily traded during the GameStop event – is the largest market cap name in this index. Additionally, GameStop's (ticker: GME) market cap grew so significantly under the heavy trading that it had to be moved out of this small cap index in the second half of the year (into the Russell 1000), further attributing to the slower second half performance for this index.

On the following pages, we highlight keys trends for 2021 across the different indexes.

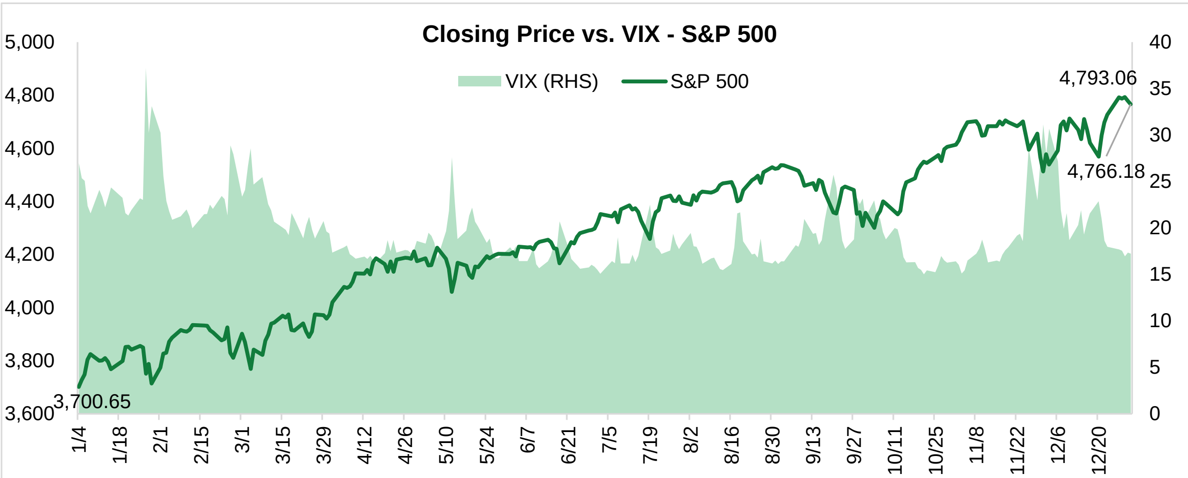
S&P 500

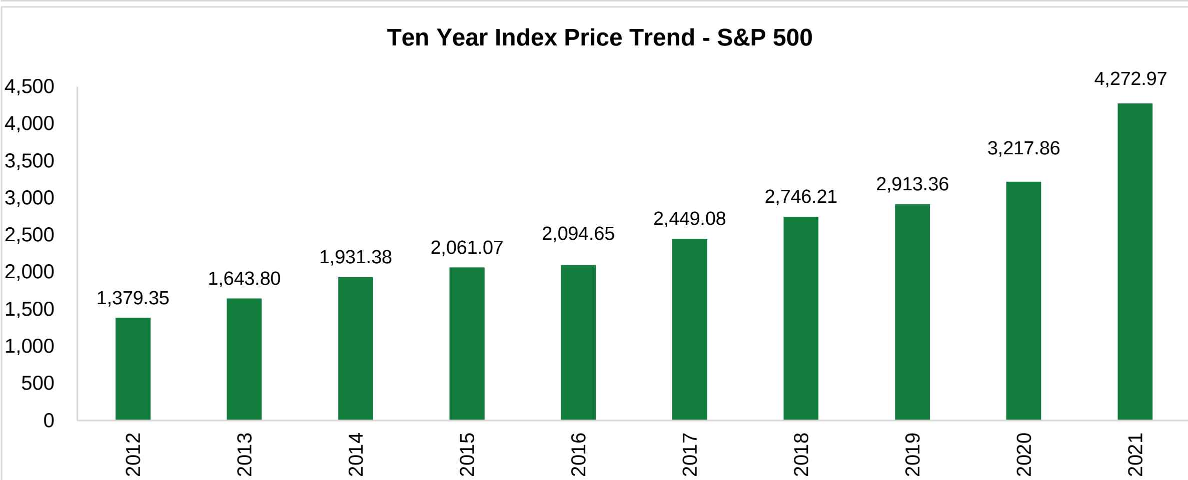
- 2021 average 4,272.97
  - +32.8% Y/Y
  - +46.7% since 2019
  - Daily peak 4,793.06 on December 29
  - Daily trough 3,700.65 on January 4
- Average monthly level 4,266.34
  - Monthly peak 4,674.77 in December
  - Monthly trough 3,793.75 in January
- 10-Year CAGR 12.0%





Source: Bloomberg, SIFMA estimates

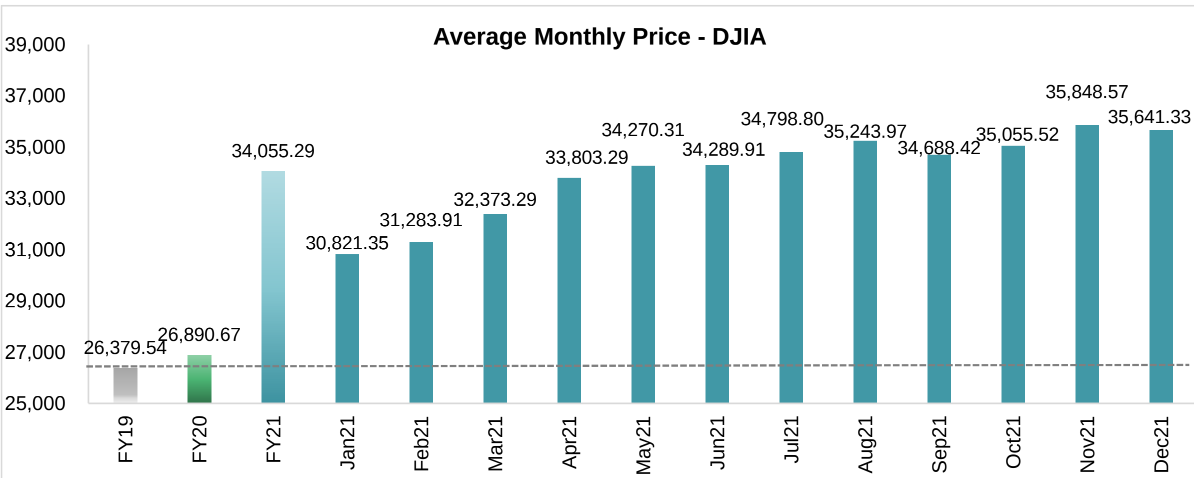


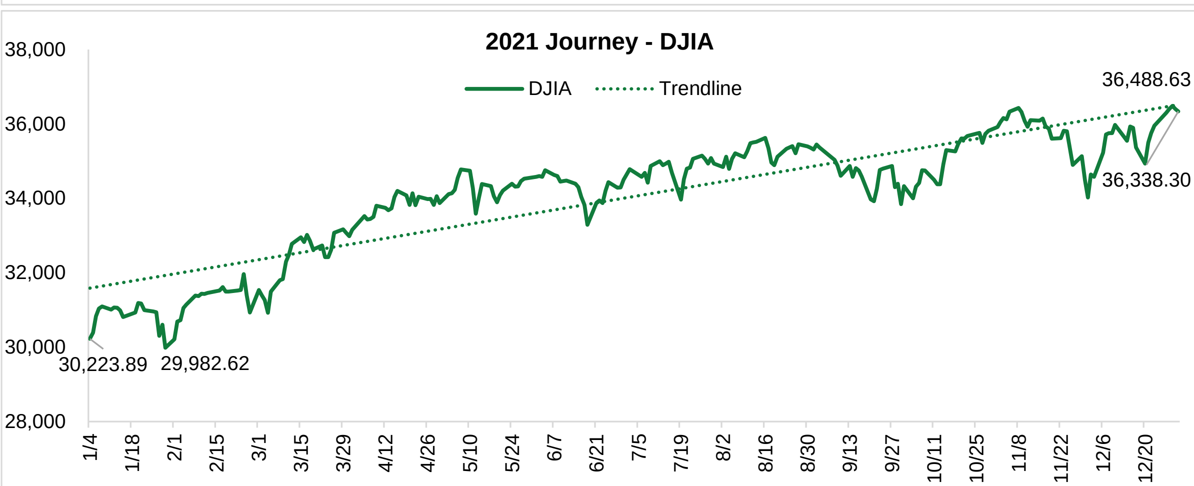


Source: Bloomberg, SIFMA estimates

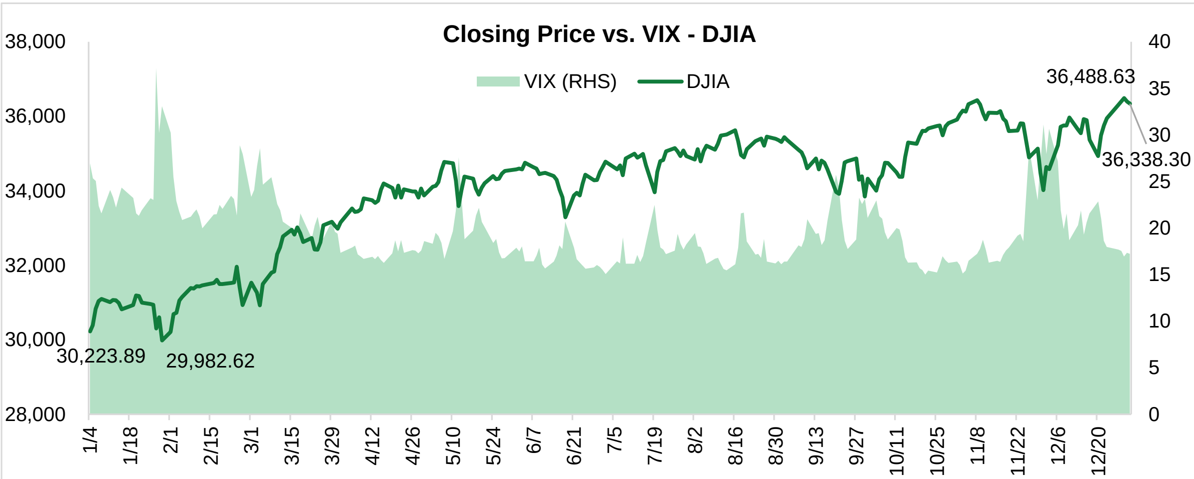
Dow Jones Industrial Average (DJIA)

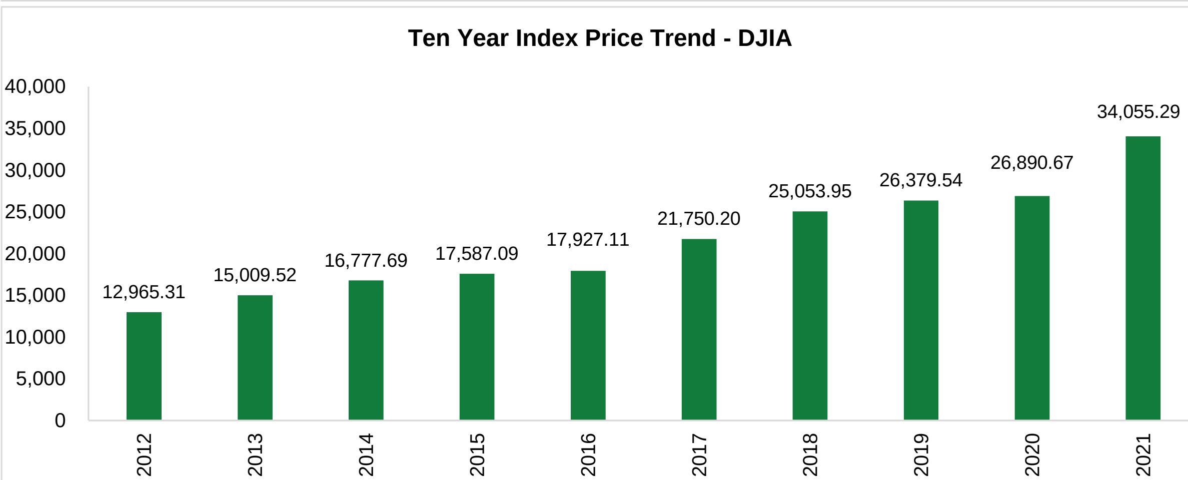
- 2021 average 34,055.29
  - +26.6% Y/Y
  - +29.1% since 2019
  - Daily peak 36,488.63 on December 29
  - Daily trough 29,982.62 on January 29
- Average monthly level 34,009.89
  - Monthly peak 35,848.57 in November
  - Monthly trough 30,821.35 in January
- 10-Year CAGR 10.1%





Source: Bloomberg, SIFMA estimates

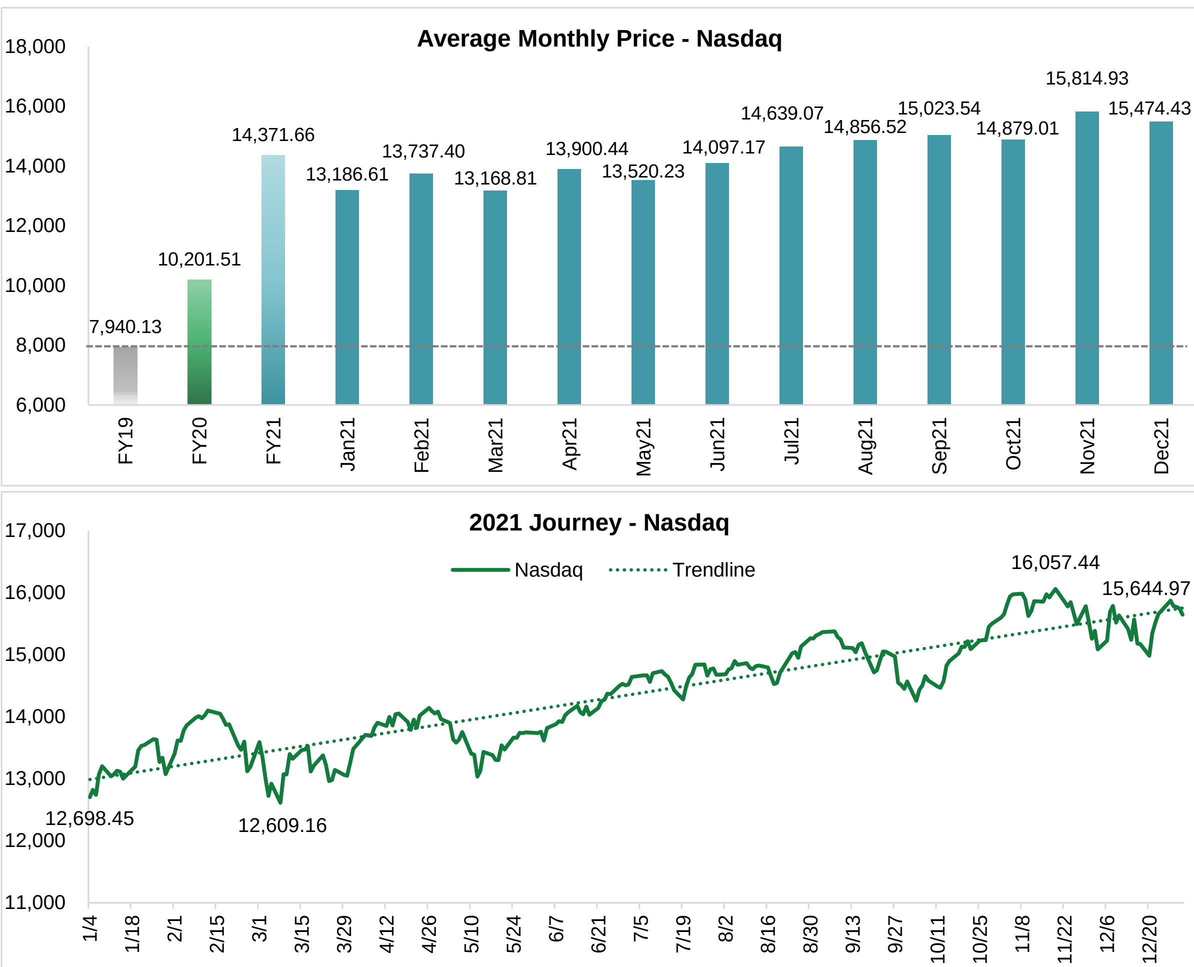




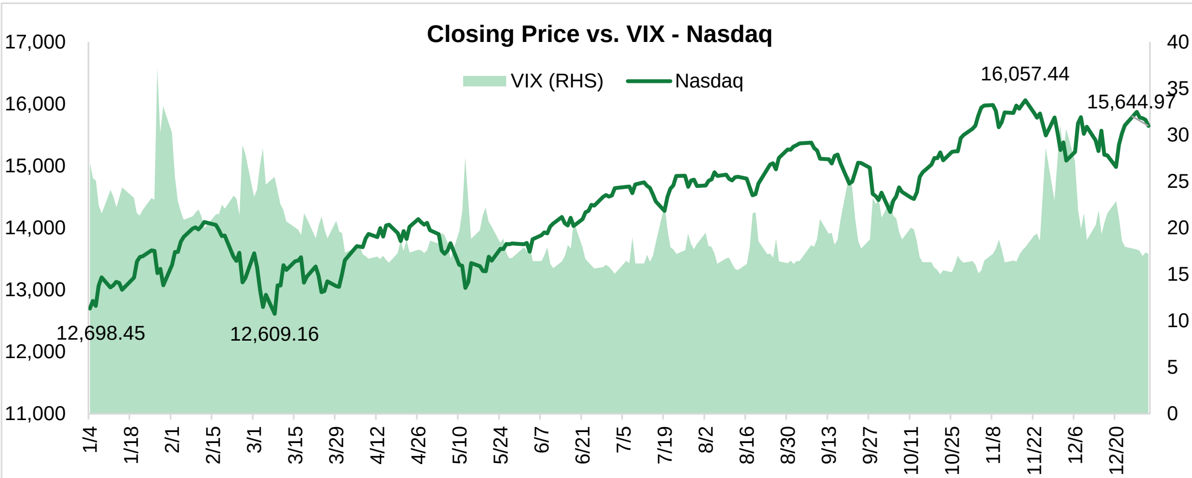
Source: Bloomberg, SIFMA estimates

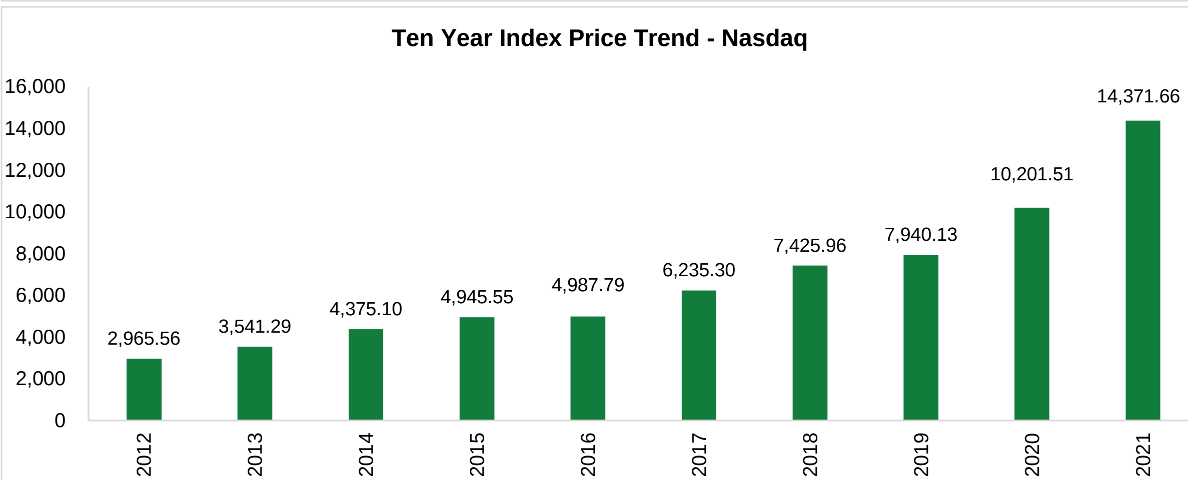
Nasdaq Composite

- 2021 average 14,371.66
    - +40.9% Y/Y
    - +81.0% since 2019
    - Daily peak 16,057.44 on November 19
    - Daily trough 12,609.16 on March 8
- Average monthly level 14,358.18
    - Monthly peak 15,814.93 in November
    - Monthly trough 13,168.81 in March
- 10-Year CAGR 17.1%



Source: Bloomberg, SIFMA estimates

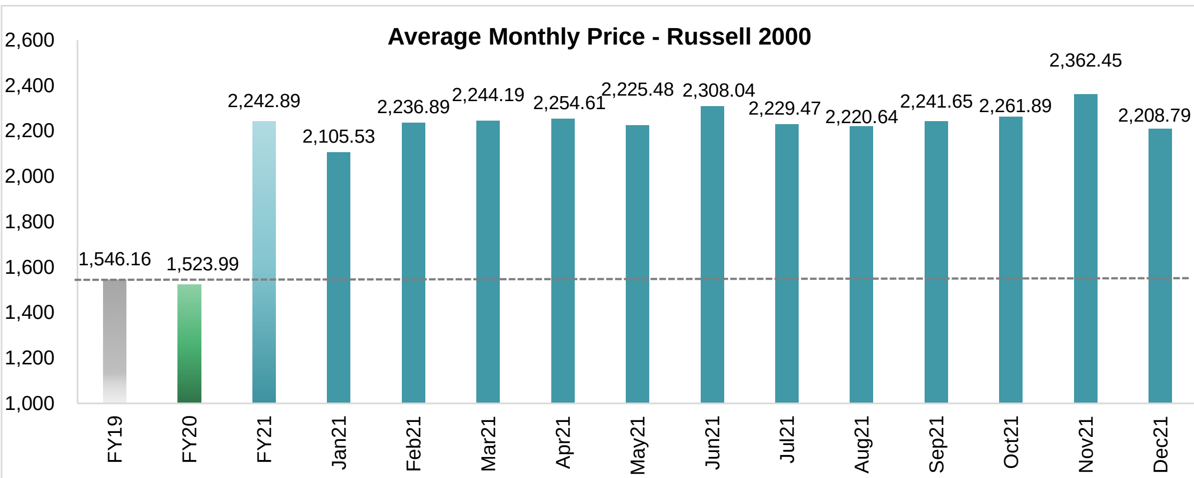


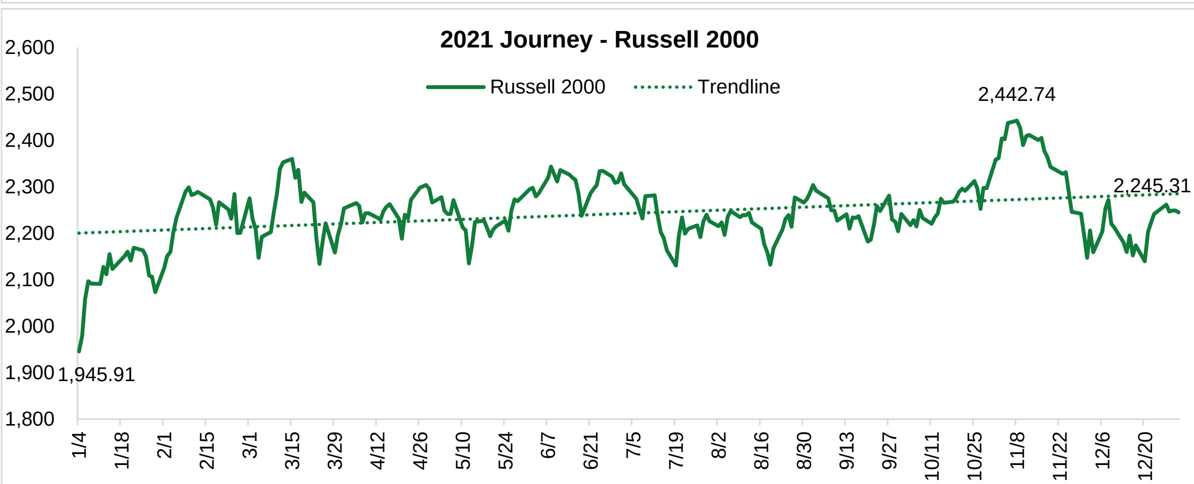


Source: Bloomberg, SIFMA estimates

Russell 2000

- 2021 average 2,242.89
    - +47.2% Y/Y
    - +45.1% since 2019
    - Daily peak 2,442.74 on November 8
    - Daily trough 1,945.91 on January 4
- Average monthly level 2,241.64
    - Monthly peak 2,362.45 in November
    - Monthly trough 2,105.53 in January
- 10-Year CAGR 10.8%





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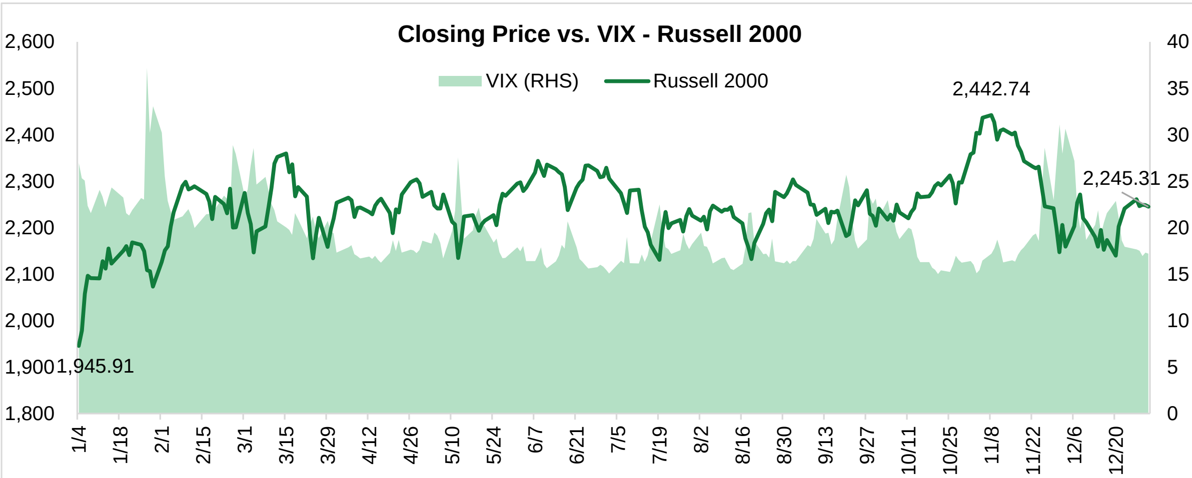
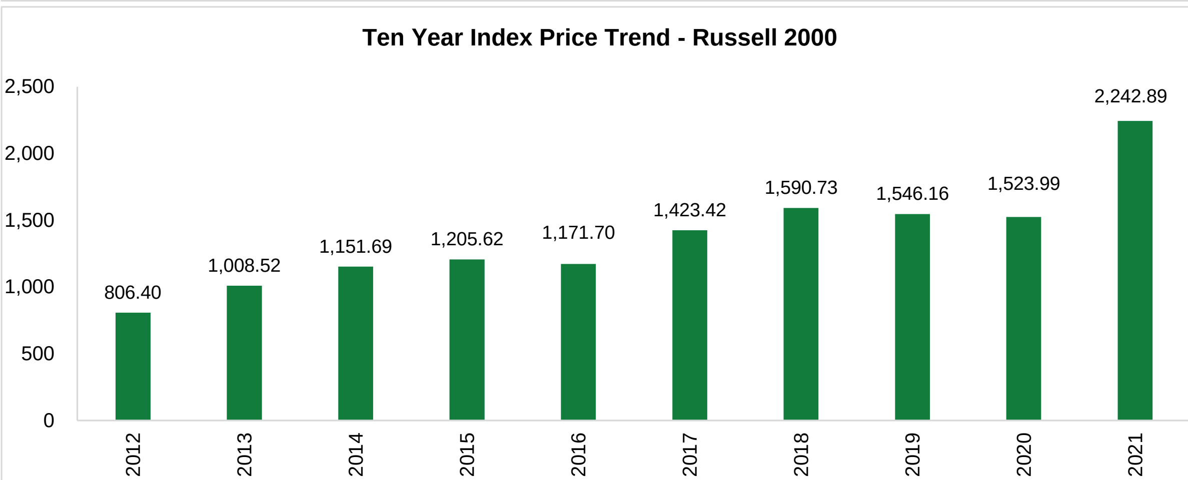




Source: Bloomberg, SIFMA estimates

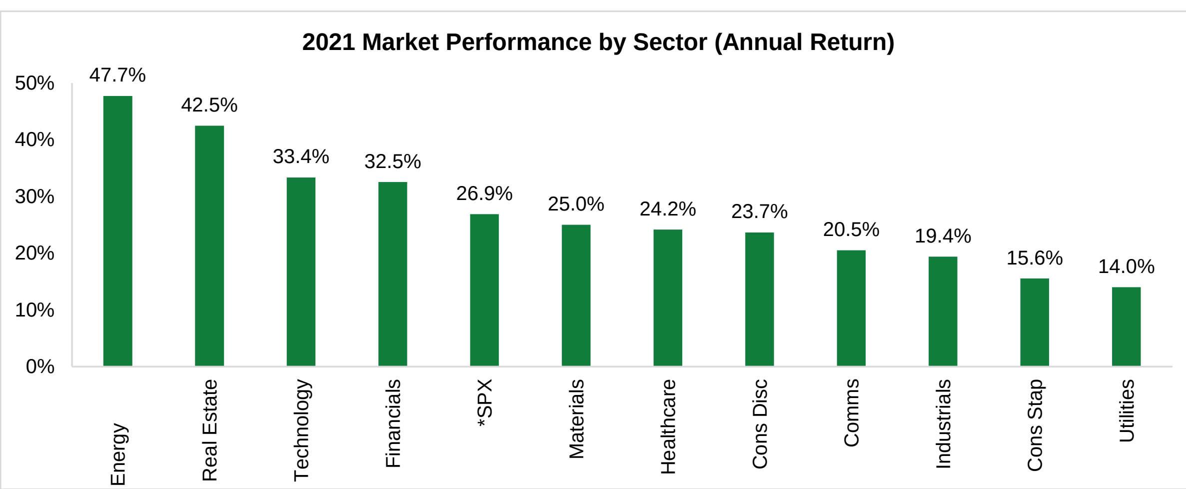
Market Performance Themes

Performance by Sector

As discussed above, market participants had to digest increased inflation and rising rate concerns, as well as new COVID variants, as we headed into the second half of the year. Despite this, all sectors finished the year strong, with annual returns ranging from the mid-teens to almost +50%. Markets as a whole, as measured by the SPX, increased 26.9% (December 31/January 4). We further note that six of the eleven sectors – and the total index – experienced lower annual returns in the second half. For example, the SPX grew 16.1% in 1H21, slowing to +10.9% in 2H21.

We highlight the following trends:

- Top sector = energy at +47.7% as oil prices rallied versus prior years, followed by real estate at +42.5% as real estate/REITs traditionally act as an inflation hedge
- Worse sector = utilities at +14.0% as this sector does not traditionally perform well in inflationary or rising rate environments, followed by consumer staples at +15.6% which typically does not benefit from business cycles, i.e. the economic reopening that boosted other sectors (we do note that this sector performed well under inflationary pressure last year as most companies were able to pass through price increases)
- We note that many tech stocks still posted strong returns (+33.4% for the sector) despite concerns over raising rates, which weighs heavily on valuations for this sector
- Lower sector returns in 2H21 vs. 1H21: SPX, energy, financials, industrials, materials, comms, real estate
- Higher sector returns in 2H21 vs. 1H21: technology, healthcare, utilities, consumer discretionary & staples



Source: Bloomberg, SIFMA estimates

Note: Comms = telecommunications; SPX = total market; Cons Disc = consumer discretionary; Cons Stap = consumer staples

Next, we looked at annual returns since 2019, highlighting the following:

- SPX: The market as a whole performed well at +26.9% for 2021, not quite reaching the solid output in 2019 (+28.9%)
- Technology: Concerns over raising rates brought down returns for the tech sector from +48.0% in 2019 to “only” +33.4% in 2021
- Sectors with lower annual returns in 2021 versus 2020: technology, consumer discretionary (remember that Tesla and Amazon are in this sector, despite being considered a tech trade), and communications
- Sectors with lower annual returns in 2021 versus 2019: technology, consumer discretionary, communications, SPX, industrial, consumer staples, and utilities

Market Performance by Sector (Annual Return)

Source: Bloomberg, SIFMA estimates

Note: Comms = telecommunications; SPX = total market; Cons Disc = consumer discretionary; Cons Stap = consumer staples

Market Performance vs. Inflation

Markets continued to push higher in 2021, despite having to fight through inflation, the Delta and Omicron variants, and supply chain constraints, attributing this to solid earnings results outweighing macro concerns. Ongoing COVID concerns and supply chain issues continued to drive inflation higher: +6.2% in October, +6.9% in November, and +7.1% in December versus +1.4% to start the year (Y/Y changes).

Inflation Data (Y/Y Change)

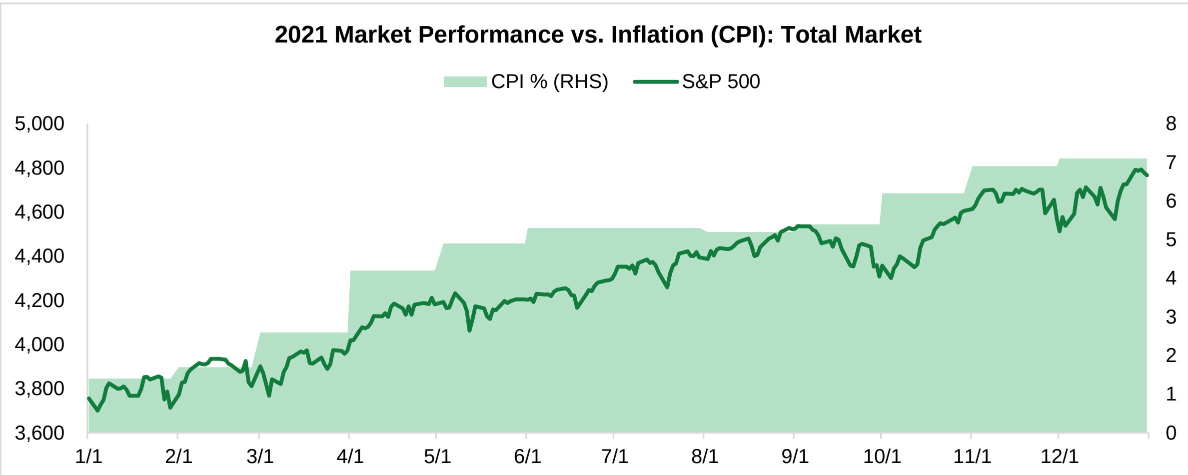
	CPI	vs. Jan (pps)	Core CPI	vs. Jan (pps)
January	1.4%		1.4%	
February	1.7%	0.3	1.3%	-0.1
March	2.6%	1.2	1.6%	0.2
April	4.2%	2.8	3.0%	1.6
May	4.9%	3.5	3.8%	2.4
June	5.3%	3.9	4.5%	3.1
July	5.3%	3.9	4.2%	2.8
August	5.2%	3.8	4.0%	2.6
September	5.4%	4.0	4.0%	2.6
October	6.2%	4.8	4.6%	3.2
November	6.9%	5.5	5.0%	3.6
December	7.1%	5.7	5.5%	4.1

Source: Bureau of Labor Statistics, SIFMA estimates

As such, the Fed made it clear that the timeline for tapering of monthly bond purchases would be accelerated, which paves the way to raise interest rates sooner, estimated as early as the spring. Some economists and equity strategists are now building four to five rate hikes into their models for next year, with some putting in as many as seven hikes. We also looked at the CNBC Fed Survey on timing for the first rate hike. In the September survey, the top response was end of 2022. By the December survey, the majority responded June 2022 (and this poll was prior to learning the December inflation number jumped to 7.1%, as the data was not released until January 12, 2022).

Rising rates compress stock valuations. Additionally, companies will experience varying success rates for pushing through price increases on consumers. The length of the inflationary period is also a concern, as investors estimate how long can companies continue to push through price increases on consumers.

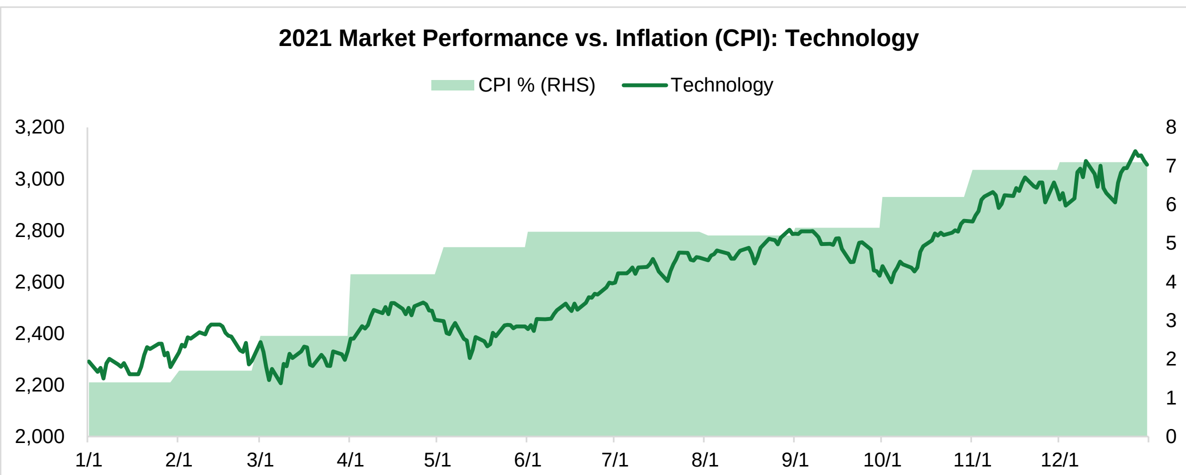
In aggregate, markets pushed higher, albeit at a slower pace, with ebbs and flows around inflation release dates.

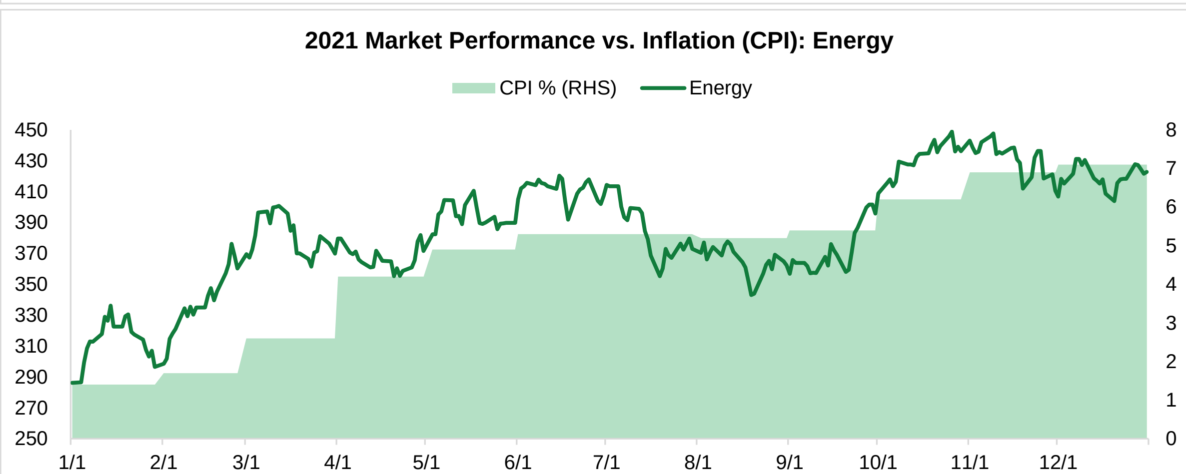


Source: Bloomberg, Bureau of Labor Statistics, SIFMA estimates

In general, equity strategists will tell you that in periods of high inflation: (a) value stocks outperform growth; income oriented or high dividend paying stock prices decline; and stocks as a whole can be more volatile. Looking closer at individual sector performance last year, we see the technology sector continued to climb (+33.4%, rank #3), albeit with some hiccups around inflation concerns. At 29.2% of the S&P 500 index market cap, this sector can drive total market performance. However, the continued upward momentum for this growth oriented sector seems counterintuitive, as tech stocks should be more heavily impacted by rising rates. Yet, going back to the question on raising prices, names like Apple (ticker: AAPL) are expected to be able to pass though prices. With a market cap of around $2.8 trillion, AAPL was estimated to represent 22.9% of the tech sector and 6.7% of the total market index market cap. Its stock price ended up +38.1% for the year.

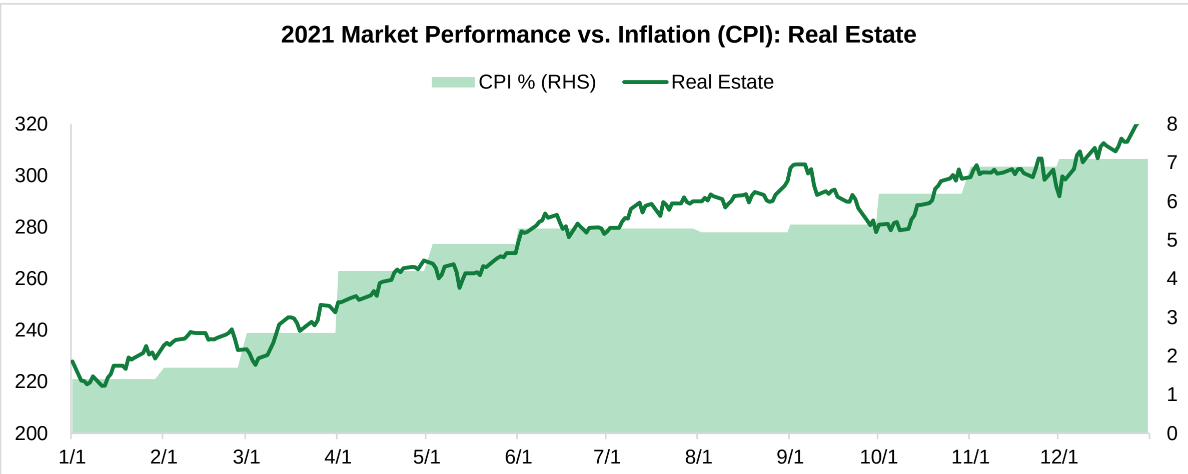
Energy, on the other hand, is a sector that typically performs well under inflation. It was the #1 performing sector in 2021, +47.7%. However, it only represents 2.7% of the total index so is not a market driver. Energy began to perform well as inflation fears emerged, and it continued to move up with the increase in oil (and other commodity) prices.

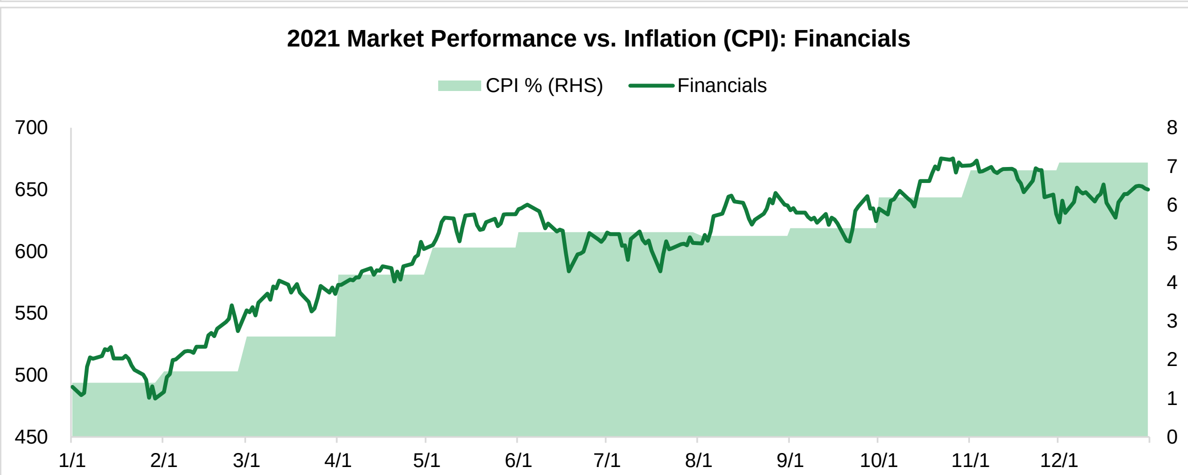




Source: Bloomberg, Bureau of Labor Statistics, SIFMA estimates

Both real estate and financials can perform well during inflationary and higher interest rate environments. Real estate was #2 in sector performance at 42.5%, but only represents 2.8% of the total index market cap. Financials was in the #4 spot at +32.5%, representing 10.7% of total index market cap.

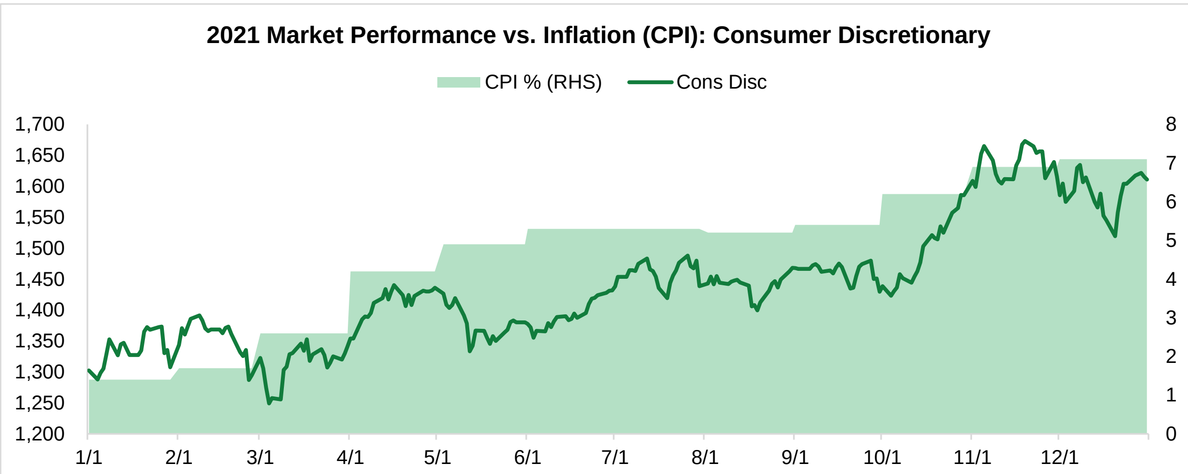


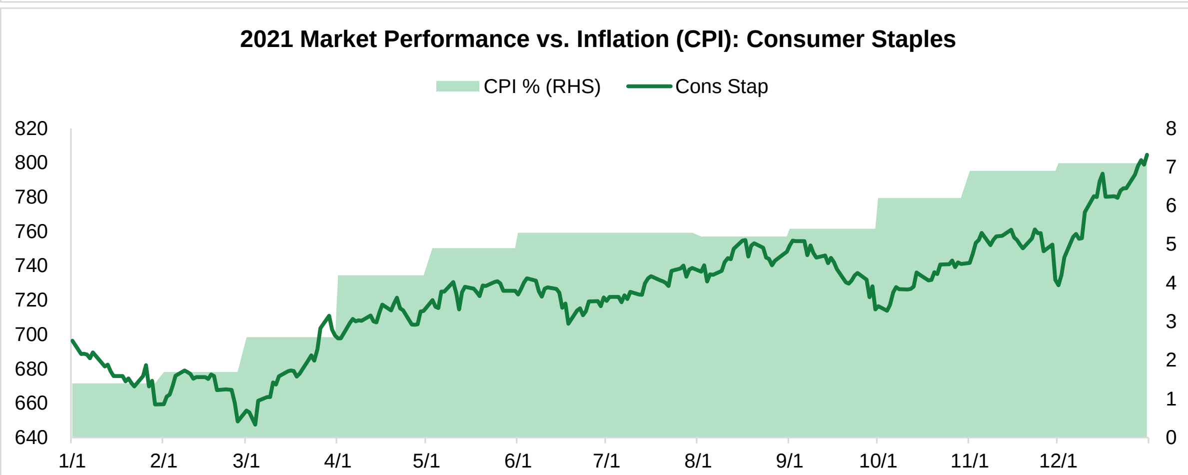


Source: Bloomberg, Bureau of Labor Statistics, SIFMA estimates

Finally, we look at the different returns in the two categories of consumer goods. Consumer discretionary ranked #7 in performance at +23.7% and represented 12.5% of the total index market cap. Consumer staples was up +15.6%, ranking second to last, and represents 5.9% of the index. Typically, consumer discretionary should not perform as well under an inflationary environment.

However, people often forget that Tesla (ticker: TSLA) is listed under consumer discretionary, even if traded as a tech play (also as an ESG trade). With a market cap of around $1 trillion, TSLA was estimated to represent 17.7% of the consumer discretionary sector and 2.2% of the total index market cap. Its stock price ended up 44.8% last year.





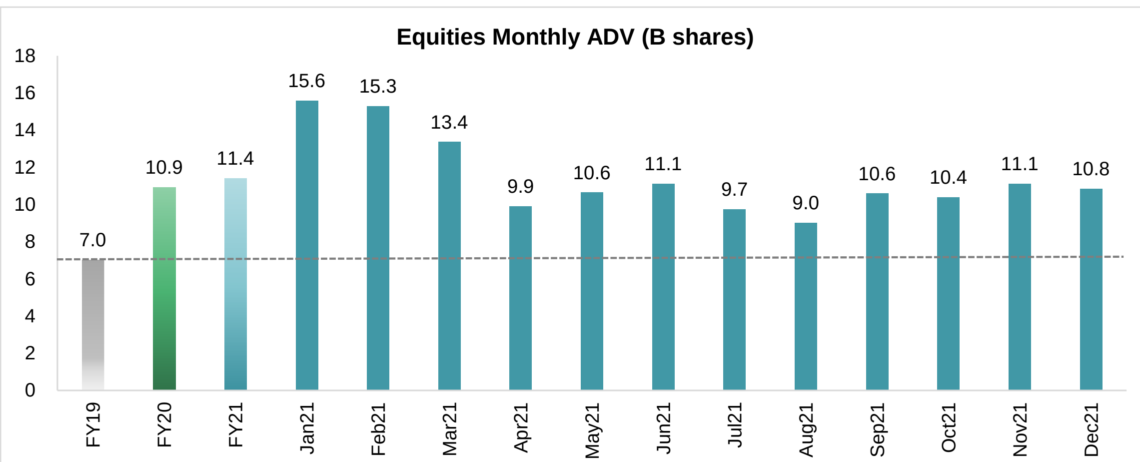
Source: Bloomberg, Bureau of Labor Statistics, SIFMA estimates

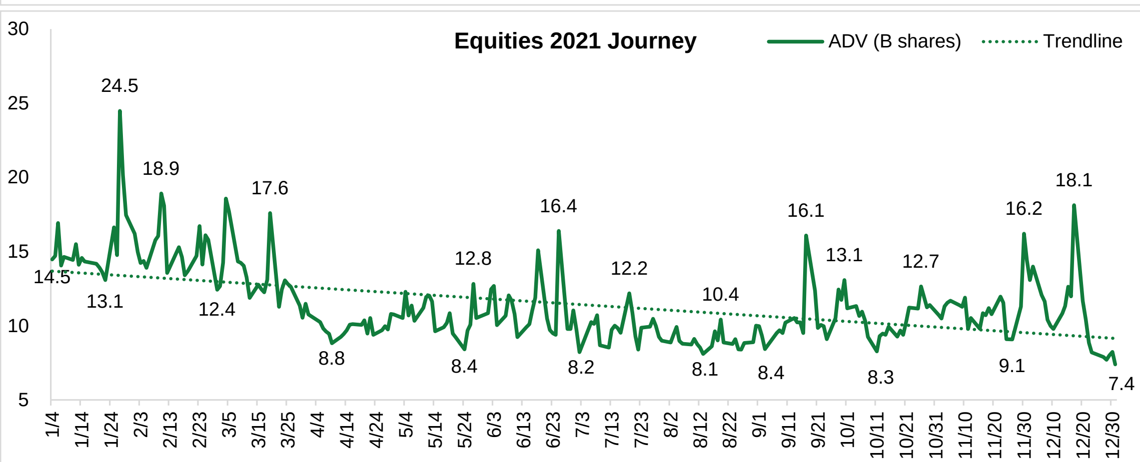
Equity Volumes Metrics

Equity volumes remain elevated to historical levels at 11.4 billion shares on average in 2021, +62.2%, and higher to last year, +4.4%. The overall trendline for equity volumes in 2021 was downward sloping. Yet, we saw some spikes to start and end the year, a similar pattern as with the VIX. To end the year, the month of December went on a bit of a roller coaster ride, peaking mid-month at 18.1 billion shares and then ending the month more in line with historical levels – December 31 volume was 7.4 billion shares; volumes for the last week averaged 7.8 billion shares.

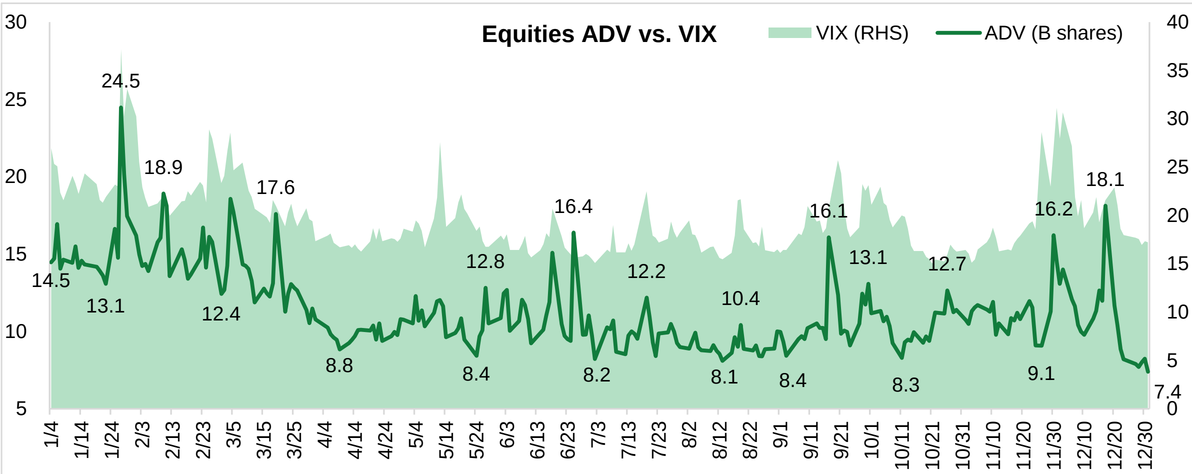
We highlight the following trends:

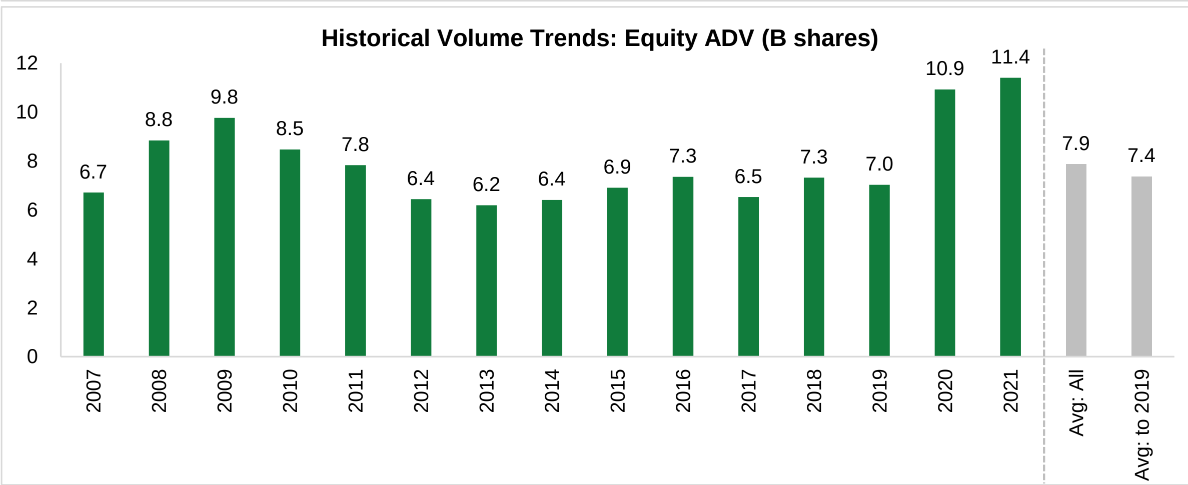
- 2021 average 11.4 billion shares
  - +4.4% Y/Y
  - +62.2% to historical levels
- 2021 peak 24.5 billion shares on January 27
- 2021 trough 7.4 billion shares on December 31
- Monthly trends
  - Highest month January at 15.6 billion shares
  - Lowest month August at 9.0 billion shares





Source: Cboe Global Markets, SIFMA estimates



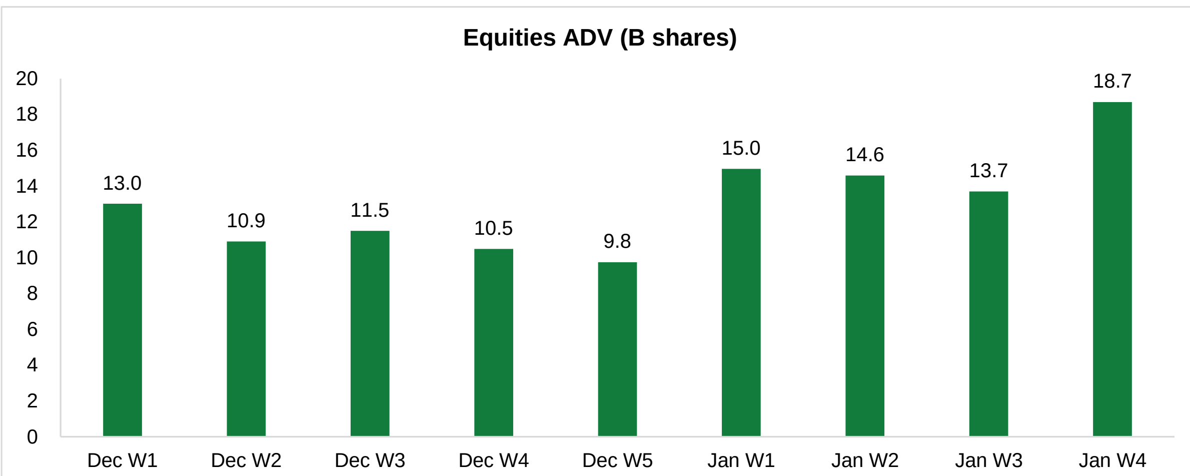


Source: Cboe Global Markets, Bloomberg, SIFMA estimates

Equity Volumes Themes

The GameStop Event

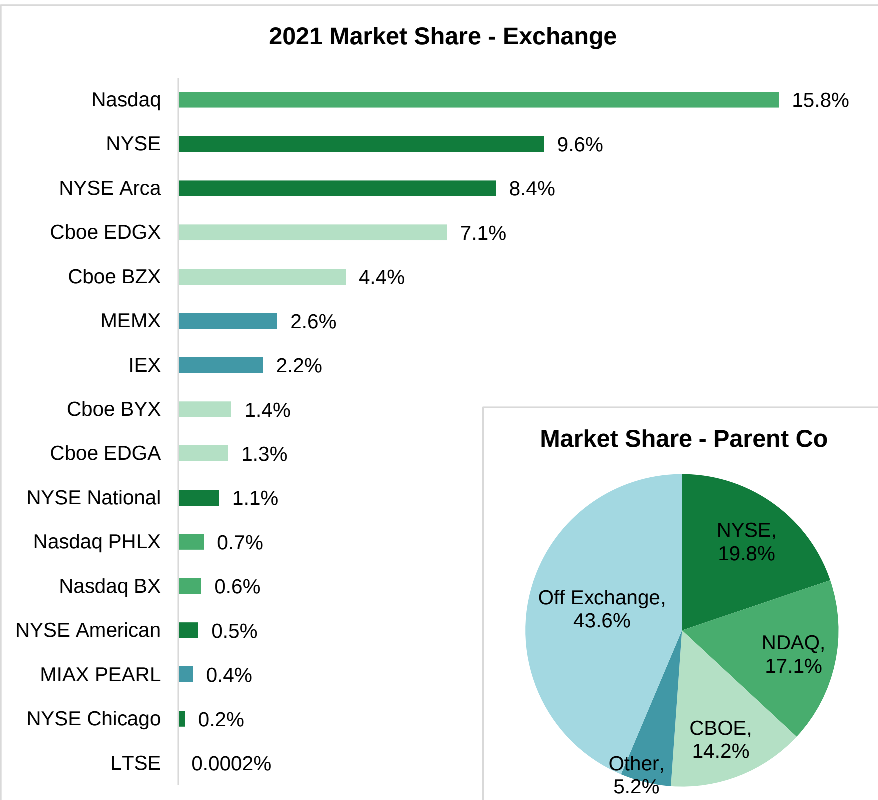
As discussed in the volatility section of this report, the GameStop event created quite an exciting start to 2021 in the equity markets. While elevated to the December close, the 2021 equity ADV trend began in a downward sloping pattern. Then the GameStop event occurred in the final week of January. The average equity ADV for the last week of January was 18.7 billion shares, +36.5% to the prior week and +67.9% to the December 2020 weekly average. After peak during this event, equity ADV settled back down to end the year at 11.4 billion shares, -39.0%.



Source: Cboe Global Markets, SIFMA estimates

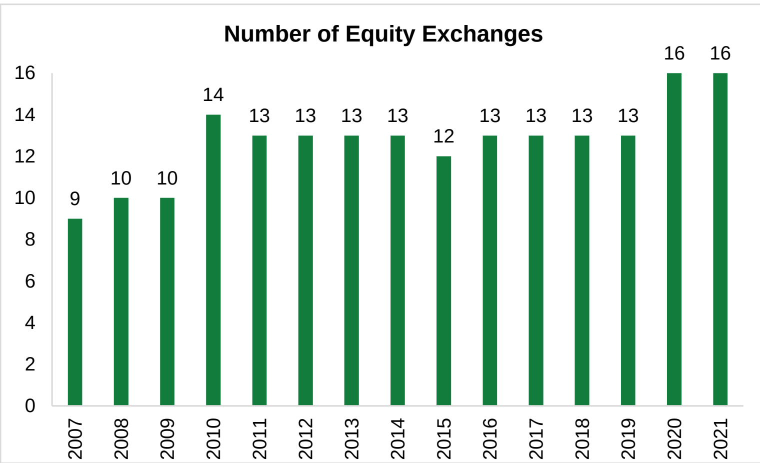
Exchange and Parent Group Market Share

Currently, there are sixteen U.S. equities exchanges, operating under seven parent companies. The Nasdaq stock exchange holds the top spot among individual exchange licenses, with a 15.8% market share. However, NYSE holds the top spot on aggregate, with a cumulative 19.8% share across its five exchanges.



Source: Cboe Global Markets, SIFMA estimates

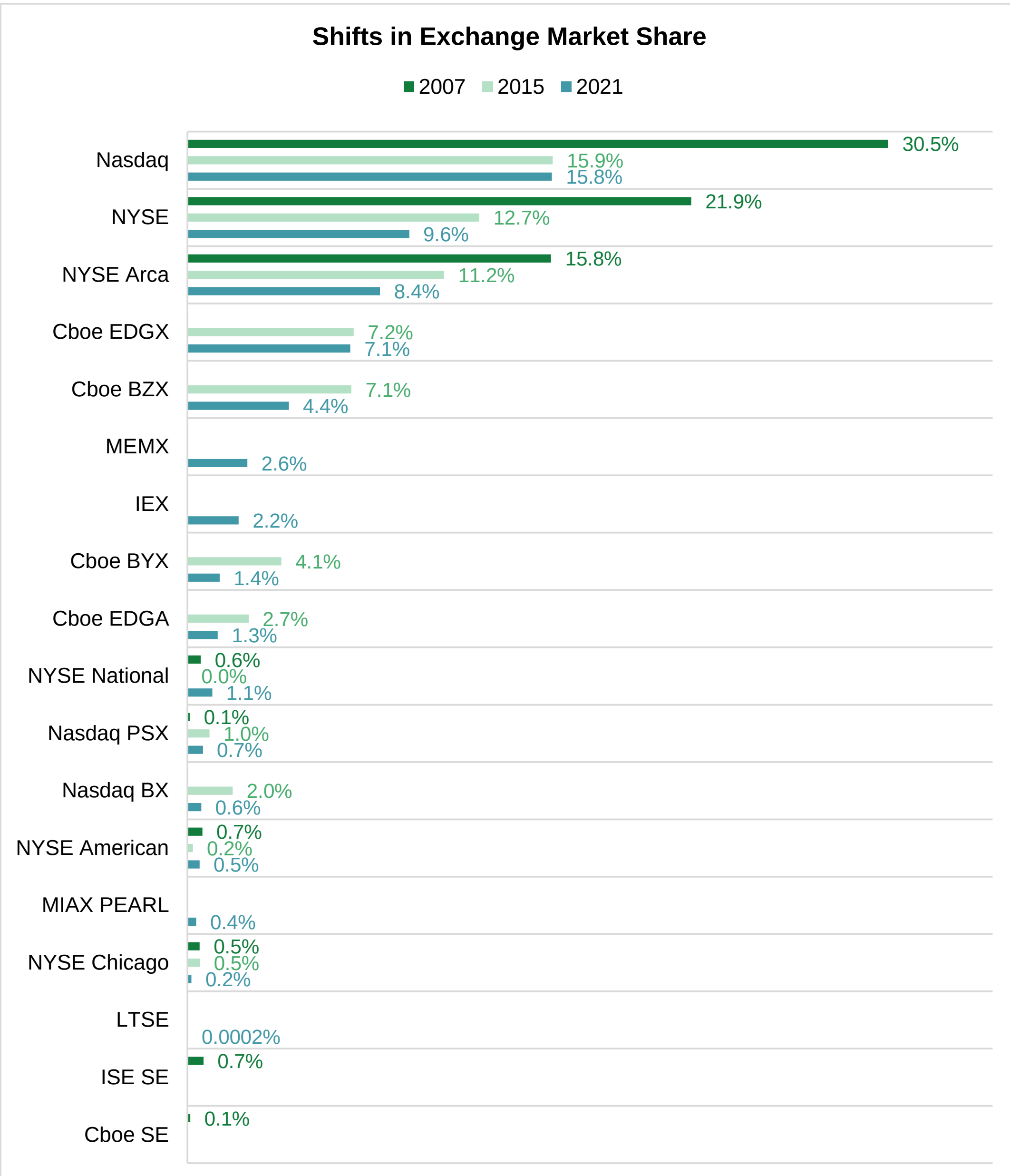
In the mid-2000s, we saw many of the original exchanges merge: NYSE and the Pacific Exchange and then with Archipelago (Arca); Nasdaq and the Philadelphia (PHLX) and Boston (BX) exchanges. We had a new entrant in BATS (now Cboe), as well as Nasdaq officially becoming an exchange. We also had some closures: Cboe and ISE stock exchanges. In the last few years, we added IEX, MEMX, LTSE, and MIAX PEARL. With all of this action, the exchange total has moved from nine in 2007 to sixteen today, +77.8%.



Original Exchange	Current Name	Equities Trading	Options Trading	Notes
Philadelphia Stock Exchange	Nasdaq PHLX/PSX	1790	1975	Bought by Nasdaq in 2007
New York Stock Exchange	NYSE	1792	1985	Traced back to then Buttonwood Agreement, became New York Stock and Exchange Board in 1817
Boston Stock Exchange	Nasdaq BX	1834	2012	Boston Stock Exchange (BX) bought by Nasdaq in 2007
Pacific Exchange	NYSE	1882	1976	Traced back to San Francisco Stock & Bond Exchange and Los Angeles Oil Exchange; bought by Archipelago in 2005, which merged with NYSE in 2006
Chicago Stock Exchange	NYSE Chicago	1882	na	Bought by NYSE in 2018
Cincinnati Stock Exchange	NYSE National	1885	na	Rebranded to National Stock Exchange in 2003; acquired by CBSX in 2011, closed in 2014; bought by NYSE in 2017
American Stock Exchange	NYSE American	1907	1975	Traced back to the curb brokers agreement. Bought by NYSE in 2008
Chicago Board Options Exchange	Cboe	2000s/2017	1973	Options began in 1973; CBOE Stock Exchange (CBSX) founded in 2007 & traded in the 2000s/2010s, acquired National Stock Exchange in 2011 which ceased trading in 2014; re-entered cash equities when bought BATS in 2017
Archipelago	NYSE Arca	1996	1996	Merged with NYSE in 2006
Direct Edge	Cboe EDGA, Cboe EDGX	1998	2015	Direct Edge (EDGX), originally an ECN, bought by BATS in 2014; Cboe acquired these licenses when bought BATS in 2017
International Securities Exchange	Nasdaq ISE	2006/na	2000	ISE Stock Exchange partnership with Direct Edge in 2008; bought by Nasdaq in 2016; no longer trades equities
Boston Options Exchange	BOX	na	2004	Originally a partnership between Montreal Exchange, Boston Stock Exchange & Interactive Brokers
Nasdaq Stock Market	Nasdaq	2005	2008	Began as an electronic stock market in 1971 (National Association of Securities Dealers Automated Quotations)
BATS	Cboe BYX, Cboe BZX	2005	2010	Better Alternative Trading System (BATS) began as an ECN, exchange license in 2008; bought by Cboe in 2017
C2 Options Exchange	Cboe C2	na	2010	
MIAX	MIAX	na	2012	
ISE Gemini	Nasdaq GEMX	na	2013	Bought by Nasdaq in 2016
ISE Mercury	Nasdaq MRX	na	2016	Bought by Nasdaq in 2016
Investors Exchange	IEX	2016	na	
MIAX Pearl	MIAX Pearl	2020	2017	
MIAX Emerald	MIAX Emerald	na	2019	
Members Exchange	MEMX	2020	na	
Long-Term Stock Exchange	LTSE	2020	na	

Source: Cboe Global Markets, company websites, OCC, SIFMA estimates (some dates are estimated)

Given the shifting landscape, market shares by individual exchange have shifted substantially since 2007. For example, while the Nasdaq exchange remains on top, its share has decreased by 14.7 pps since 2007. Similarly, NYSE has lost 12.3 pps and Arca 7.4 pps.



Source: Cboe Global Markets, SIFMA estimates

Note: Market share as a percent of total volumes, but off-exchange trading levels not shown (discussed in more detail on the next section)

Looking at the mergers more closely, it is a mixed bag of whether the deals led to market share gainers or losers: six deals resulted in higher market share today and six now post lower market shares. Even deals occurring in the same time period show mixed results. For example, NYSE Arca (in 2006) now has a lower market share, versus Nasdaq PSX (in 2007) now having a slightly higher market share that at the time of the deal.

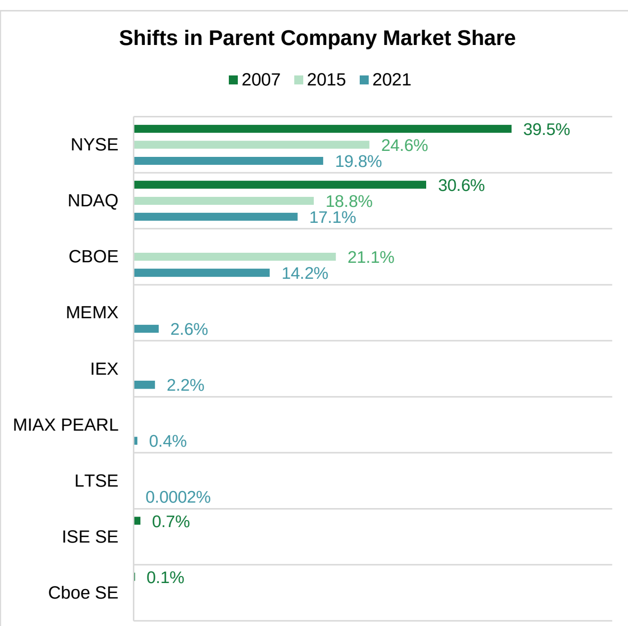
	M&A Year		+1 Year	2021	Average
NYSE Arca	2006	na	15.8%	8.4%	11.7%
NYSE American	2007	0.7%	0.4%	0.5%	0.3%
Nasdaq PSX	2007	0.1%	0.1%	0.7%	0.7%
Nasdaq BX	2007	0.0%	0.0%	0.6%	2.2%
Cboe EDGX (BATS)	2014	6.8%	7.2%	7.1%	6.2%
Cboe EDGA (BATS)	2014	2.7%	2.7%	1.3%	2.3%
NYSE National	2017	0.001%	0.5%	1.1%	0.6%
Cboe BZX	2017	6.0%	6.5%	4.4%	7.0%
Cboe BYX	2017	4.9%	4.7%	1.4%	3.0%
Cboe EDGX (CBOE)	2017	6.4%	5.8%	7.1%	6.2%
Cboe EDGA (CBOE)	2017	1.8%	1.4%	1.3%	2.3%
NYSE Chicago	2018	0.3%	0.3%	0.5%	0.3%

Source: Cboe Global Markets, SIFMA estimates

Note: na = data not available. BX had no trading volumes during the merger but remained a licensed exchange. EDGX/EDGA were in play two times: bought by BATS in 2014 and then Cboe bought BATS in 2017

We also highlight the following trends on a parent company basis:

- **NYSE** (5 exchanges): -19.7 pps from 2007 to 2021 (39.5% share in 2007, 19.8% in 2021)
- **Nasdaq** (3 exchanges): -13.4% pps from 2007 to 2021 (30.6% share in 2007, 17.1% in 2021)
- **Cboe** (4 exchanges): flat from 2010 to 2021 (14.0% share in 2010 when all 4 exchanges became operational, 14.2% in 2021); -7.0 pps from its peak in 2012 of 21.2%
- **Other** (2 exchanges in 2007, 4 in 2021): +4.4 pps from 2007 to 2021 (0.8% share in 2007, 5.2% in 2021)



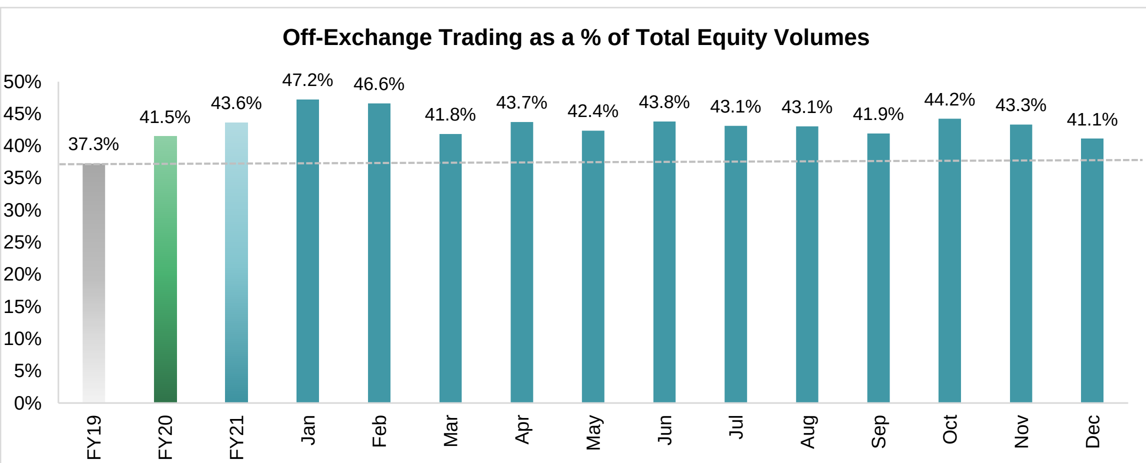
Source: Cboe Global Markets, SIFMA estimates

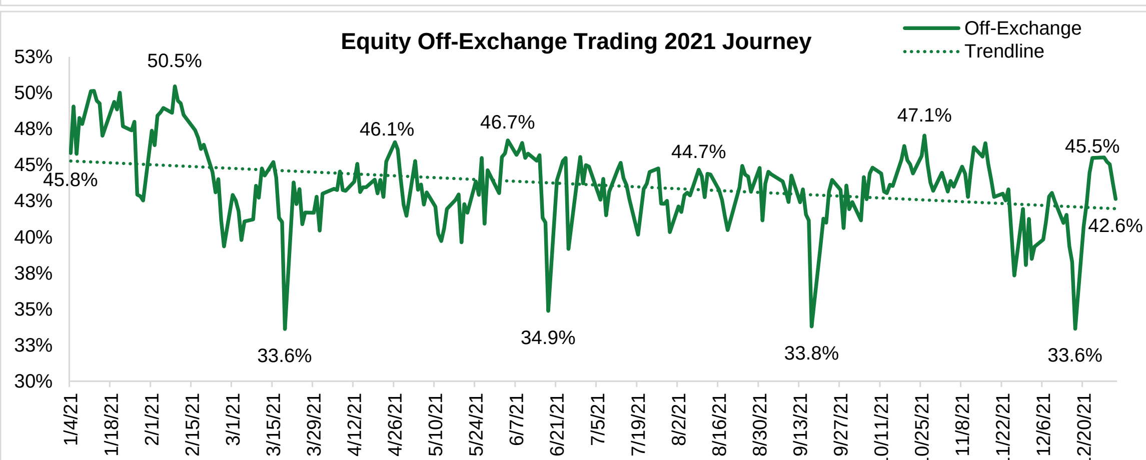
Off-Exchange Trading Metrics

Off-exchange trading as a percent of total equity volumes remained elevated to historical levels at 43.6% on average in 2021, +6.4 pps, and higher to last year, +2.2 pps. The overall trendline for off-exchange volumes in 2021 was downward sloping. We saw some spikes to start the year, coming down to end the year below the annual average.

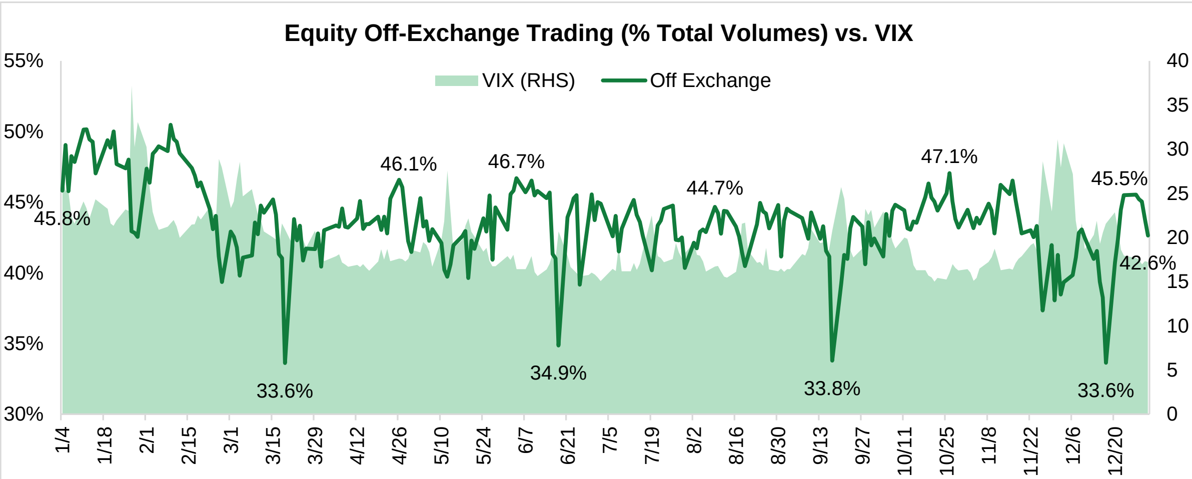
We highlight the following trends:

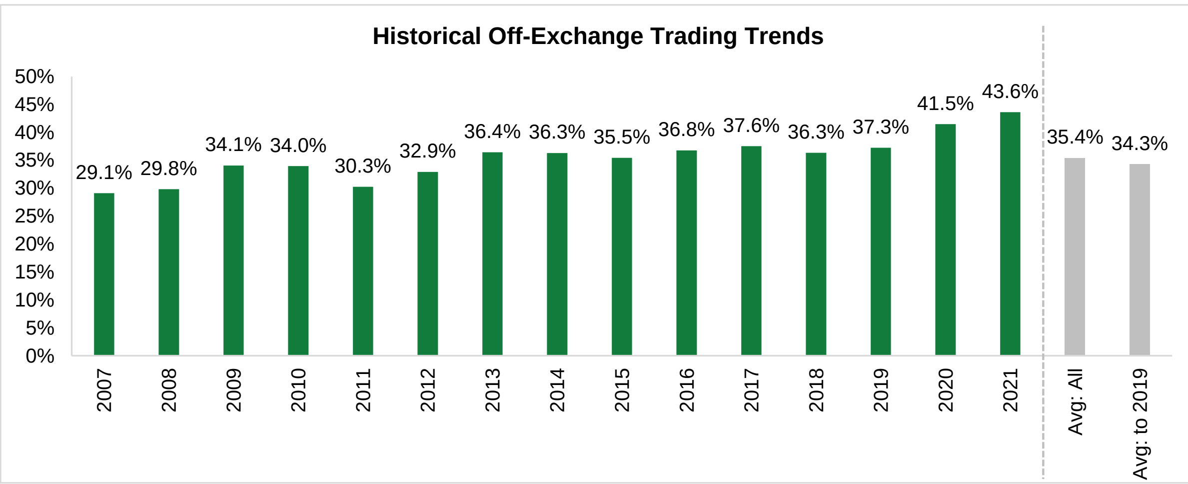
- 2021 average 43.6%
    - +2.2 pps Y/Y
    - +6.4 pps to historical levels
- 2021 peak 50.5% on February 9
- 2021 trough 33.6% on March 19
- Monthly trends
    - Highest month 47.2% in January
    - Lowest month 41.1% in December





Source: Cboe Global Markets, SIFMA estimates





Source: Cboe Global Markets, Bloomberg, SIFMA estimates

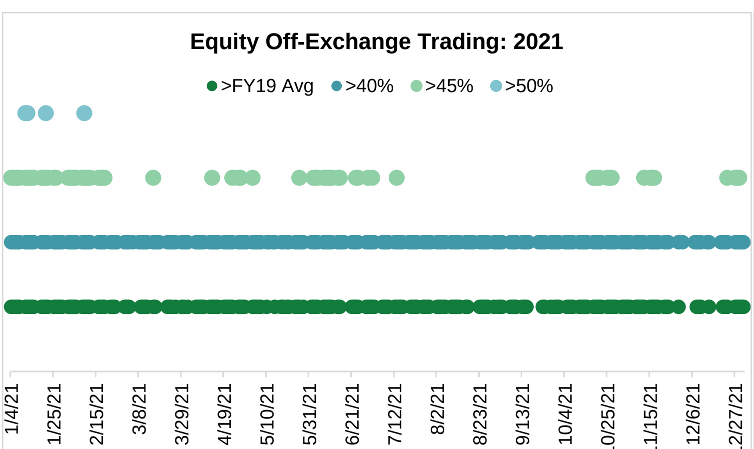
Off-Exchange Trading Themes

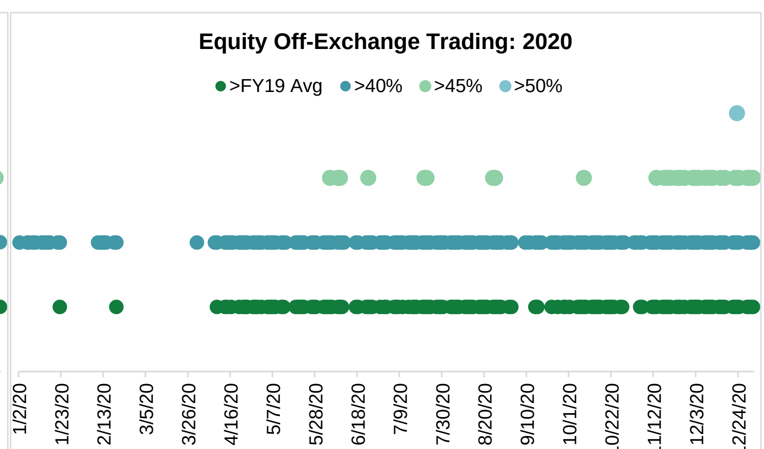
To look at the change in levels of off-exchange trading for equities, we analyzed daily percentages versus historical patterns and (what used to be considered) stretch levels, including:

- Greater than the 2019 average
- Greater than 40% (+2.7 pps to 2019)
- Greater than 45% (+7.7 pps to 2019)
- Greater than 50% (+12.7 pps to 2019)

The charts below marks each day where the percent of off-exchange trading hit one of these criteria, comparing 2021 results to 2020:

- For both years, almost every day beat the 2019 average, except at the start of the pandemic in 2020 where trades moved back onto exchanges to weather the extreme volatility seen at this time. 2020 monthly averages for the VIX were 57.74 in March and 41.45 in April, with a daily peak of 82.69 in March 2020.
- 2021: Almost every day beat the 2019 average; only 17 days were not over 40% of total volumes; there were more days in the first half of the year above 45% of total volumes; and four days in January/February were above 50% of total volumes
- 2020: Starting in April, almost every day was above 40% of total volumes; almost every day since mid-November was above 45% of total volumes; and there was one day in December above 50% of total volumes





Source: Cboe Global Markets, SIFMA estimates

While levels of off-exchange trading are interesting to monitor, we would like to remind readers of a few points around off-exchange trading and market quality:

- **Off-Exchange Not All Retail**: Much of the growth in off-exchange trading starting in 2020 has been attributed to retail investors. Based on our market structure survey, market participants estimate retail investors now represent 20%-30% of total equity volumes (58.3% of respondents). However, all off-exchange trading is not 100% retail. Off-exchange trading as a percent of volumes in 2021 was 43.6% on average, greater than the retail estimate from market participants. Off-exchange volumes also include block (trade size 10,000+ shares) and other institutional trades, including bank capital commitment as part of institutional trades.
- **Variances by Metric**: There are different growth rates when looking at off-exchange as a percent of volumes versus notional value or trade count. Which is the "correct" metric? Most other countries look at the market in terms of notional value instead of volumes, and this metric shows a lower level of off-exchange trading.
- **Function of Market Structure**: Market participants note that the level of the percent off-exchange trading volumes is not a measure of market quality, more directly, the increase in off-exchange trading is not a sign of declining market quality. The percent of off-exchange trading is a function of market structure, and the optimal level of the percent of off-exchange trading is the actual amount in that given time period. Any increase may impede price discovery, and any decrease may hinder trading. In other words, the percent of off-exchange trading volumes is self-correcting, ebbing and flowing based on current market structure characteristics.
- **Segmentation Benefits Investors**: Retail order flow is segmented from non-retail flow in order for retail brokers to find the best execution for their clients. Retail investors are considered less informed than institutional peers, and their trades are determined to add little to price discovery on a standalone basis. By segmenting retail order flow, the information content is increased, improving price discovery for these trades and the market as a whole. A 2016 Bank of Canada study showed just this, as well as concluding that segmentation of retail flow slightly lowered transaction costs for both retail and non-retail trades.

Finally, we note that retail flow has always been executed off exchange (the exception being limit orders which are sent to exchanges). As retail investor trading has grown as a percentage of overall volume – our market structure survey estimates this at 20-30% of total volumes (58.3% of respondents) or higher (25.0% of respondents), versus around 10% historically – it is logical that off-exchange volume grew as well. In fact, since retail trades are generally executed off exchange, it statistically makes sense that off-exchange trading experienced a higher growth rate.

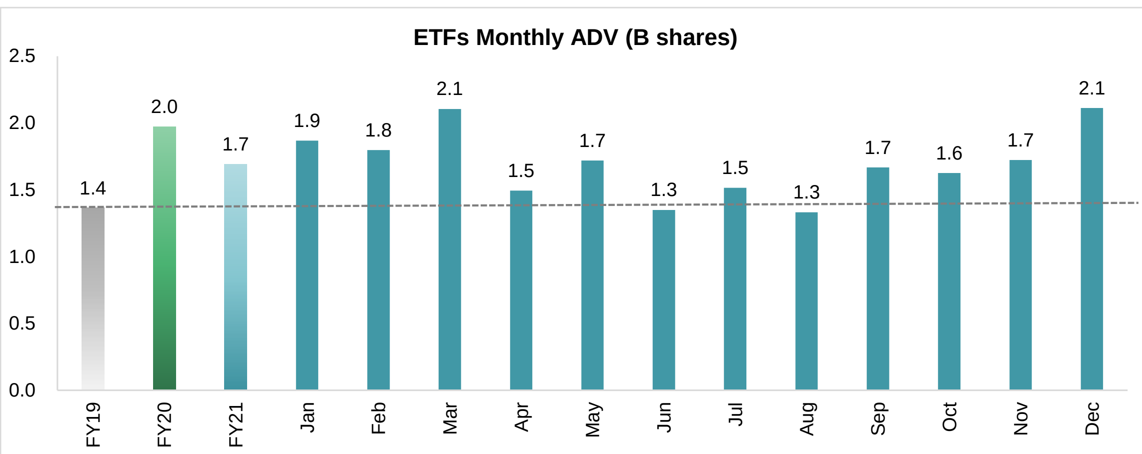
The competition for retail order flow is a hunger game, driven by the quest for best execution for their clients. For example, retail brokers may route flow based on who will provide the best price (or size) improvement for their clients' trades. Additionally, it would be extremely costly for retail brokers to become exchange members in order to route directly to exchanges, costs which would be passed onto retail investors increasing transaction costs.

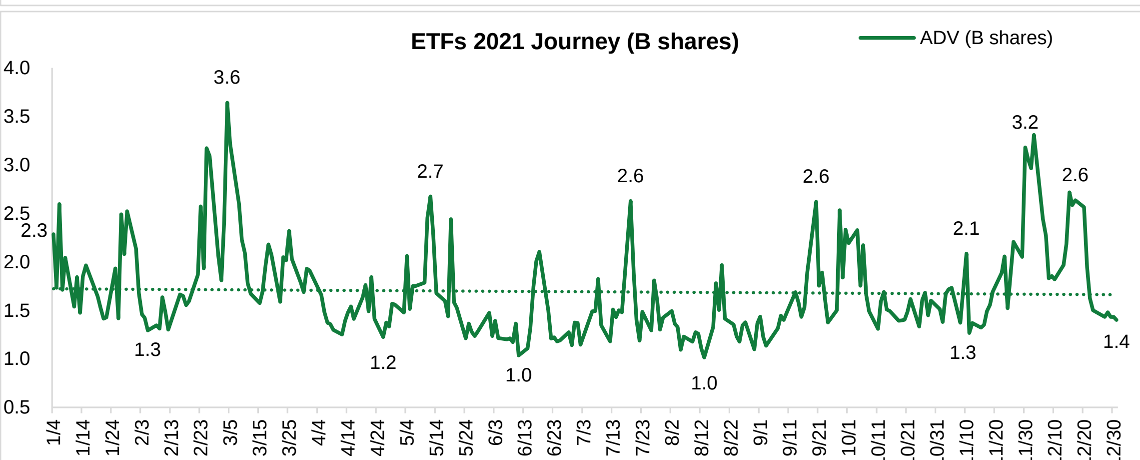
ETF Volumes Metrics

ETF volumes remain elevated to historical levels at 1.7 billion shares on average, +24.0%, but down versus last year, -14.2%. The overall trendline for equity volumes in 2021 was ever so slightly downward sloping, with spikes to start and end the year (as with overall equities and the VIX. ETFs as a percent of total equity market volumes is down from historical levels, 14.8% in 2021 around 19% on average pre COVID.

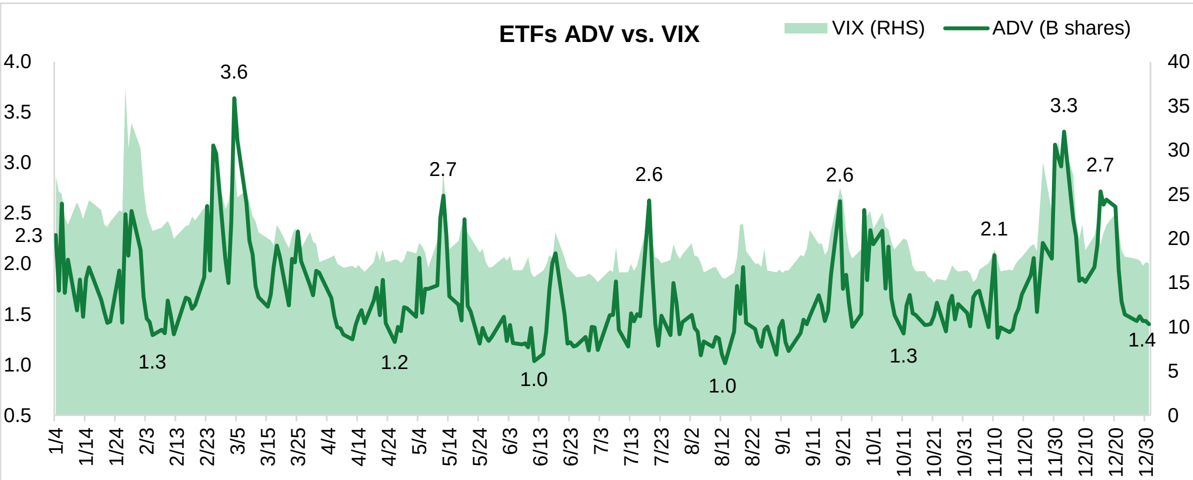
We highlight the following trends:

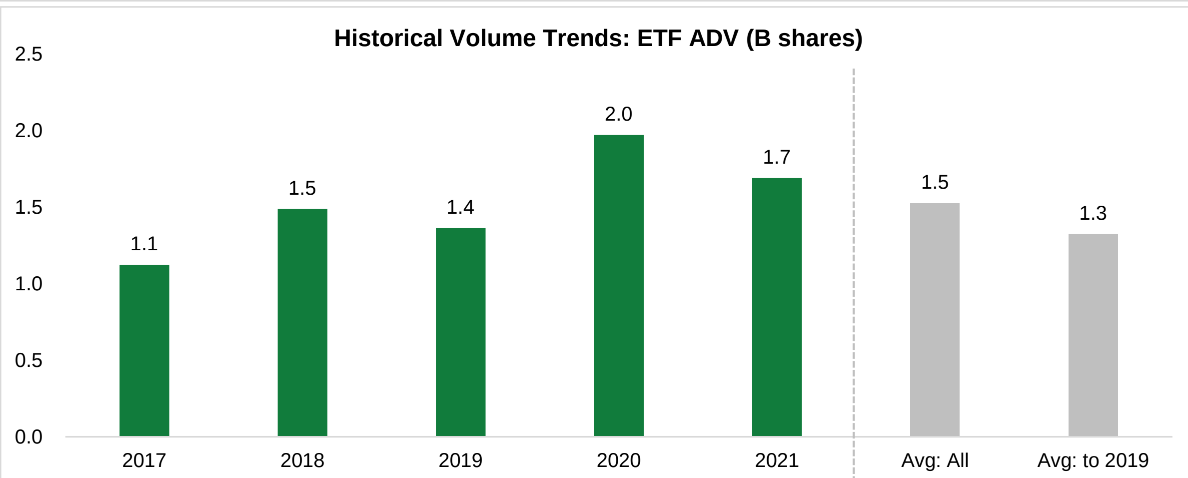
- 2021 average 1.7 billion shares
  - -14.2% Y/Y
  - +24.0% to historical levels
- 2021 peak 3.6 billion shares on March 4
- 2021 trough 1.0 billion shares on August 13
- Monthly trends
  - Highest month 2.1 billion shares in December
  - Lowest month 1.3 billion shares in August





Source: Cboe Global Markets, SIFMA estimates





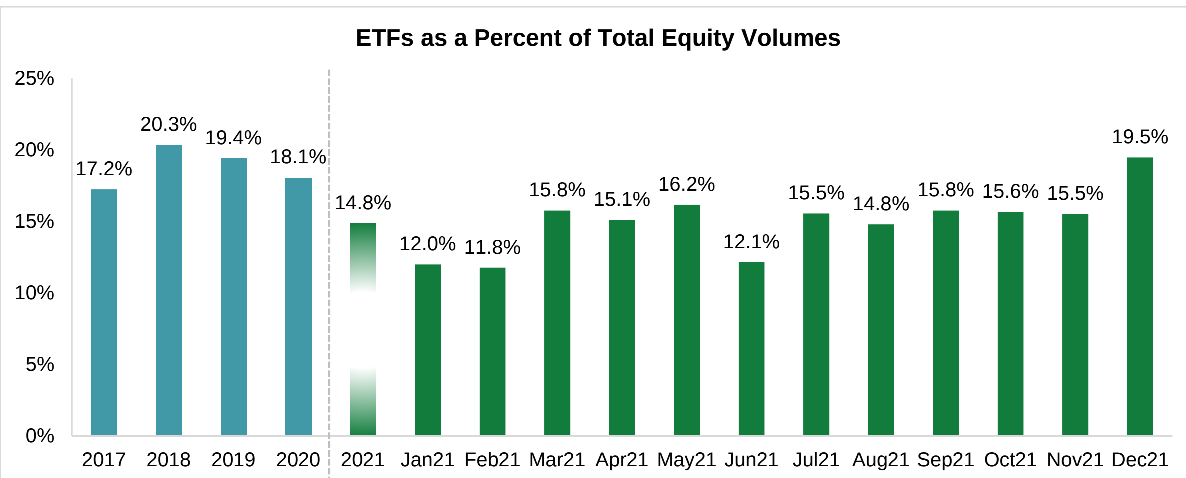
Source: Cboe Global Markets, Bloomberg, SIFMA estimates

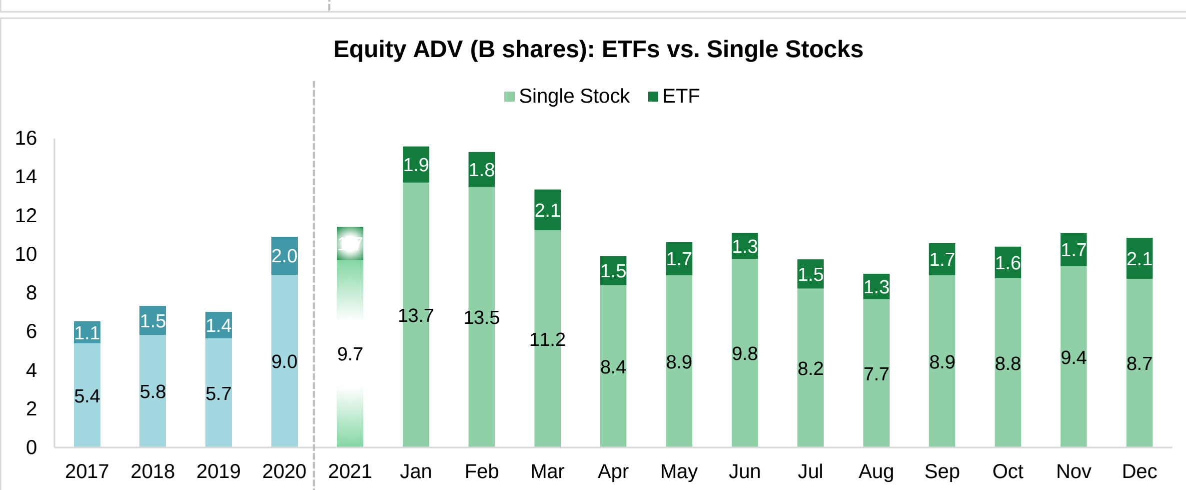
ETF Volumes Themes

ETFs as a Percent of Total Equities

ETF shares trade on the U.S. equity markets in the secondary market, as do the underlying stocks used to create equity ETFs. On average in 2021, ETF volume was 1.7 billion shares versus 9.7 billion shares for single stock equites, or 14.8% of total equity volumes. We highlight the following trends:

- 14.8% of total equities volume in 2021; pre COVID average 19.0%
- Monthly average 15.0%; peaked in December at 19.5%, troughed in February at 11.8%
- ETFs volumes -14.2% Y/Y vs. +44.6% in 2020
    - Single stock +8.5% and +58.0%
    - Total equities +4.4% and +55.4%



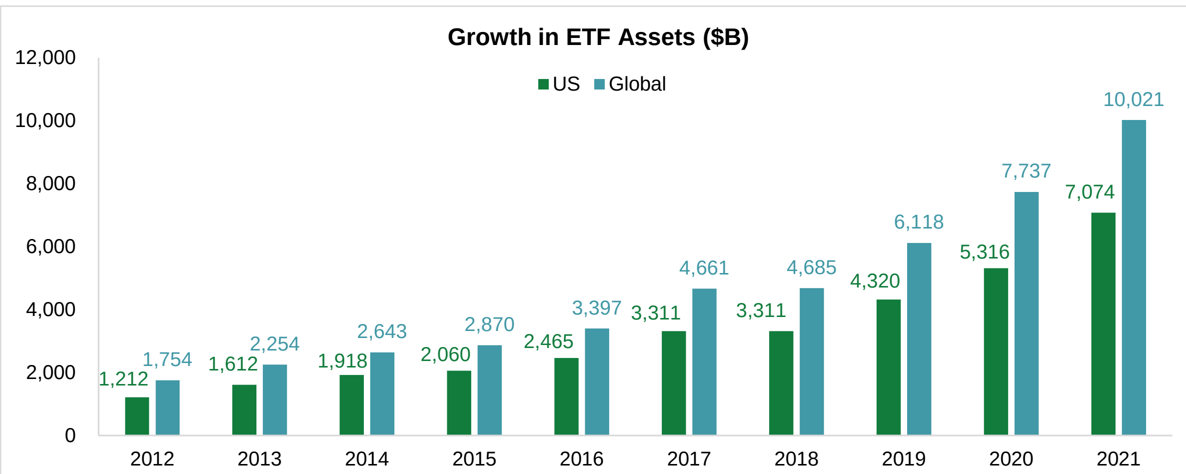


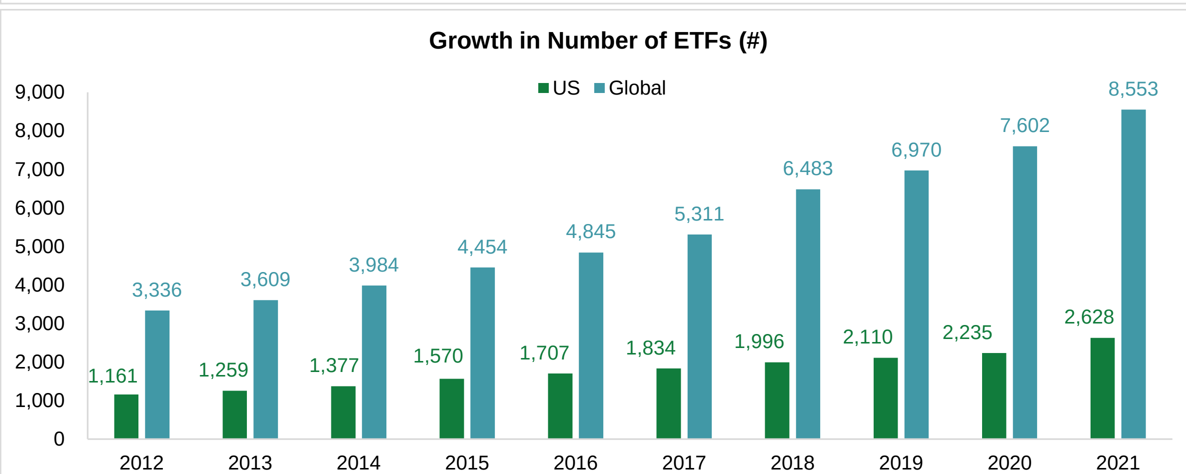
Source: Cboe Global Markets, SIFMA estimates

ETF Landscape

According to ETFGI research, ETFs saw record net inflows of $1.3 trillion in 2021, surpassing the prior record of $762.8 billion in 2020 (+69.1%). December 2021 marked the 31st month of consecutive net inflows. We highlight the following trends on ETF assets and number of funds:

- US ETF assets $7.1 trillion; +33.1% Y/Y, +16.4% 5-year CAGR (US 70.6% of total global)
- US # ETFs 2,628; +17.6% Y/Y, +7.5% 5-year CAGR (US 30.7% of total global)
- Global ETF assets $10.0 trillion; +29.5% Y/Y, +16.5% 5-year CAGR
- Global # ETFs 8,553; +12.5% Y/Y, +10.0% 5-year CAGR





Source: ETFGI (as of December 2021)

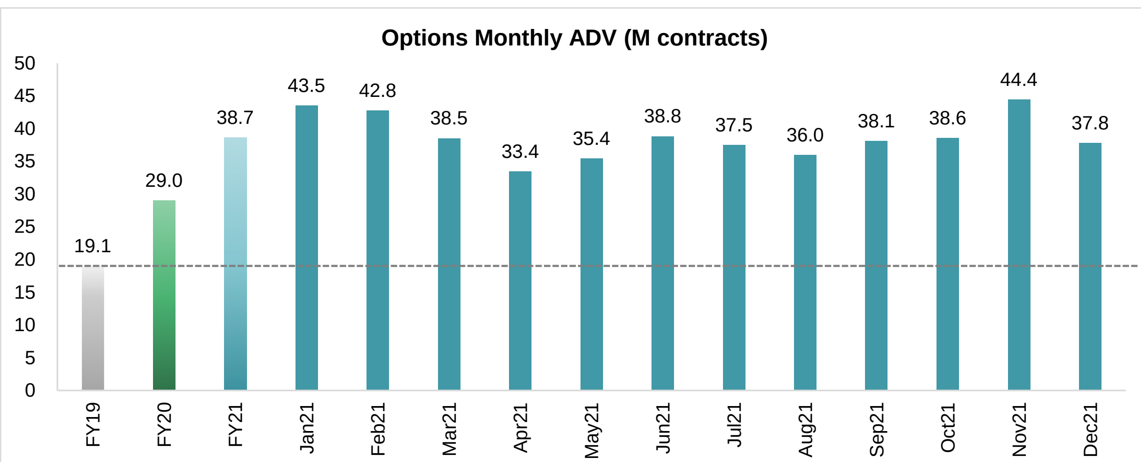
Listed Options Volumes Metrics

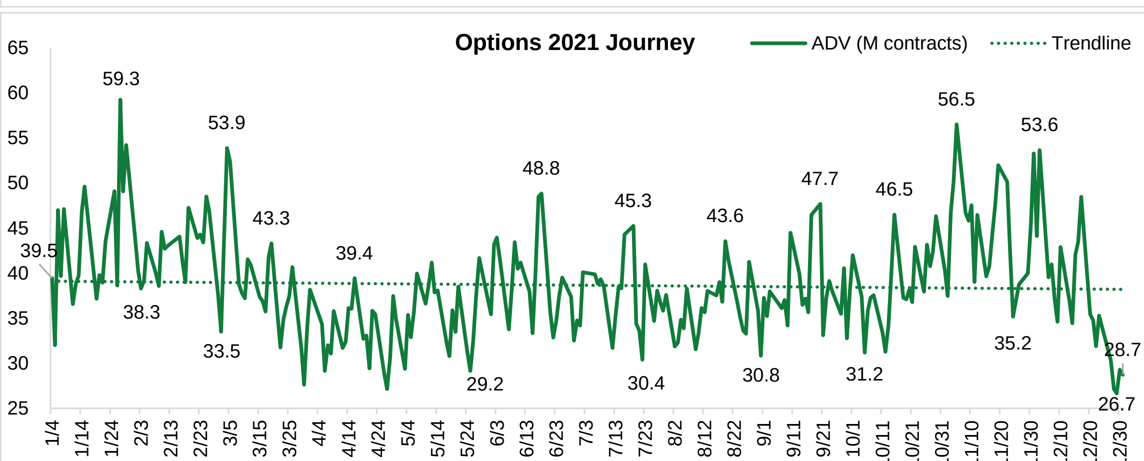
Multi-listed options volumes remained elevated to historical levels at 38.7 million contracts on average in 2021, +102.9%, and higher to last year, +33.1%. The overall trendline for options volumes in 2021 was essentially flat. Markets saw ten days last year where volumes were greater than 50 million contracts, and even the minimum daily level, 26.7 million contracts, was 40% higher than historical levels.

We highlight the following trends:

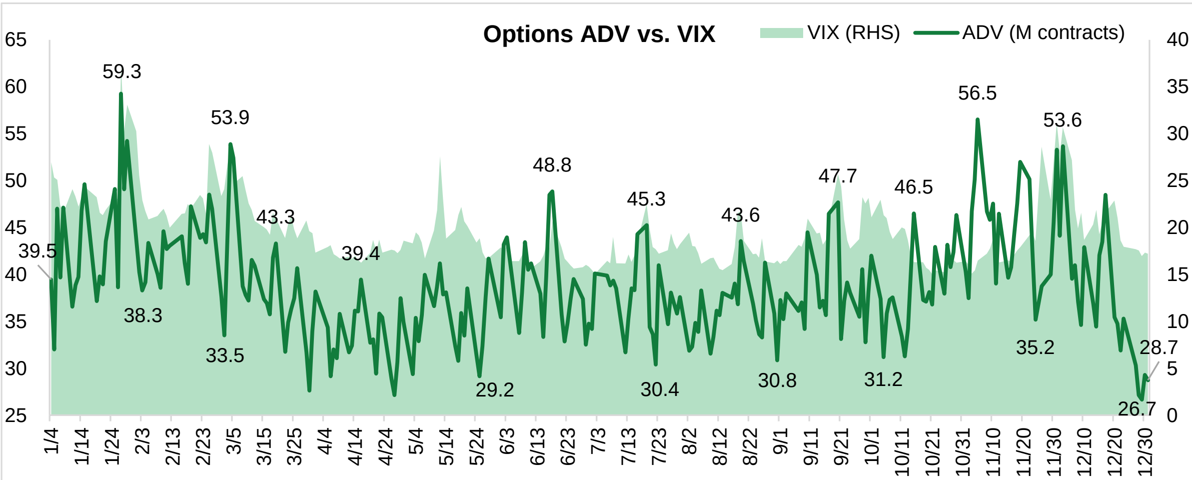
Total Options

- 2021 average 38.7 million contracts
  - +33.1% Y/Y
  - +102.9% to historical levels
- 2021 peak 59.3 million contracts on January 27
- 2021 trough 26.7 million contracts on December 29
- Monthly trends
  - Highest month at 44.4 million contracts in November
  - Lowest month at 33.4 million contracts in April

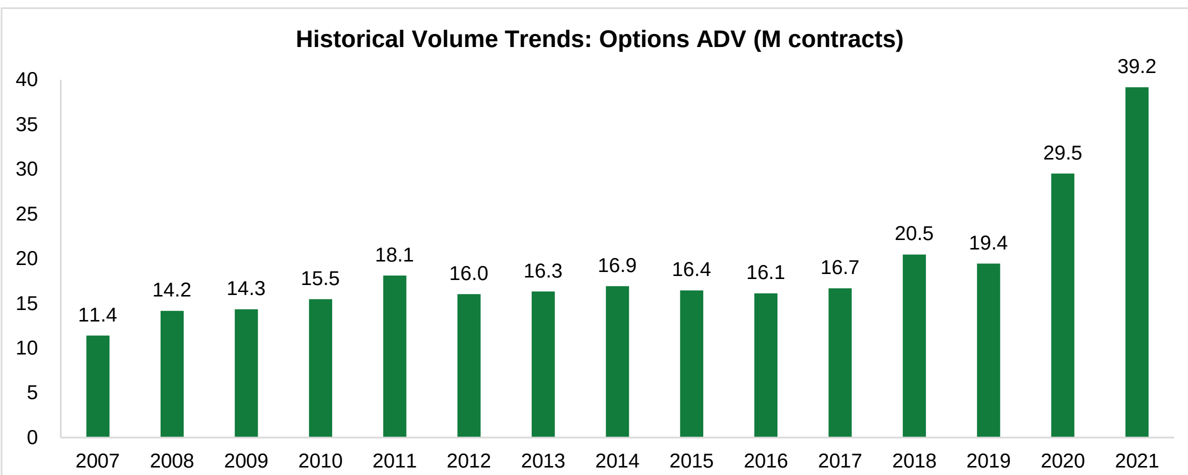




Source: Cboe Global Markets, SIFMA estimates



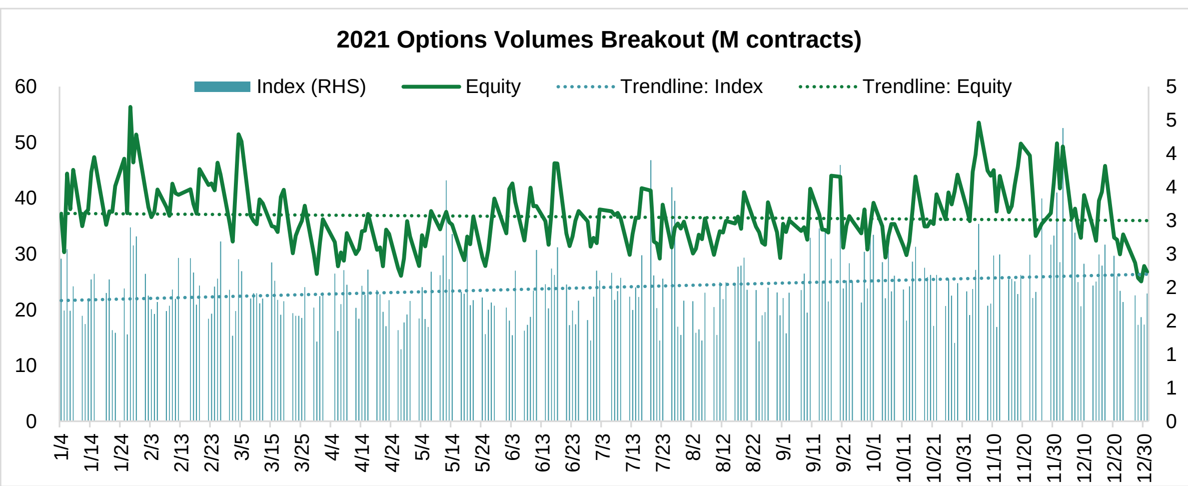
Source: Cboe Global Markets, Bloomberg, SIFMA estimates



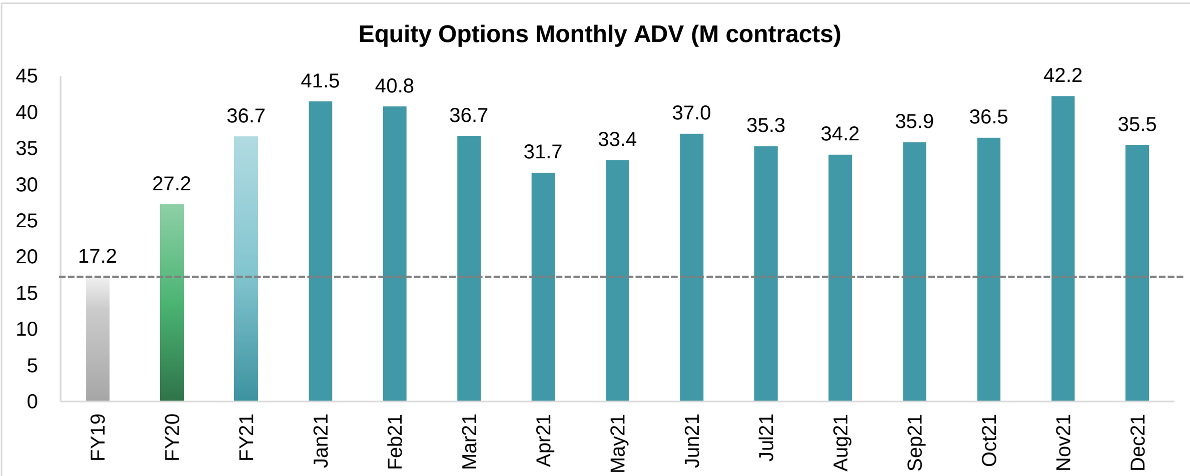
Source: Options Clearing Corporation, SIFMA estimates
Note: Data varies slightly from precious charts given different sources

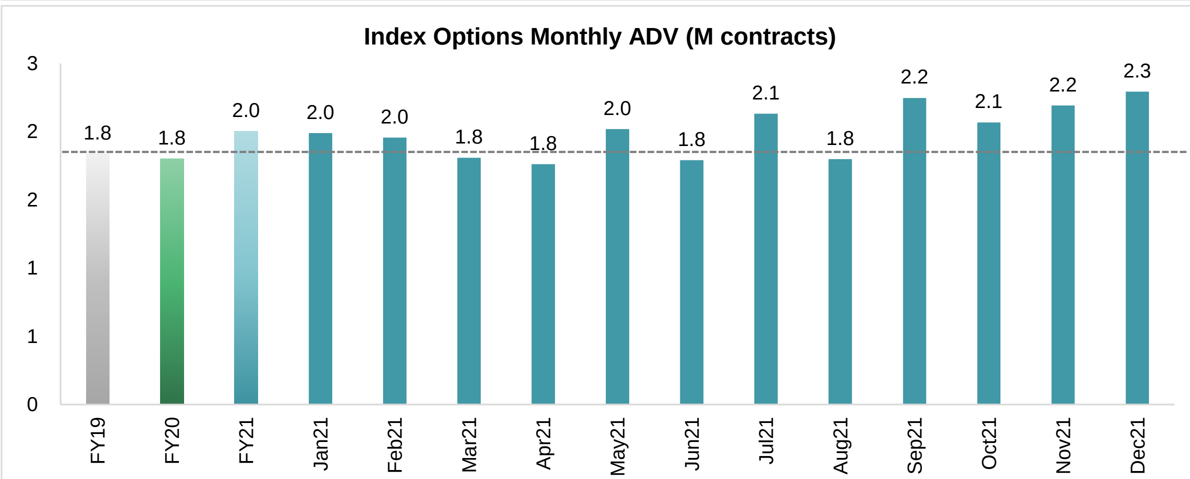
Options Breakout

- Equities Options
  - 2021 average 36.7 million contracts
    - +34.6% Y/Y
    - +113.0% to historical levels
  - 2021 peak 56.4 million contracts on January 27
  - 2021 trough 25.1 million contracts on December 29
  - Monthly trends
    - Highest month 42.2 million contracts in November
    - Lowest month 31.7 million contracts in April
- Index Options
  - 2021 average 2.0 million contracts
    - +11.1% Y/Y
    - +8.9% to historical levels
  - 2021 peak 4.4 million contracts on December 3
  - 2021 trough 1.1 million contracts on April 27
  - Monthly trends
    - Highest month 2.3 million contracts in December
    - Lowest month 1.8 million contracts in April



Source: Cboe Global Markets, SIFMA estimates





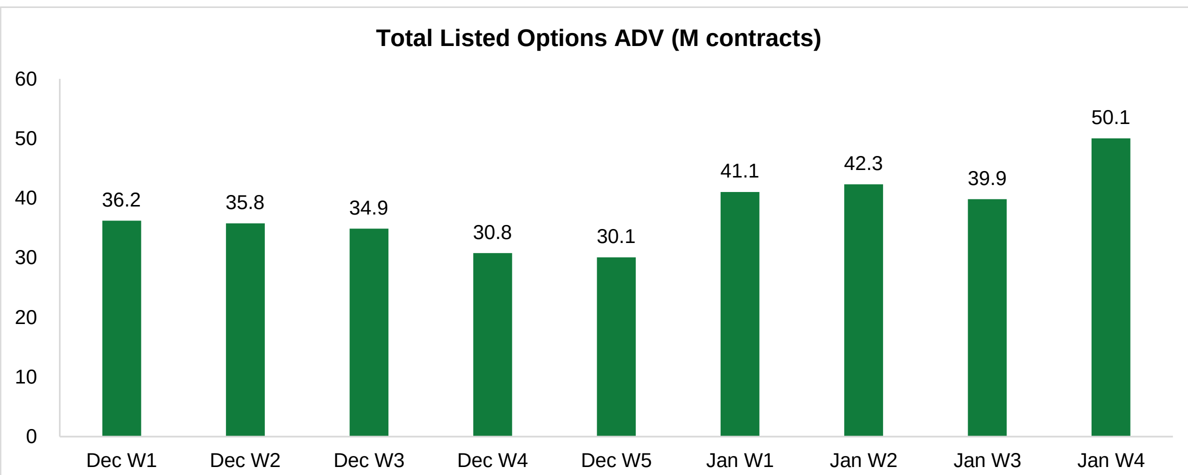
Source: Cboe Global Markets, SIFMA estimates

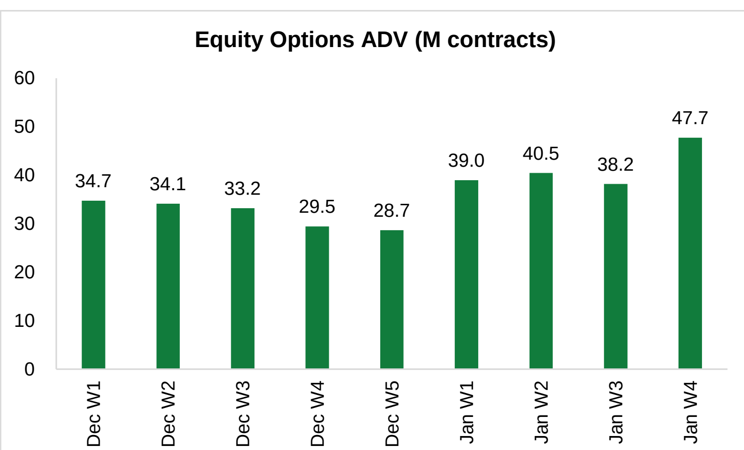
Listed Options Volumes Themes

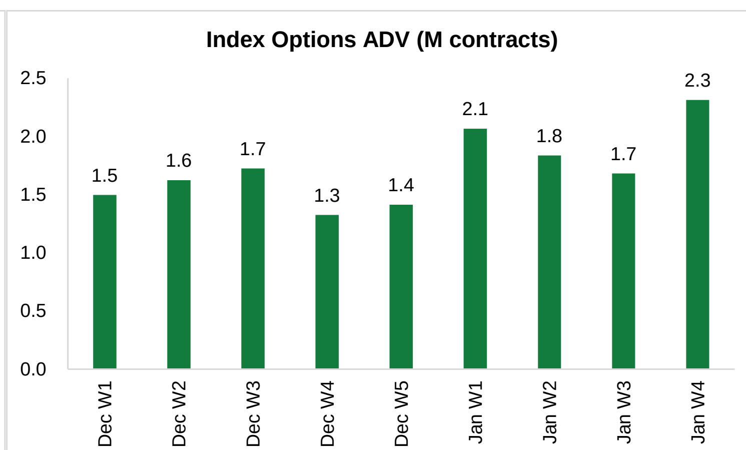
The GameStop Event

As discussed in other sections in this report, the GameStop event created quite an exciting start to 2021 in the listed options markets. Options began January elevated to December, although volumes had decreased from week two to week three. Then the GameStop event occurred in the final week of January. We highlight the trends seen during this week:

- **Total Options**: January week 4 ADV was 50.1 million contracts; +25.6% to week 3, +49.2% to December 2020 weekly average; ended 2021 with ADV of 38.7 million contracts (-22.8%)
- **Equity Options**: January week 4 ADV was 47.7 million contracts; +25.1% to week 3, +49.0% to December 2020 weekly average; ended 2021 with ADV of 36.7 million contracts (-23.2%)
- **Index Options**: January week 4 ADV was 2.3 million contracts; +37.7% to week 3, +52.6% to December 2020 weekly average; ended 2021 with ADV of 2.0 million contracts (-13.4%)



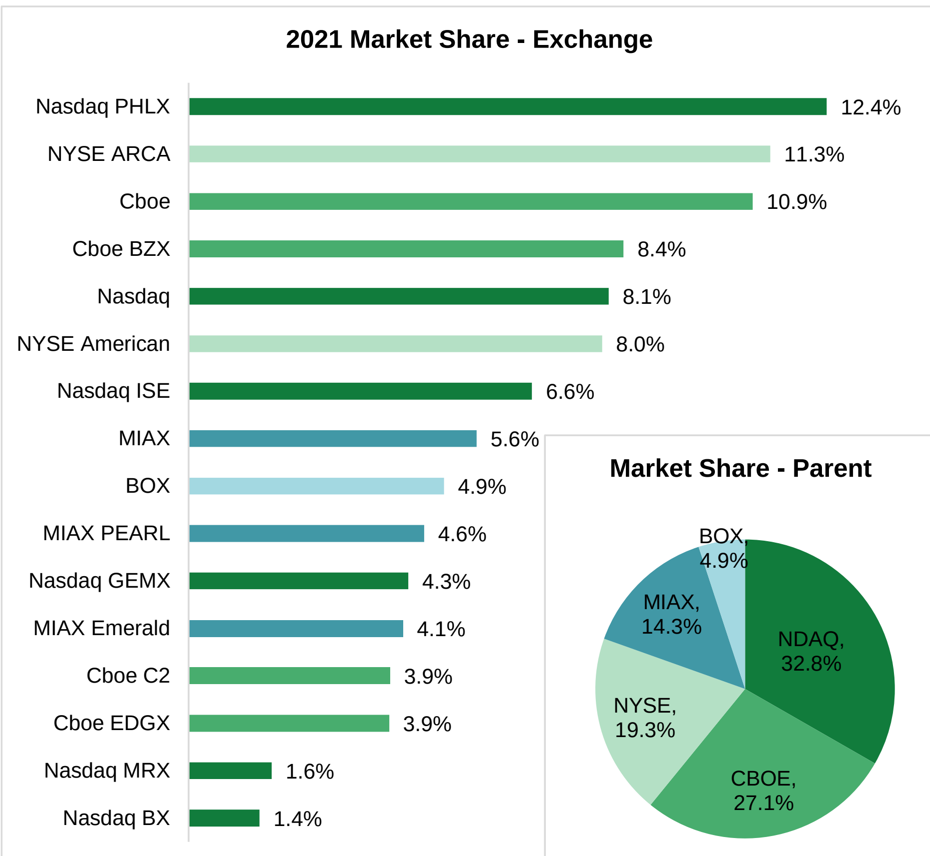




Source: Cboe Global Markets, SIFMA estimates

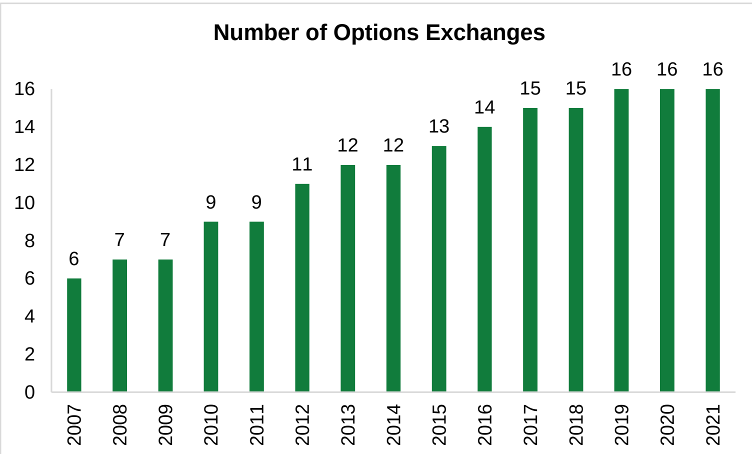
Exchange and Parent Group Market Share

Currently, there are sixteen U.S. multi-listed options exchanges, operating under five parent companies. The Nasdaq PHLX exchange holds the top spot among individual exchange licenses, with a 12.4% market share. Nasdaq also holds the top spot on aggregate, with a cumulative 32.8% share across its six exchanges.



Source: Options Clearing Corporation, SIFMA estimates
Note: Includes activity cleared in OCC's equity option clearing system

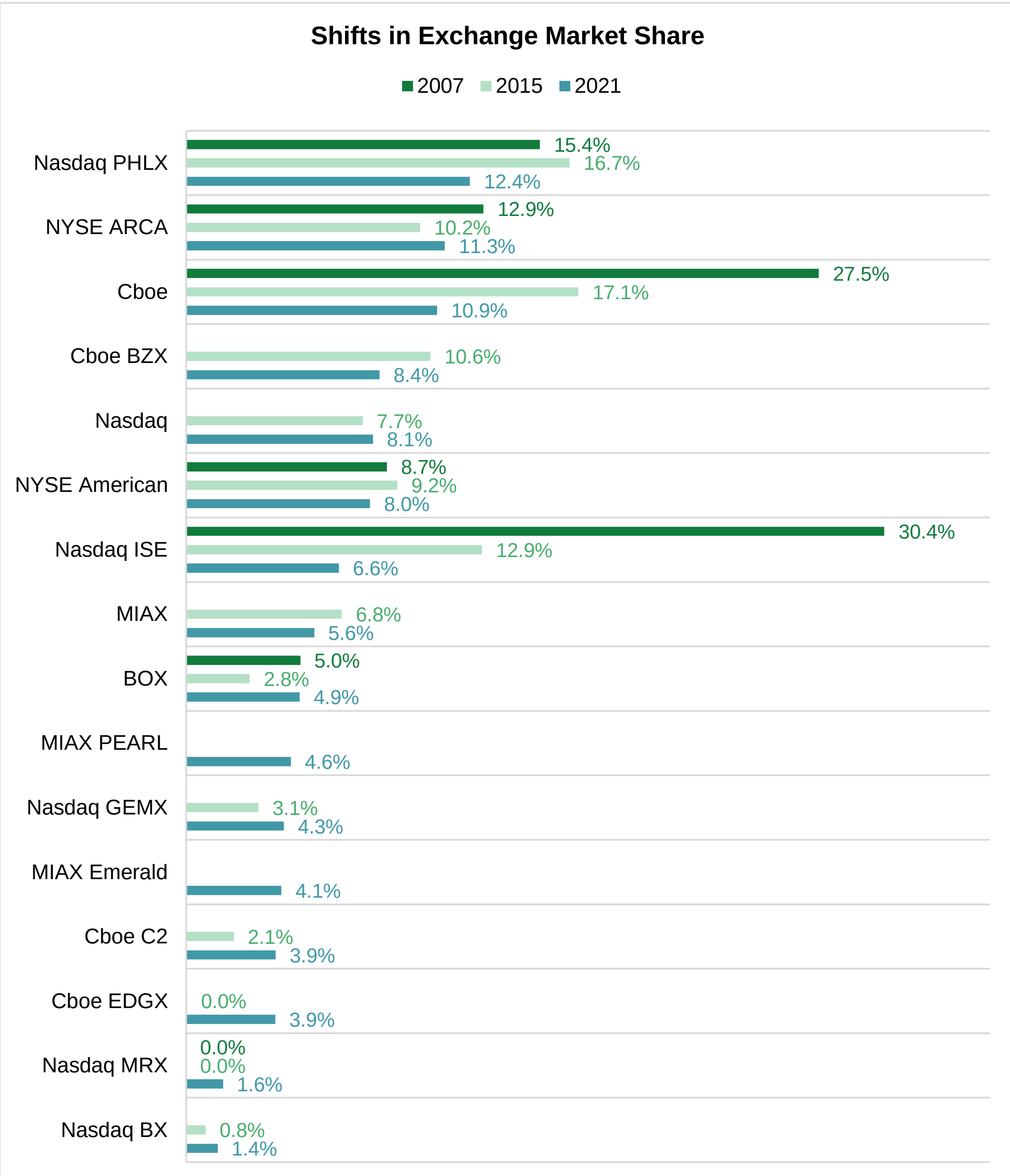
Naturally, there were the same transactions listed in the equities section of this report – NYSE and Arca/American, Nasdaq and PHLX/BX, BATS entrance, etc. We did not see closures, but rather new entrants (BOX in 2004) and more mergers, as Nasdaq bought the three ISE exchange. Additionally, both established players (Cboe) and younger firms (MIAX) opened new exchanges. With all of this action, the exchange total has moved from six in 2007 to sixteen today, +166.7%.



Original Exchange	Current Name	Equities Trading	Options Trading	Notes
Philadelphia Stock Exchange	Nasdaq PHLX/PSX	1790	1975	Bought by Nasdaq in 2007
New York Stock Exchange	NYSE	1792	1985	Traced back to then Buttonwood Agreement, became New York Stock and Exchange Board in 1817
Boston Stock Exchange	Nasdaq BX	1834	2012	Boston Stock Exchange (BX) bought by Nasdaq in 2007
Pacific Exchange	NYSE	1882	1976	Traced back to San Francisco Stock & Bond Exchange and Los Angeles Oil Exchange; bought by Archipelago in 2005, which merged with NYSE in 2006
Chicago Stock Exchange	NYSE Chicago	1882	na	Bought by NYSE in 2018
Cincinnati Stock Exchange	NYSE National	1885	na	Rebranded to National Stock Exchange in 2003; acquired by CBSX in 2011, closed in 2014; bought by NYSE in 2017
American Stock Exchange	NYSE American	1907	1975	Traced back to the curb brokers agreement. Bought by NYSE in 2008
Chicago Board Options Exchange	Cboe	2000s/2017	1973	Options began in 1973; CBOE Stock Exchange (CBSX) founded in 2007 & traded in the 2000s/2010s, acquired National Stock Exchange in 2011 which ceased trading in 2014; re-entered cash equities when bought BATS in 2017
Archipelago	NYSE Arca	1996	1996	Merged with NYSE in 2006
Direct Edge	Cboe EDGA, Cboe EDGX	1998	2015	Direct Edge (EDGX), originally an ECN, bought by BATS in 2014; Cboe acquired these licenses when bought BATS in 2017
International Securities Exchange	Nasdaq ISE	2006/na	2000	ISE Stock Exchange partnership with Direct Edge in 2008; bought by Nasdaq in 2016; no longer trades equities
Boston Options Exchange	BOX	na	2004	Originally a partnership between Montreal Exchange, Boston Stock Exchange & Interactive Brokers
Nasdaq Stock Market	Nasdaq	2005	2008	Began as an electronic stock market in 1971 (National Association of Securities Dealers Automated Quotations)
BATS	Cboe BYX, Cboe BZX	2005	2010	Better Alternative Trading System (BATS) began as an ECN, exchange license in 2008; bought by Cboe in 2017
C2 Options Exchange	Cboe C2	na	2010	
MIAX	MIAX	na	2012	
ISE Gemini	Nasdaq GEMX	na	2013	Bought by Nasdaq in 2016
ISE Mercury	Nasdaq MRX	na	2016	Bought by Nasdaq in 2016
Investors Exchange	IEX	2016	na	
MIAX Pearl	MIAX Pearl	2020	2017	
MIAX Emerald	MIAX Emerald	na	2019	
Members Exchange	MEMX	2020	na	
Long-Term Stock Exchange	LTSE	2020	na	

Source: Company websites, OCC, SIFMA estimates (some dates are estimated)

Given the changing landscape, market shares by individual exchange have shifted substantially since 2007. For example, formerly leading exchange ISE – now owned by Nasdaq – saw its market share decrease by 23.8 pps since 2007. Similarly, Cboe has lost 16.6 pps and PHLX 3.0 pps.



Source: Cboe Global Markets, SIFMA estimates

Looking at the mergers more closely, it is a mixed bag of whether the deals led to market share gainers or losers: five deals resulted in higher market share today and five now post lower market shares. Even deals occurring in the same time period with the same parent company show mixed results. For example, Nasdaq PHLX now has a lower market share, versus Nasdaq BX now has a higher market share that at the time of the deal (both occurred in 2007).

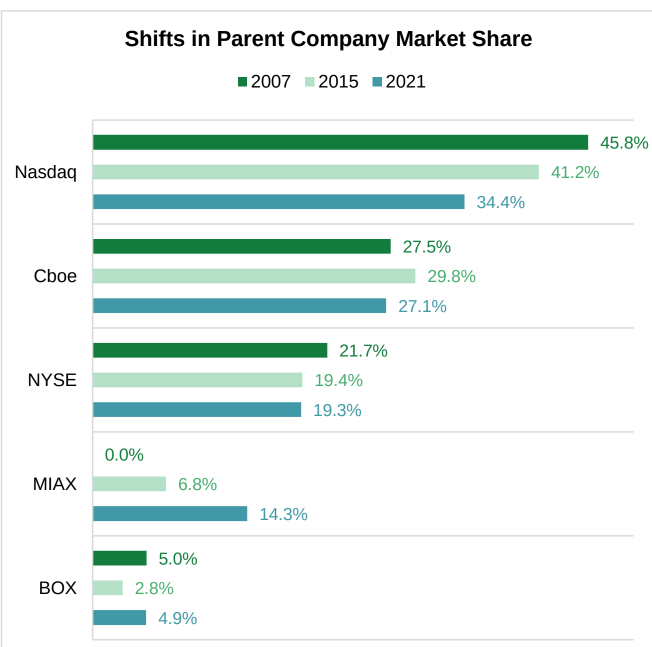
	M&A Year		+1 Year	2021	Average
NYSE Arca	2006	na	12.9%	11.3%	11.2%
NYSE American	2007	8.7%	6.1%	8.0%	10.0%
Nasdaq PHLX	2007	15.4%	16.4%	12.4%	17.2%
Nasdaq BX	2007	0.0%	0.0%	1.4%	0.7%
Cboe EDGX (BATS)	2014	0.0%	0.04%	3.9%	2.3%
Nasdaq ISE	2016	12.6%	9.0%	6.6%	16.0%
Nasdaq GEMX	2016	2.5%	5.2%	4.3%	3.7%
Nasdaq MRX	2016	0.2%	0.2%	1.6%	0.5%
Cboe BZX	2017	11.1%	9.2%	8.4%	7.2%
Cboe EDGX	2017	1.4%	2.6%	3.9%	2.3%

Source: Cboe Global Markets, SIFMA estimates

Note: na = data not available. Nasdaq did not launch options on BX until 2012. Direct Edge (EDGX) did not launch options until 2015. EDGX was in play two times: bought by BATS in 2014 and then Cboe bought BATS in 2017

We also highlight the following trends on a parent company basis:

- **Nasdaq** (6 exchanges): -11.4% pps from 2007 to 2021 (45.8% share in 2007, 34.4% in 2021)
- **Cboe** (4 exchanges): essentially flat from 2007 to 2021 (27.5% share in 2007, 27.1% in 2021); -6.5 pps from its peak in 2017 of 33.6%
- **NYSE** (2 exchanges): -2.4 pps from 2007 to 2021 (21.7% share in 2007, 19.3% in 2021)
- **MIAX** (3 exchanges)**:** Conversely, "newcomer" MIAX has grown share; +13.2 pps from 2013 to 2021 (1.1% share in 2013 when it became fully operational, 14.3% in 2021)



Source: Cboe Global Markets, SIFMA estimates

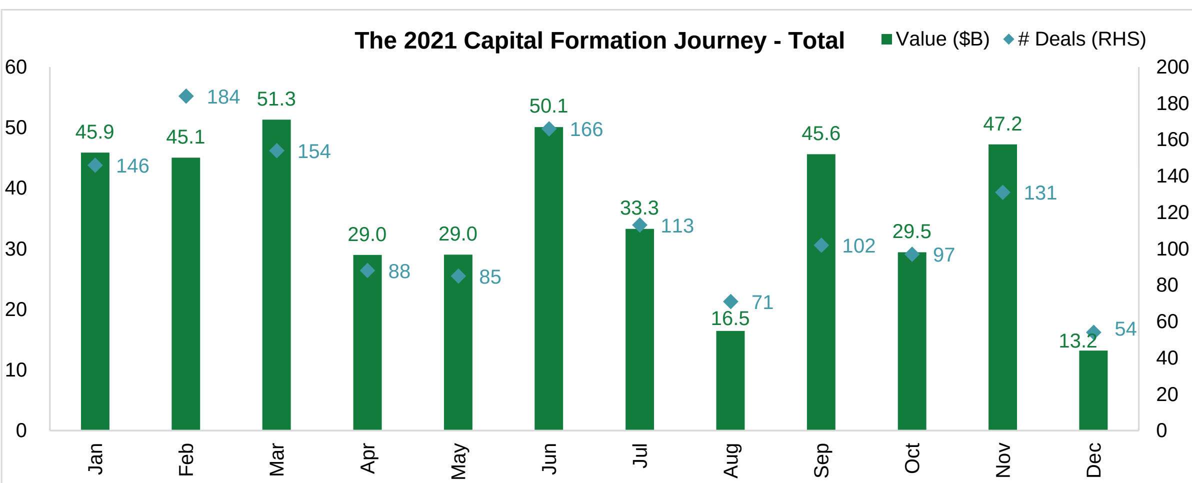
Capital Formation Metrics

Equity capital formation had another strong year in 2021, with (excluding SPACs): total deal value $435.8 billion, +11.6% Y/Y; secondaries $224.7 billion, -13.0% Y/Y, IPOs $153.1 billion, +79.2% Y/Y; and preferreds $58.0 billion, +24.4% Y/Y. The IPO result comes on top of a robust year in 2020 ($85.4 billion, +75.1%). These two strong years for IPOs reverse the long-term decline seen since the early 2000s. In fact, the $153 billion last year significantly beats the 1999 and 2000 peak years of around $107 billion. We have also seen a reversal in the trend for number of listed companies, ending the year at 6,203 (+20.2% Y/Y). The 6,000 level has not been seen since 2002.

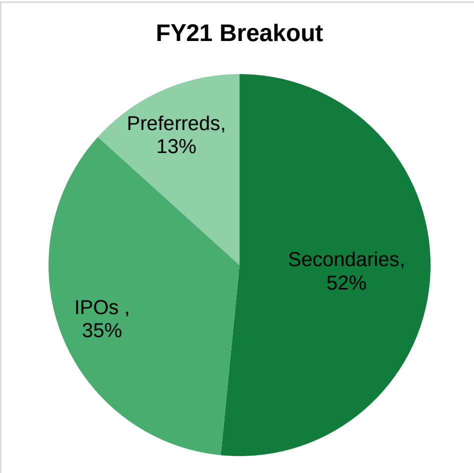
We highlight the following trends:

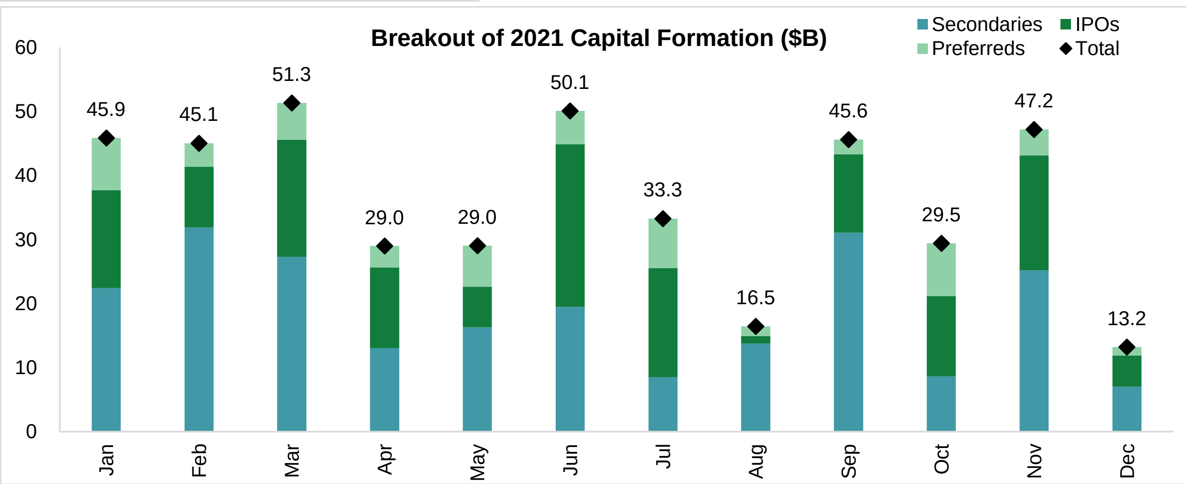
Total Issuance

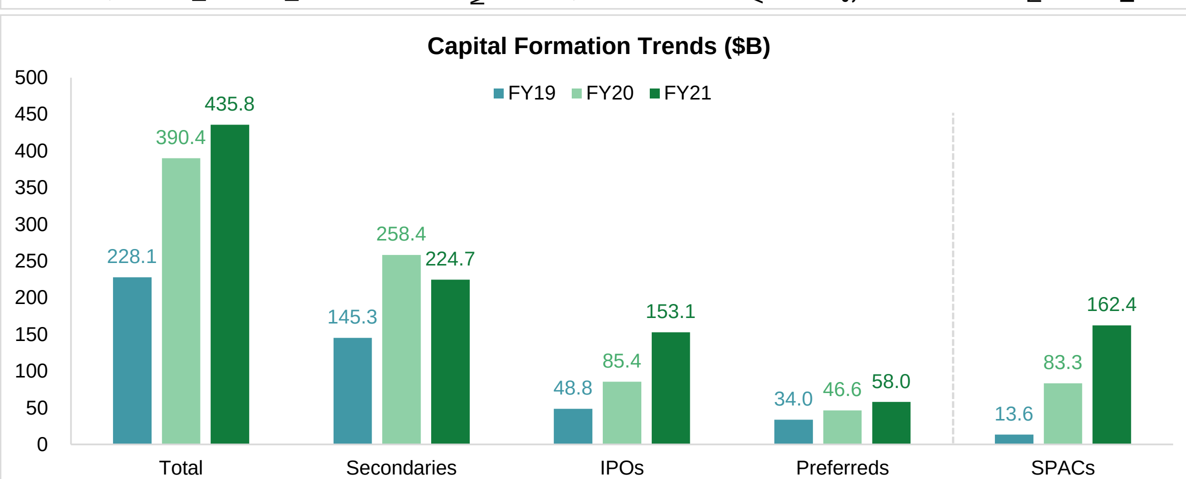
- 2021 total deal value $435.8 billion, +11.6% Y/Y
- Monthly deal value trends
  - Average monthly level $36.3 billion
  - Highest month $51.3 billion in March
  - Lowest month $13.2 billion in December
- 2021 total number of deals 1,391, +20.2% Y/Y
- Monthly number of deals trends
  - Average monthly level 116
  - Highest month 184 in February
  - Lowest month 54 in December
- Breakout of total capital formation: Secondaries 52%, IPOs 35%, and preferreds 13%



Source: Dealogic
Note: Includes rank eligible deals; excludes BDCs, SPACs, ETFs, CLEFs and rights offers





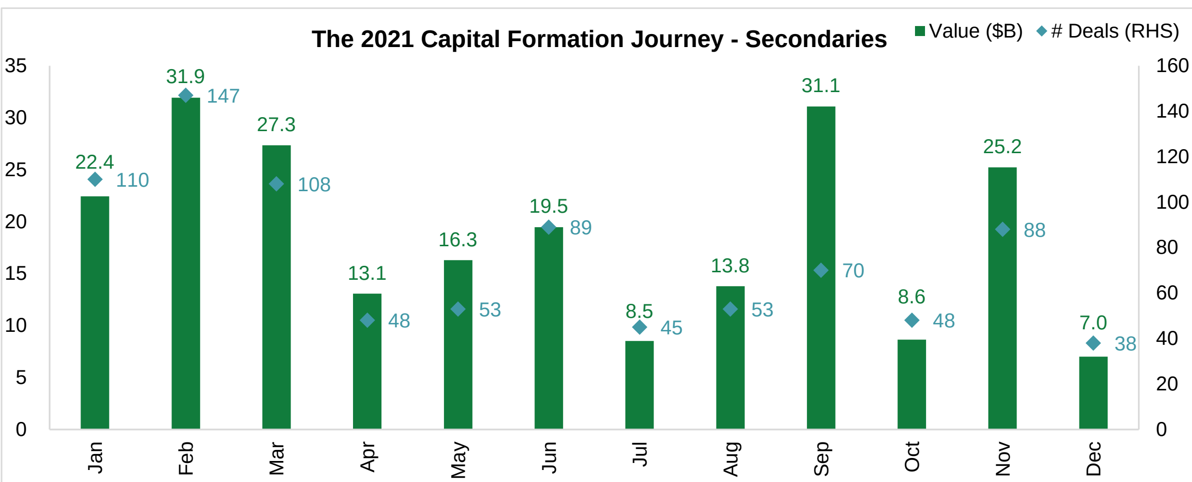


Source: Dealogic

Note: Total, secondaries, IPOs, and preferreds include rank eligible deals and exclude BDCs, SPACs, ETFs, CLEFs and rights offers. SPAC value not included in the total value.

Secondary Issuance

- 2021 total deal value $224.7 billion, -13.0% Y/Y
- Monthly deal value trends
  - Average monthly level $18.7 billion
  - Highest month $31.9 billion in February
  - Lowest month $7.0 billion in December
- 2021 total number of deals 897, +3.9% Y/Y
- Monthly number of deals trends
  - Average monthly level 75
  - Highest month 147 in February
  - Lowest month 38 in December

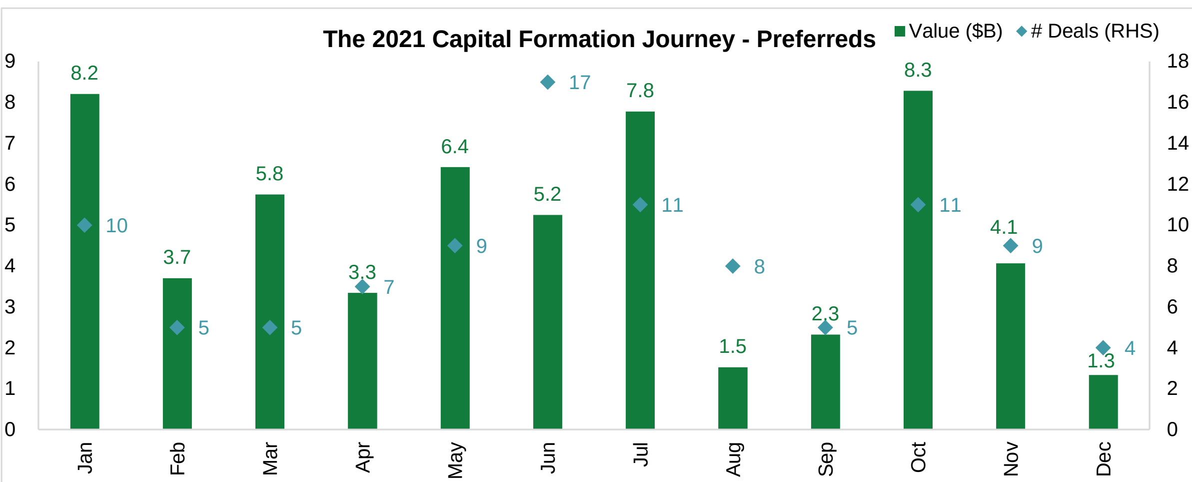


Source: Dealogic

Note: Includes rank eligible deals; excludes BDCs, SPACs, ETFs, CLEFs and rights offers

Preferreds Issuance

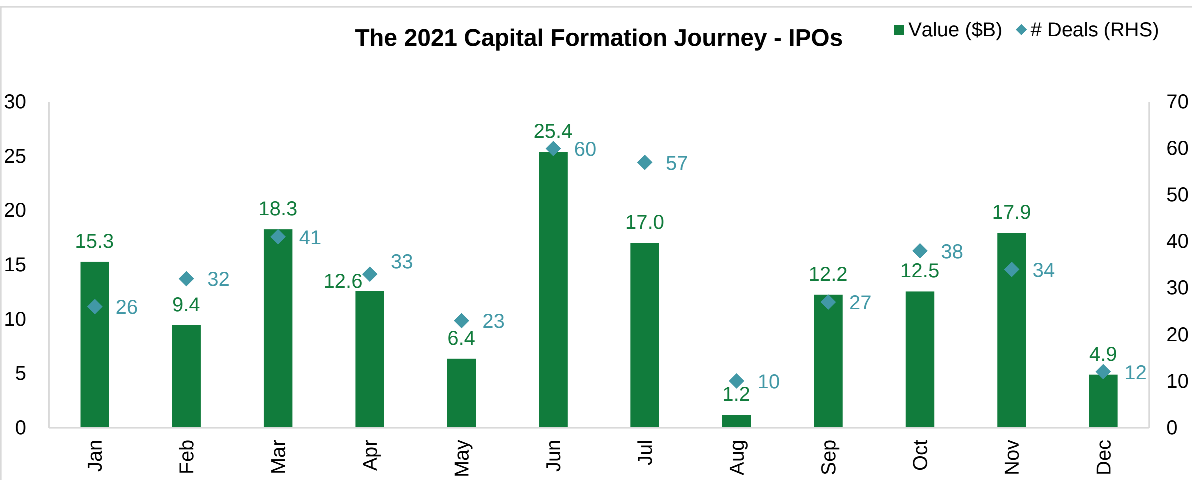
- 2021 total deal value $58.0 billion, +24.4% Y/Y
- Monthly deal value trends
    - Average monthly level $4.8 billion
    - Highest month $8.3 billion in October
    - Lowest month $1.3 billion in December
- 2021 total number of deals 101, +18.8% Y/Y
- Monthly number of deals trends
    - Average monthly level 8
    - Highest month 17 in June
    - Lowest month 4 in December

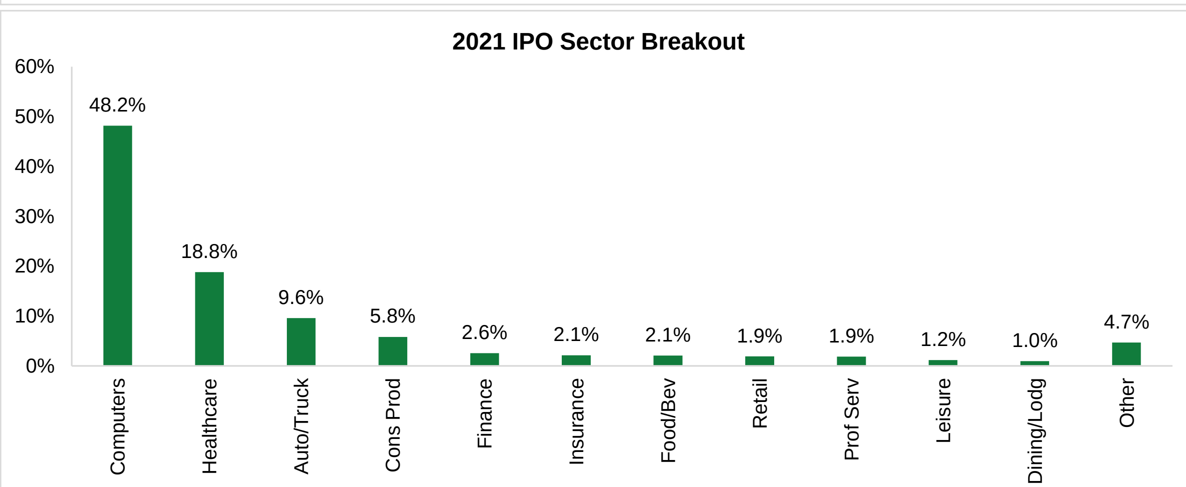


Source: Dealogic
Note: Includes rank eligible deals; excludes BDCs, SPACs, ETFs, CLEFs and rights offers

IPO Issuance

- 2021 total deal value $153.1 billion, +79.2% Y/Y
- Monthly deal value trends
  - Average monthly level $12.8 billion
  - Highest month $25.4 billion in June
  - Lowest month $1.2 billion in August
- 2021 total number of deals 393, +88.0% Y/Y
- Monthly number of deals trends
  - Average monthly level 33
  - Highest month 60 in June
  - Lowest month 10 in August
- Sector Breakout: Computers and electronics dominated at 48.2%, followed by healthcare at 18.8% and auto/truck at 9.6%

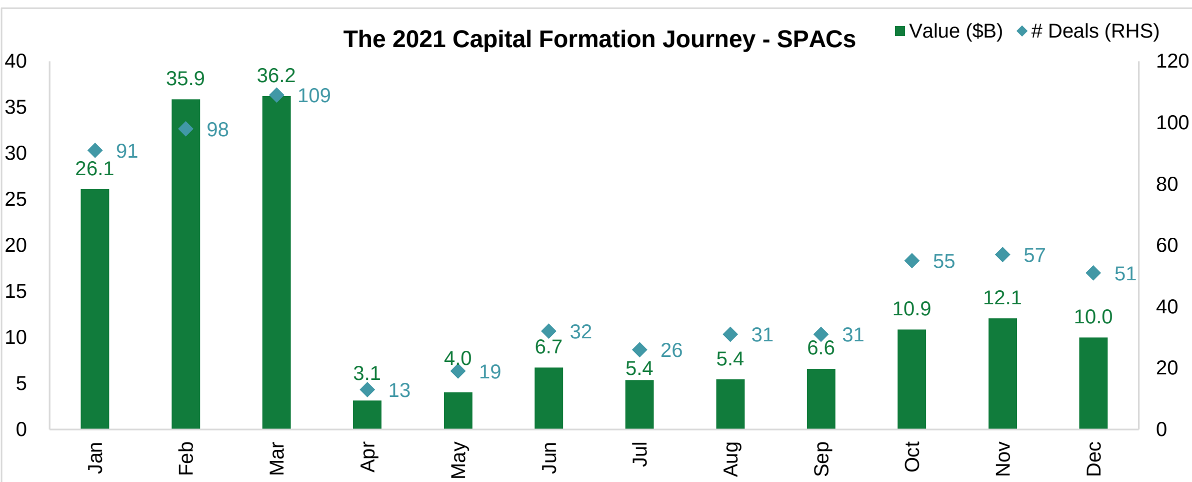




Source: Dealogic, SIFMA estimates
Note: Includes rank eligible deals; excludes BDCs, SPACs, ETFs, CLEFs and rights offers. Computers = computers & electronics; cons prod = consumer products; food/bev = food & beverage; prof serv = professional services; leisure = leisure & recreation; dining/lodg = dining & lodging; other = machinery, publishing, agribusiness, defense, mining, construction/building, oil & gas, telecommunications, chemicals, textile, metal & steel, transportation, utility & energy, and real estate/property

SPAC Issuance

- 2021 total deal value $162.4 billion, +94.9% Y/Y
- Monthly deal value trends
  - Average monthly level $13.5 billion
  - Highest month $36.2 billion in March
  - Lowest month $3.1 billion in April
- 2021 total number of deals 613, +147.2% Y/Y
- Monthly number of deals trends
  - Average monthly level 51
  - Highest month 109 in March
  - Lowest month 13 in April



Source: Dealogic
Note: Includes rank eligible BCC/SPAC deals; SPAC totals are separate from the IPO/secondaries/total capital formation figures discussed above

Capital Formation Themes

Historical Trends

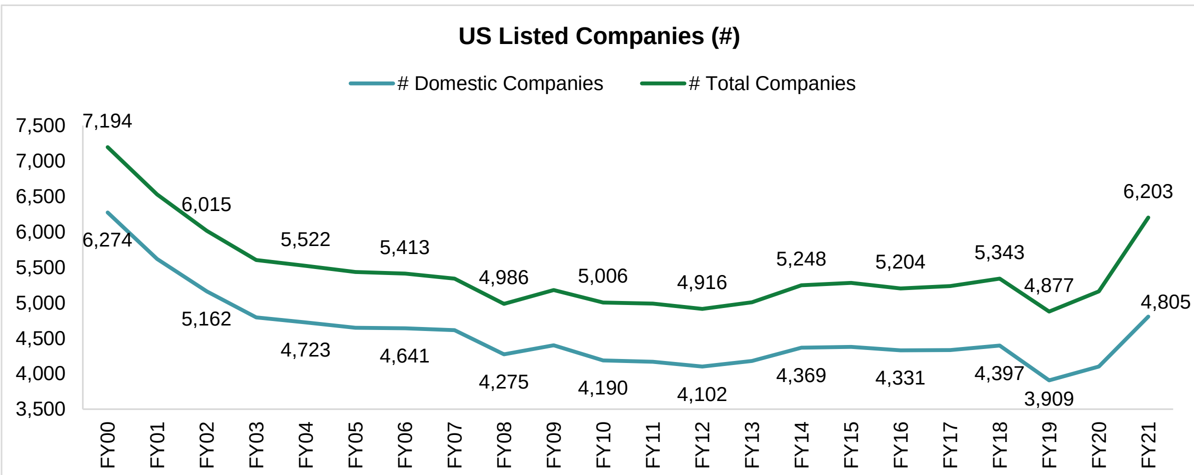
With two solid years of issuance, could we be seeing the rebirth of capital formation? IPOs had a banner year in 2021:

- 2021 deal value $153.1 billion, +79.2% Y/Y
- Far surpassed the prior peak of around $107 billion in 1999/2000 by 43.0%
- 2020 deal value $85.4 billion, +75.1%

Source: Dealogic
Note: Includes rank eligible deals; excludes BDCs, SPACs, ETFs, CLEFs and rights offers

Given two strong years of IPOs, the number of listed companies has also returned to peak territory:

- 2021 total listed companies 6,203
    - Down 13.8% from the 2000 peak
    - Up 27.2% from the 2019 trough
- 2021 total domestic listed companies 4,805
    - Down 23.4% from the 2000 peak
    - Up 22.9% from the 2019 trough



Source: World Federation of Exchanges
Note: FY21 is preliminary

SPACs vs. IPOs

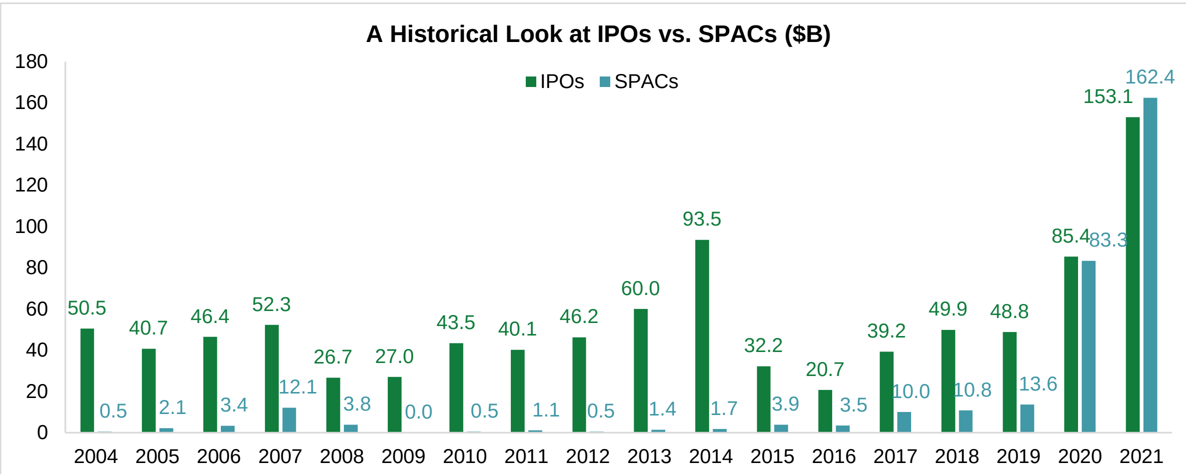
Both IPOs and SPACs have had two very strong years during the COVID era. In terms of eye-popping figures, SPACs are beating out IPOS. SPACs grew over 500% in 2020 and then another 95% in 2021; 2021 deal value is +1,844% to the pre-COVID 5-year average. We have also seen a closing of the IPO to SPAC ratio, to ~1x in in 2021 and 202 versus 5.3x the 5-year pre COVID average and 77.4x the 2004-2019 average.

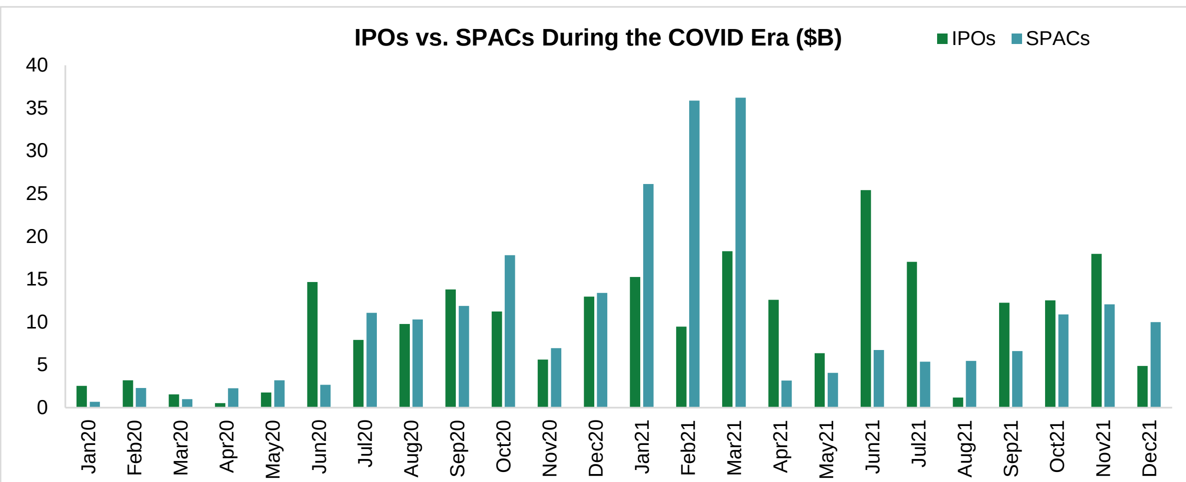
While it is interesting to see the spread closure, we also note that SPACs are not replacing IPOS, as shown by IPO issuance setting a new historical high last year ($153 billion is +43% to the prior peak of around $107 billion in 1999/2000).

- IPO: 2021 total deal value $153.1 billion
  - vs. $85.4 billion in 2020, +79.2% Y/Y
  - vs. a 5-year average of $38.2 billion, +8.7% CAGR (5 years prior to COVID)
- SPAC: 2021 total deal value $162.4 billion
  - vs. $83.3 billion in 2020, +94.9% Y/Y
  - vs. a 5-year average of $8.4 billion, +28.4% CAGR (5 years prior to COVID)
- IPO/SPAC Ratio: 0.94x in 2021
  - vs. 5.27x 5-year average (5 years prior to COVID)
  - vs. 77.35x average from 2004-2019 (years prior to COVID)

	IPO	SPAC
Deal Value ($B)		
2021	153.1	162.4
to 5-Y Avg	301.3%	1844.3%
2020	85.4	83.3
to 5-Y Avg	123.9%	897.6%
5-Year Avg (pre COVID)	38.2	8.4
Y/Y Change		
2021	79.2%	94.9%
2020	75.1%	513.1%
5-Year CAGR (pre COVID)	8.7%	28.4%
IPO/SPAC		
2021	0.94x	
2020	1.03x	
5-Year Avg (pre COVID)	5.27x	
2004-2019 Avg (pre COVID)	77.35x	

Source: Dealogic, SIFMA estimates





Source: Dealogic
Note: From 1990 to 2003, there was only $0.2 billion cumulative SPAC issuance

Looking to 2022: Market Structure Survey

As market participants continue to search for the new normal, we once again thought it would be interesting to survey our equity markets and listed options trading committees, as well as representatives of U.S. equity and multi-listed options exchanges. We questioned survey respondents about where they saw 2022 market metrics heading, as well as their views on retail investor participation.

This section analyzes those results. (Please note that the survey was conducted before the geopolitical events involving Russia and Ukraine began.)

Comparing the Current and Previous Survey

Before we dive into the results in detail, we compare this year's and last year's survey responses. We highlight the following:

- **VIX** – The top response was still a high teens-low 20s level, but the conviction came down to 49.0% of responses this year versus 62.5% last year.
- **Equity ADV** – The top response was still around 10 billion shares, but the conviction came down to 74.0% of responses this year versus 83.9% last year.
- **Listed Options ADV** – The top response changed to the mid-high 30s (52.1% of responses) from high 20s-low 30s last year (56.3% of responses).
- **Markets** – This section had another big change from the last survey. This year there was a tie at the top between continue to expand but at a slower pace and decline somewhat (38.0% of responses each). Whereas last year the top response was continue to expand but at a slower pace (56.3% of responses).
- **Retail Investors** –
    - Equities: estimated at 20-30% both years, but with lower conviction this year (now 58.3% of responses versus 84.4% last year)
    - Options: changed to an estimate of 30-40% from 20-30% last year (48.9% and 31.0% of responses respectively)
    - Participation: $0 commissions moved to the top of factors for both growth and maintenance of retail investor participations (#3 for each last year)

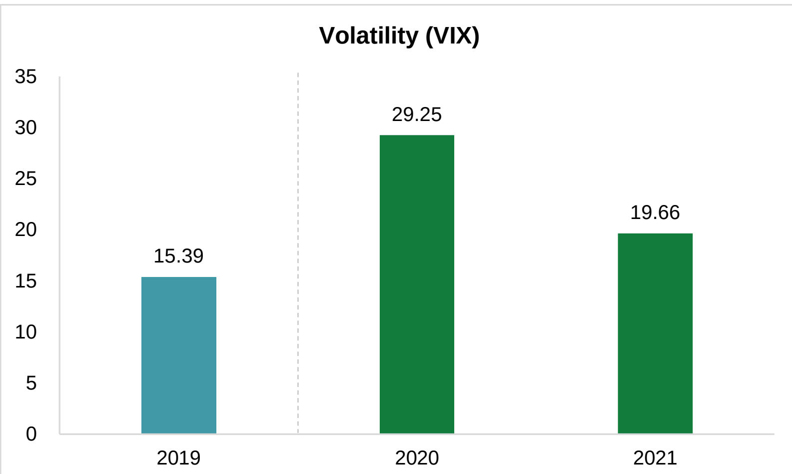
Survey Question	2022 Survey	2021 Survey
Survey Populated	January 4-21	April 16-30
Respondents: # / unique firms	67 / 40	47 / 25
Volatility & Volumes		
What do you expect to be the new normal for:		
--The VIX	High teens-low 20s (49.0% responses); 8.2% expect a return to historical levels	High teens-low 20s (62.5% responses); 6.3% expect a return to historical levels
--Equity ADV	~10B shares (74.0% responses); 10.0% expect a return to historical levels	~10B shares (83.9% responses); 6.5% expect a return to historical levels
--Off-exchange trading as a percent of total equity volumes	Low 40% range (51.9% responses); 11.5% expect a return to historical levels	Low 40% range (56.3% responses); 15.6% expect a return to historical levels
-- Listed Options ADV	Mid-high 30s M contracts (52.1% responses); 4.2% expect a return to historical levels	High 20s-low 30s M contracts (77.4% responses); 0% expect a return to historical levels
Markets		
Do you expect markets (S&P 500) to?	Continue to expand but at a slower pace & decline somewhat (both 38.0% of responses)	Continue to expand but at a slower pace (56.3% responses)
Top risks to markets on the upside?	Fed policy (rates, getting it right), COVID under control (endemic), managing inflation	Controlling COVID, accommodating monetary policy/low rates, stimulus, retail participation (liquidity)
Top risks to markets on the downside?	Runaway inflation, Fed policy (rates, doing it wrong), market regulation (unintended consequences)	Runaway COVID, reversing monetary policy/raising rates, inflation, higher taxes, retail participation (increased regulation)

Survey Question	2022 Survey	2021 Survey
Retail Investor Participation		
Percent equities volumes were retail trades?	20-30% (58.3% responses)	20-30% (84.4% responses)
Expect this percentage for equities to?	Decrease somewhat (43.8% responses)	Decrease somewhat (43.8% responses)
Percent listed options volumes were retail trades?	30-40% (48.9% responses)	20-30% (31.0% responses)
Expect this percentage for listed options to?	Decrease somewhat (36.7% responses)	Decrease somewhat (41.9% responses)
Factors contributing to the increase?	$0 commissions, technology/access to platforms, continued work from home	Lockdowns/staying at home, technology/access to platforms, $0 commissions
Factors important to maintaining participation?	Maintaining $0 commissions, positive investing experience, continued upward momentum in markets	Continued upward momentum in markets, positive investing experience, maintaining $0 commissions

Volatility Survey Results

Will volatility decrease further once we get through the inflation and supply chain issues? Or have other structural shifts in the market permanently lifted the historical volatility range?

A Historical Comparison:

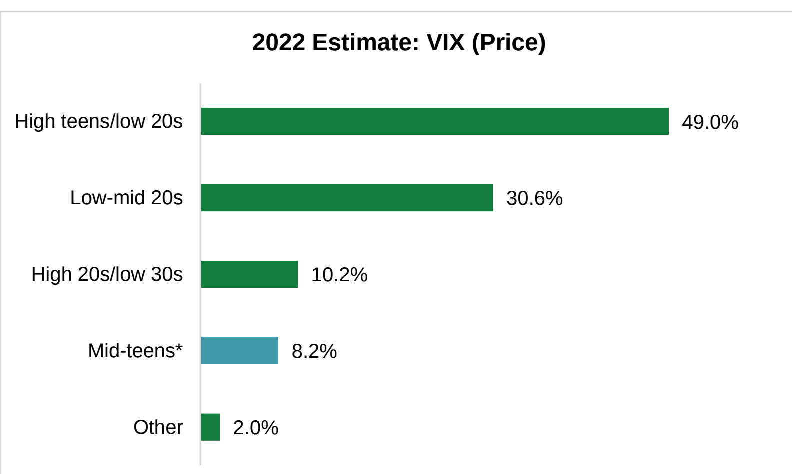


Source: Bloomberg, SIFMA estimates

Survey Question: What do you expect to be the new normal in 2022 for the VIX?

Majority Says? The majority of respondents, 49.0%, expect the VIX to remain in the high teen/low 20s range. Depending on what the actual number is in this range, this would represent a +17%-43% increase to historical levels (using 18 as the low and 22 as the high, average +30%).

Return to Historical Levels? Very few respondents (8.2%) expect a return to historical levels.

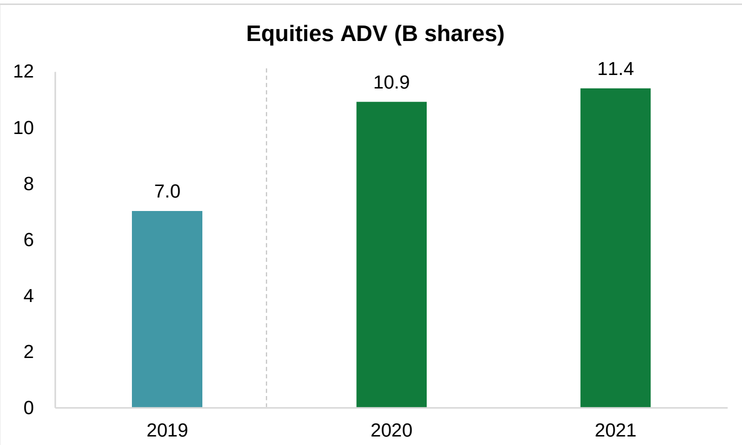


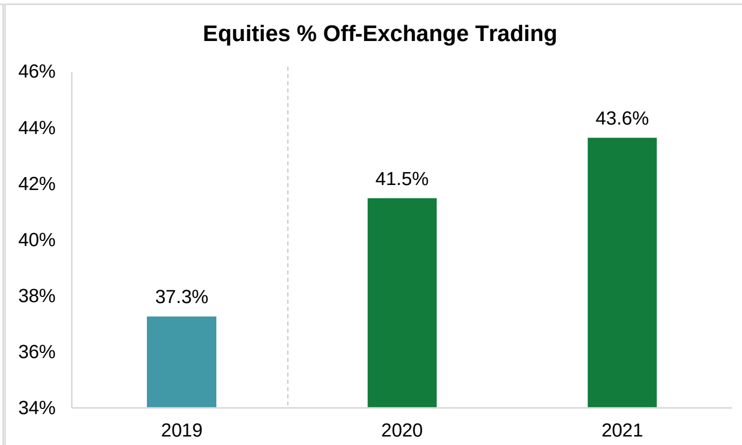
Source: SIFMA market structure survey (* = historical average)

Equity Volumes (ADV) Survey Results

Much of the 2020/2021 equity volume increase has been attributed to continued retail investor participation, but will these investors remain in the market for the long run? For off-exchange trading, will it remain at these elevated levels?

A Historical Comparison:





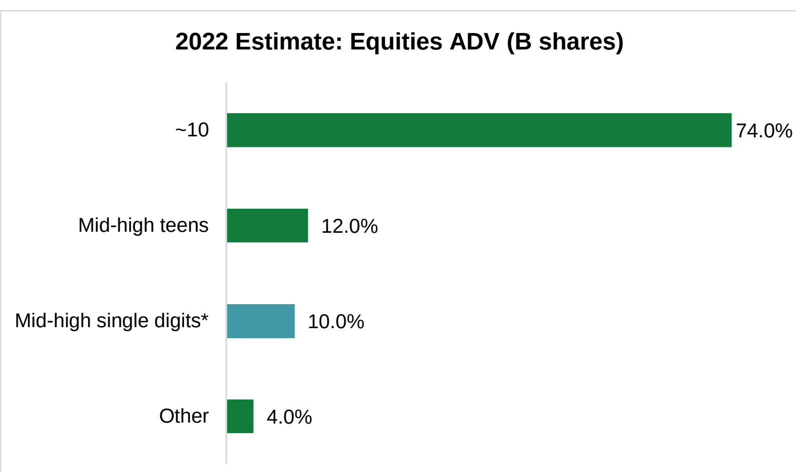
Source: Bloomberg, SIFMA estimates

Survey Question: What do you expect to be the new normal in 2022 for: (A) equity ADV? (B) off-exchange trading?

Equity ADV

Majority Says? The majority of respondents expect equities ADV to remain in the 10 billion shares level (74.0% of respondents). This would be a 43% increase to historical levels, yet a normalization to the high levels seen at the start of last year.

Return to Historical Levels? Very few respondents expect a return to historical levels (10.0%).

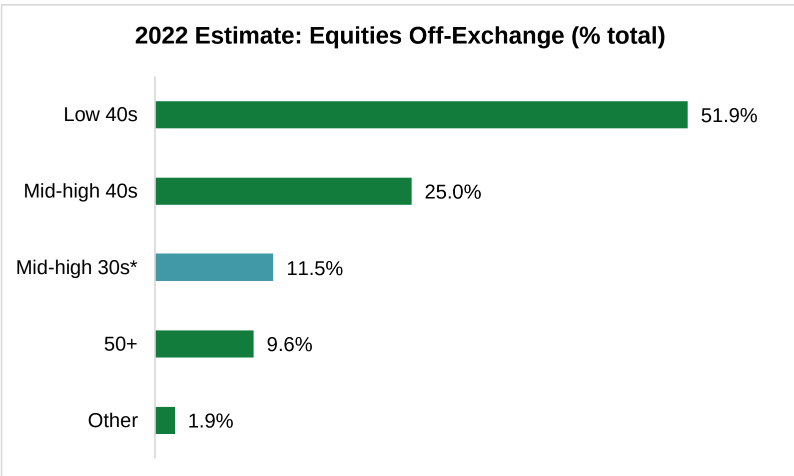


Source: SIFMA market structure survey (* = 2019 average)

Off-Exchange Trading

Majority Says? 51.9% of respondents expect off-exchange trading to be in the low 40 percent levels, with 25.0% expecting a more elevated mid to high 40 percent range.

Return to Historical Levels? A few respondents (11.5%) expect a return to historical levels.

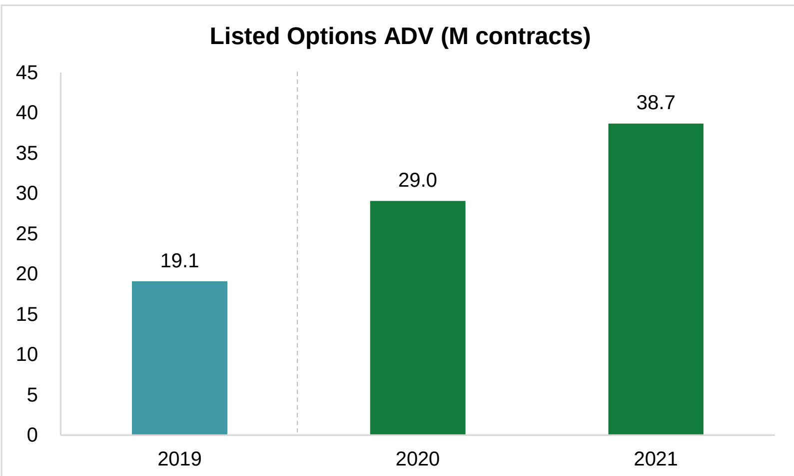


Source: SIFMA market structure survey (* = 2019 average)

Listed Options Volumes (ADV) Survey Results

Much of the 2020/2021 total multi-listed options volume increase has been attributed to the growth in retail investing, but will these investors remain in the market for the long run?

A Historical Comparison:

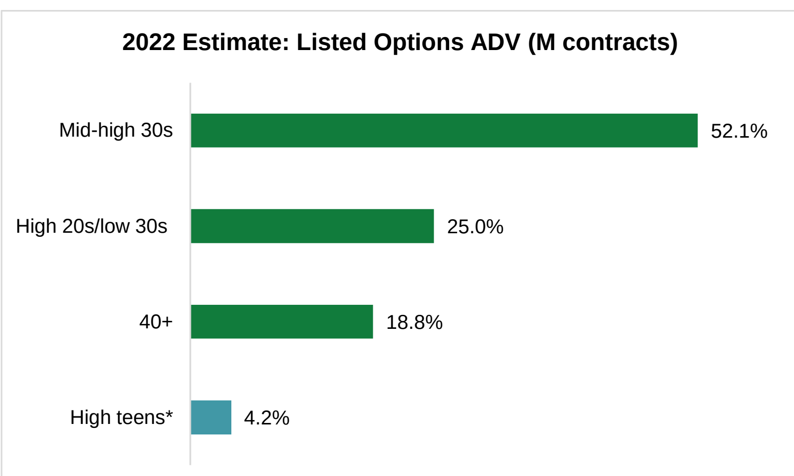


Source: Bloomberg, SIFMA estimates

Survey Question: What do you expect to be the new normal in 2022 for total listed options ADV?

Majority Says? Estimates have increased for this year, with 52.1% of respondents now expecting listed options ADV to be in the mid-high 30s range. Depending on what the actual number is in this range, this would represent an 83%-99% increase to historical levels (using 35 as the low and 38 as the high, average +91%).

Return to Historical Levels? 4.2% of respondents expect a return to historical levels.



Source: SIFMA market structure survey (* = 2019 average)

Market Performance Survey Results

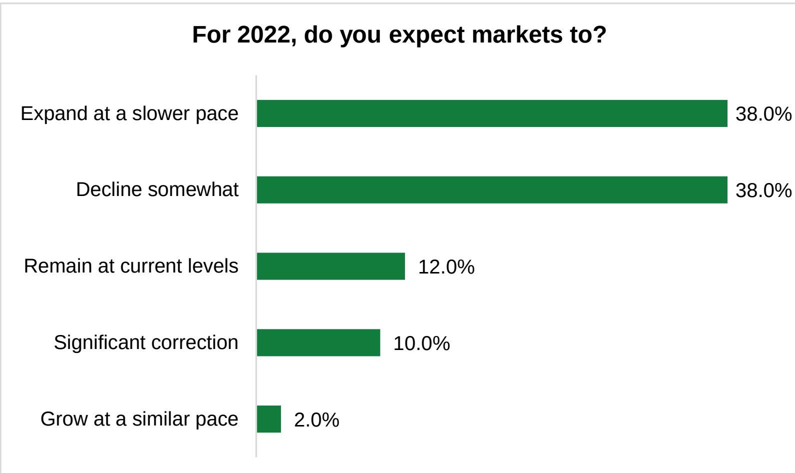
For simplicity's sake, we asked respondents about markets as a whole, not by specific index. This means the responses include all sectors (technology, consumer discretionary, etc.), all company sizes (small, mid and large cap) and all regions of company operations (domestic versus international exposure). Last year markets kept climbing higher, albeit at a slower pace. Will markets keep running (they have not fared well in January of this year)? What are the risks to market performance, on the up and downside?

A Historical Comparison:

Source: Bloomberg, SIFMA estimates

Survey Question: For 2022, do you expect markets to? (Respondents were asked to use the S&P 500 as the proxy for markets.)

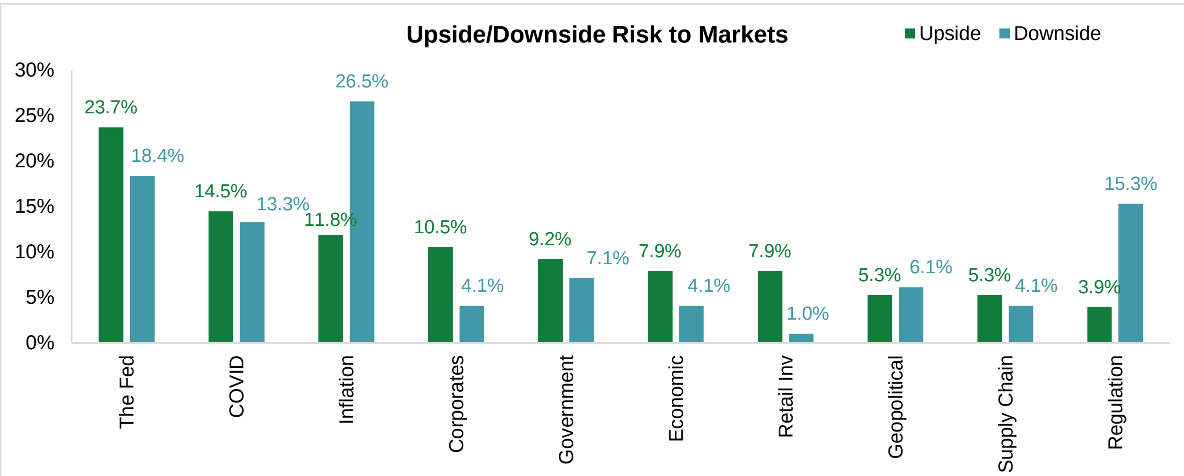
Majority Says? In this year's survey, respondents were split on market direction. While 38.0% of respondents expect markets to continue to expand but at a slower pace, another 38.0% expect markets to decline somewhat.



Source: SIFMA market structure survey

Survey Question: What do you see as the top three risks to markets in 2022 on the: (A) Upside? (B) Downside?

Majority Says?



Source: SIFMA market structure survey

Upside: The Fed and how they handle interest rates – as well as tapering, continuing the flow of money into markets – appeared as the top response for upside surprises (23.7% of responses). This was followed by COVID (14.5% of responses), with comments ranging from turning endemic to ending, as well as mentions of therapeutics and treatments. Finishing out the top three was inflation (11.8% of responses), as respondents noted everything from controlling it to no inflation (we assume this means a return to a more normal inflation level).

Downside: Inflation topped the downside list (26.5% of responses), noting everything from continuing to go higher to the response to tackle inflation. The Fed came in the second spot (18.4% of responses), with respondents commenting about rising rates in general as well as how the Fed handles rate hikes. The final category in the top three was regulation at 15.3% of responses – beating out COVID by 2 pps – with respondents concerned about what the SEC might do around equity market structure. Payment for order flow (PFOF) was cited specifically a few times, with people noting it could increase costs for retail investors and therefore drive them away from the markets.

	Upside		Downside	
	Rank	Comments	Rank	Comments
The Fed	#1	Interest rates level; tapering, money flow to markets; how Fed handles policies	#2	Rising interest rates, number of hikes; how Fed handles rate increases, disruptive/too fast
COVID	#2	“Ends”, endemic, under control; treatments, cures, vaccines, therapeutics, herd immunity	#4	New strains/variants, more dangerous variant, reemergence, pandemic; uncertainty
Inflation	#3	Transitory, none, lower, controlled, mid-year relief, disinflation	#1	Response to; continues/here to stay, increases
Corporates	#4	Earnings remain strong or growth accelerates, stock buybacks, cash flows	#7	Earnings slow, valuations
Government	#5	Midterm elections; gridlock; fiscal spending/stimulus	#5	Midterm elections; no gridlock; policy overreach, uncertainty; domestic policy
Economic	#6	GDP growth continues, GDP “boom”; reopening; consumer spending; labor market	#7	Recession, macro shock; USD; labor market
Retail Investors	#7	Demand, remain involved/keep trading; participation increases	#10	Selling, stop participating
Geopolitical	#8	China, Asia, APAC region	#6	Tensions, political unrest; China, Russia/Ukraine
Supply Chain	#9	Easing of disruptions, corrections	#7	Issues/disruptions continue
Regulation	#10	In general	#3	Environment, overreach, unintended consequences, Gary Gensler; PFOF ban/reg (on wholesaler payments) increases retail costs/decreases participation; exchange rebates; FTT
Other		M&A, futures, listed options, no better alternatives, sector rotations, spot bitcoin ETF approval, crypto, electronic fixed income/FI		Systemic event, tech/Internet failure, concentration, crypto, cyberattack/breach, equities, increased volatility leads to substantial selloff, options

Source: SIFMA market structure survey

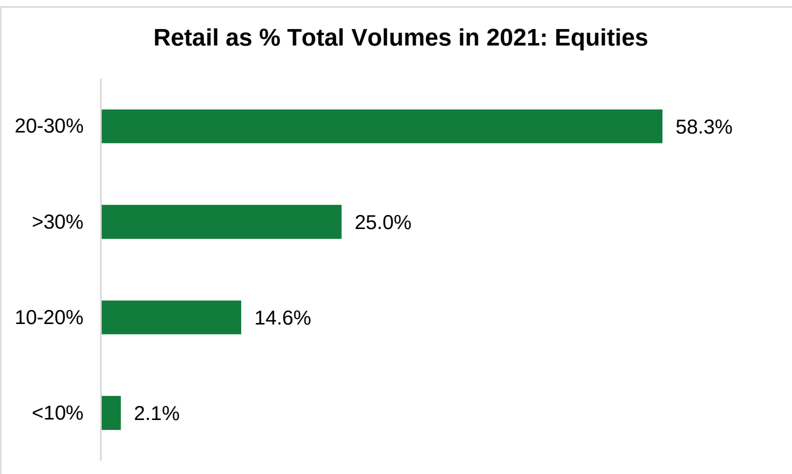
Retail Investor Participation Survey Results

Much of the growth in equity and listed options volumes in 2020/2021 was attributed to increased participation by retail investors. As such, we thought it would be interesting to survey market participants, the very people executing retail (and institutional) trades, to gauge participation levels.

Equities

Survey Question: What percentage of total 2021 equities volumes do you estimate were retail trades?

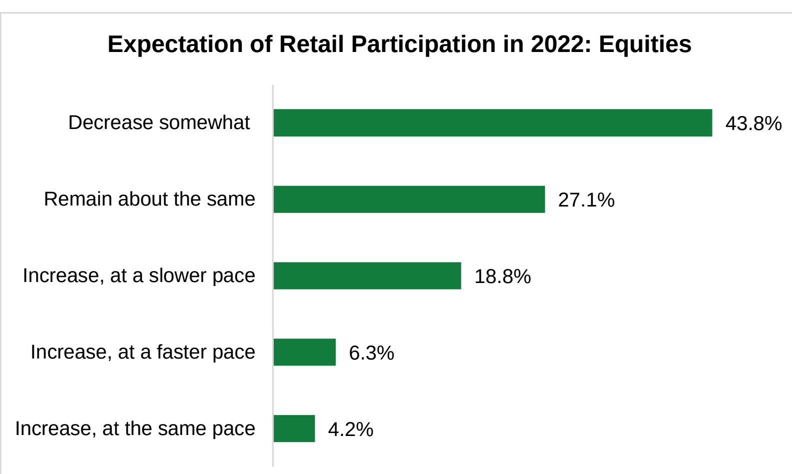
Majority Says? Respondents had less conviction this year, with respondents estimating retail investors represented 20-30% of total equity volumes last year (58.3%). The next largest group estimate this number is greater than 30% (25.0% of respondents).



Source: SIFMA market structure survey

Survey Question: In 2022, how do you expect the percentage of retail participation in equities to change?

Majority Says? 43.8% of respondents expect the level of retail participation in equities to decrease somewhat in 2021. However, 45.9% expect either the level to remain about the same or to increase at a slower pace, 27.1% and 18.8% respectively.

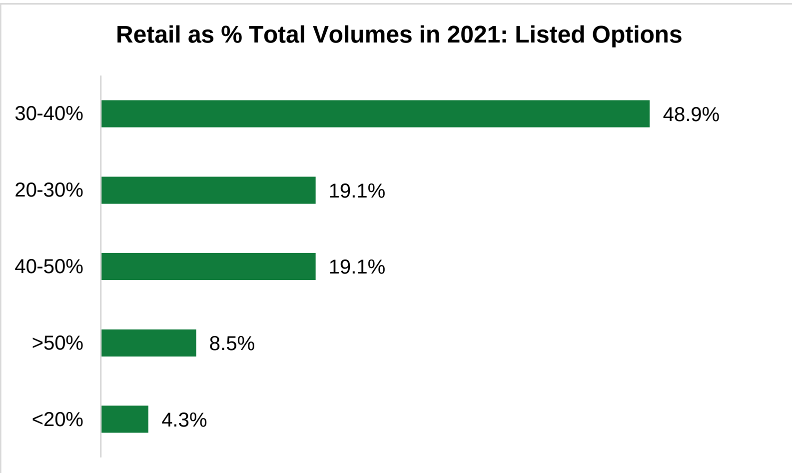


Source: SIFMA market structure survey

Listed Options

Survey Question: What percentage of total 2021 listed options volumes do you estimate were retail trades?

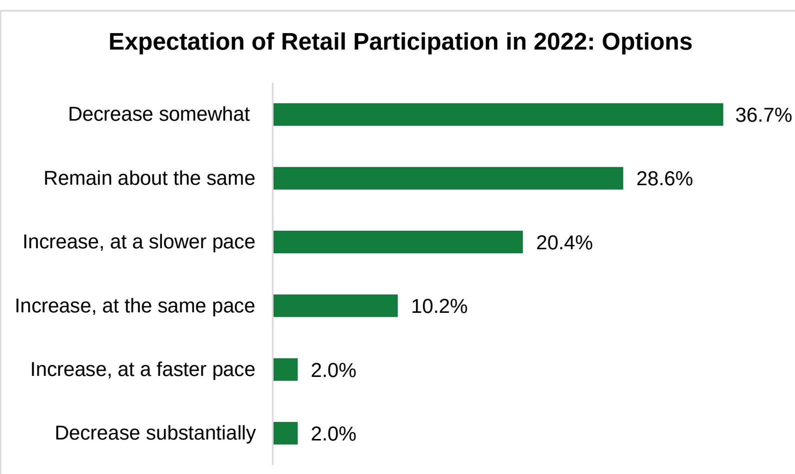
Majority Says? 48.9% of respondents estimated the level of retail participation in listed options at 30-40%. Then there was a tie between 20-30% and 40-50%, 19.1% of respondents each.



Source: SIFMA market structure survey

Survey Question: In 2022, how do you expect the percentage of retail participation in listed options to change?

Majority Says? The top response was that the level of retail participation would decrease somewhat (36.7%). However, 49.0% expect the level to remain about the same or increase at a slower pace, 28.6% and 20.4% respectively.

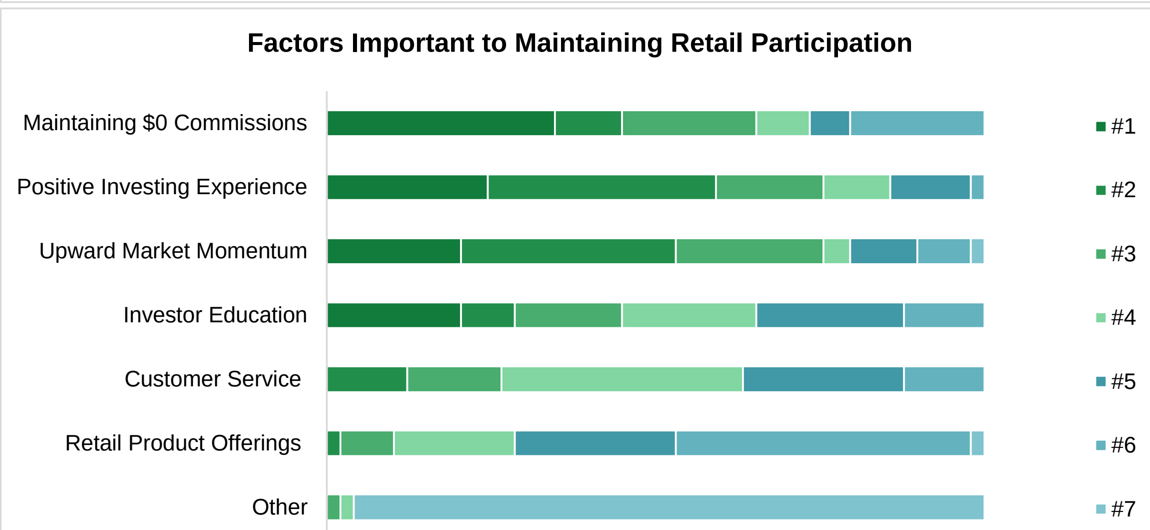


Source: SIFMA market structure survey
Note: Options = multi-listed options

General Factors

<u>Survey Questions</u>: Which factors do you believe contributed most to the increase in retail investor participation in 2021? What do you think is most important to maintaining retail investor participation?

<u>Majority Says</u>? Moving up to the top, $0 commissions is now seen as the key factor for both the growth in and maintaining retail investor participation (#3 for each last year). For growth, technology/platform access remains as the second most important factor. In other words, retail investors like the ease of access and affordability of trading. For maintaining participation, positive investing experience comes in at #2. We note that the cost and the technology come into play in maintaining the positive experience. This is why firms continually improve technology to enhance the investor experience (as well as provide investor education and good customer support).



Source: SIFMA market structure survey
Note: Other, Growth = quality of executions, stimulus money, online information/forums, markets going up relentlessly, social media. Other, Maintaining = forums (not always a good thing), maintain current market structure

Final Thoughts from Survey Respondents

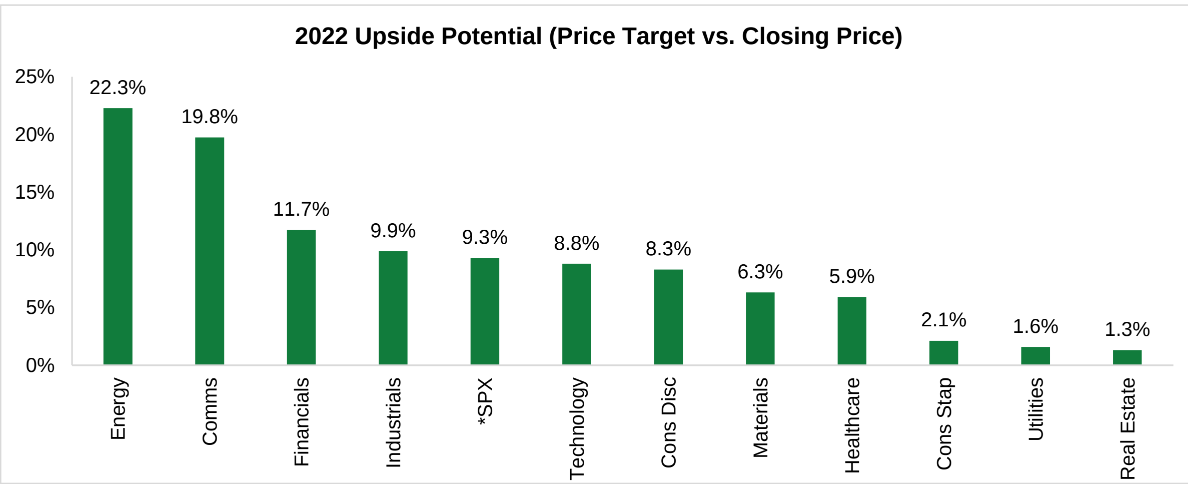
At the end of the survey, we asked respondents to provide and final thoughts they have on markets and retail investor participation:

- Should be interesting to see if we can maintain these high volumes and see if the retail investor stays patient as the market volatility continues to expand due to COVID and global unrest.
- One of the uncertainties heading into 2022 is regulatory change and how potential rule making could impact equity market structure, as well as the downstream impact on investors.
- Maintenance of current market structure focused on benefiting retail investors is paramount for continued participation and growth. The off-exchange/wholesaler trading experience has been and must remain an important component in the retail brokerage space.
- Financial transaction tax continues to be a major threat to the industry and specifically to retail participation in the equity and option markets.

Looking to 2022: The Future for Markets

Equity Strategist Estimates

Looking ahead to 2022, we analyzed the potential upside to the market as a whole and for individual sectors. Upside potential is calculated as equity strategists' price target estimates for 2022 compared by the closing price on December 31, 2021. The upside potential for the market (the SPX index) is +9.3%. Energy is estimated to remain the leading sector in 2022 (+22.3% upside), with real estate moving to the bottom (+1.3% upside).



Source: Bloomberg, SIFMA estimates

Note: Comms = telecommunications; SPX = total market; Cons Disc = consumer discretionary; Cons Stap = consumer staples

Additionally, we highlight the following moves by sector in terms of the change in rank for price target estimates for 2022 from rank for 2021 annual returns:

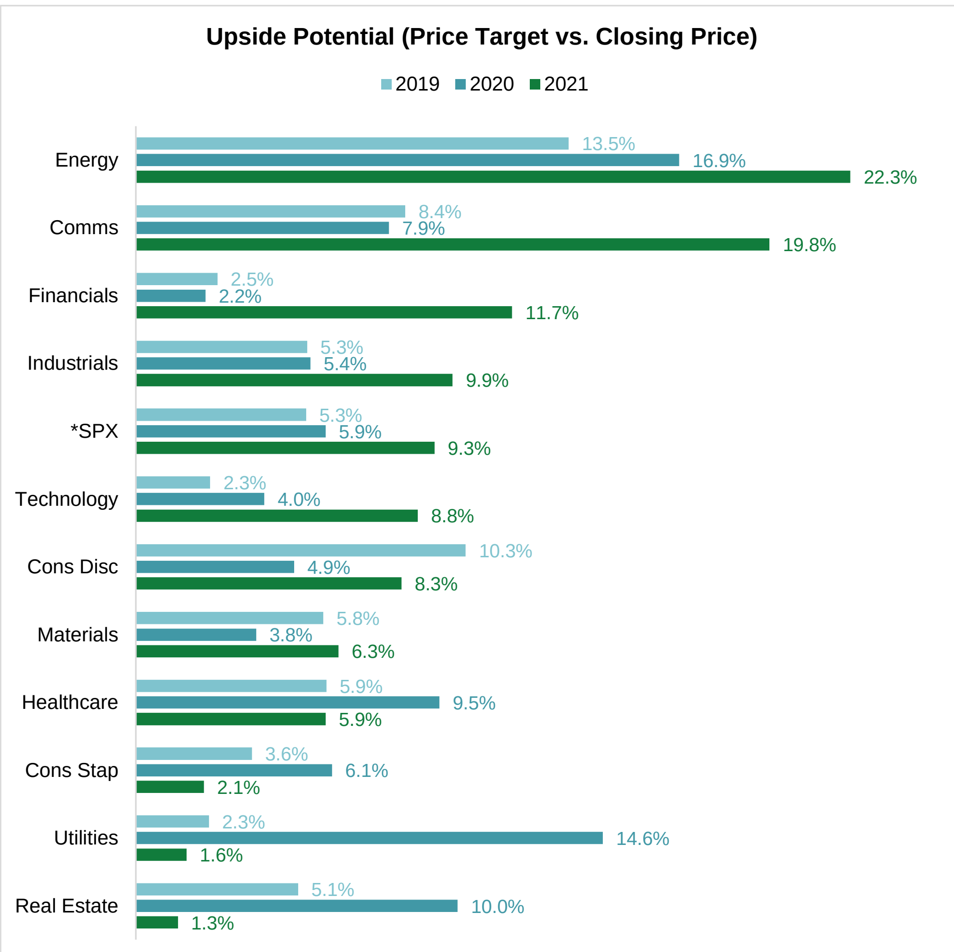
- Energy estimated to remain the leader in 2022 (no change)
- Real estate expected to fall to the bottom of the pack from the #2 spot for returns in 2021 (-10 spots)
- Technology estimated to fall to #6 (-3 spots), while materials and healthcare estimated to each fall 2 spots
- The large risers are estimated to be communications (+7 spots) and consumer staples (+6 spots)

	Rank		
	2021 Return	2022 PT	Change
Energy	1	1	0
Real Estate	2	12	(10)
Technology	3	6	(3)
Financials	4	3	1
SPX	**5**	**5**	0
Materials	6	8	(2)
Healthcare	7	9	(2)
Cons Disc	8	7	1
Comms	9	2	7
Industrials	10	4	6
Cons Stap	11	10	1
Utilities	12	11	1

Source: Bloomberg, SIFMA estimates
Note: Comms = telecommunications; SPX = total market; Cons Disc = consumer discretionary; Cons Stap = consumer staples

Finally, we look at estimated potential upside since 2019, highlighting the following:

- SPX: Equity strategists estimate the potential upside for the S&P 500 price target to almost double that in the past two years (+9.3% in 2022 vs. +5.9% in 2020 and +5.3% in 2019)
- Technology: Upside for the technology sector is estimated at greater than two times the prior year (+8.8% in 2022 vs. +4.0% in 2021 and +2.3% in 2019)
- Sectors with lower upside in 2021 versus 2020: healthcare, consumer staples, utilities, and real estate
- Sectors with lower upside in 2021 versus 2019: healthcare, consumer staples, utilities, real estate, and consumer discretionary

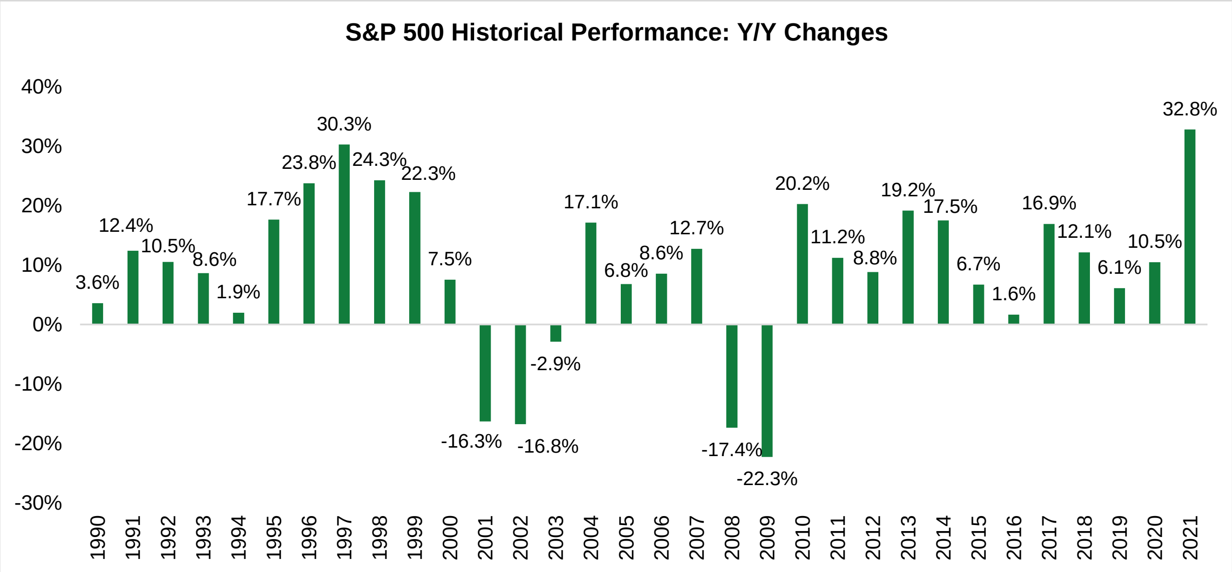


Source: Bloomberg, SIFMA estimates
Note: Comms = telecommunications; SPX = total market; Cons Disc = consumer discretionary; Cons Stap = consumer staples

Reversion to the Mean

Reversion to the mean is a concept in financial markets that returns for a security will eventually revert to the long-run mean, or average, historical level. We apply this concept to look at where the S&P 500 could go from here. First, we look at historical returns (Y/Y change) in the S&P 500 since 1990, highlighting the following:

- The annual return was positive 27 times, negative 5 times (3x after the dotcom bubble burst and 2x after the global financial crisis)
- Average annual returns, including the 2020/2021 COVID years
  - Since 1990 = +9.3%
  - Since 2000 = +6.4%
  - Since 2010 = +13.6%
- Average annual returns, excluding the 2020/2021 COVID years
  - Since 1990 = +8.4%, a -0.8 pps difference
  - Since 2000 = +4.9%, a -1.5 pps difference
  - Since 2010 = +12.0%, a -1.6 pps difference



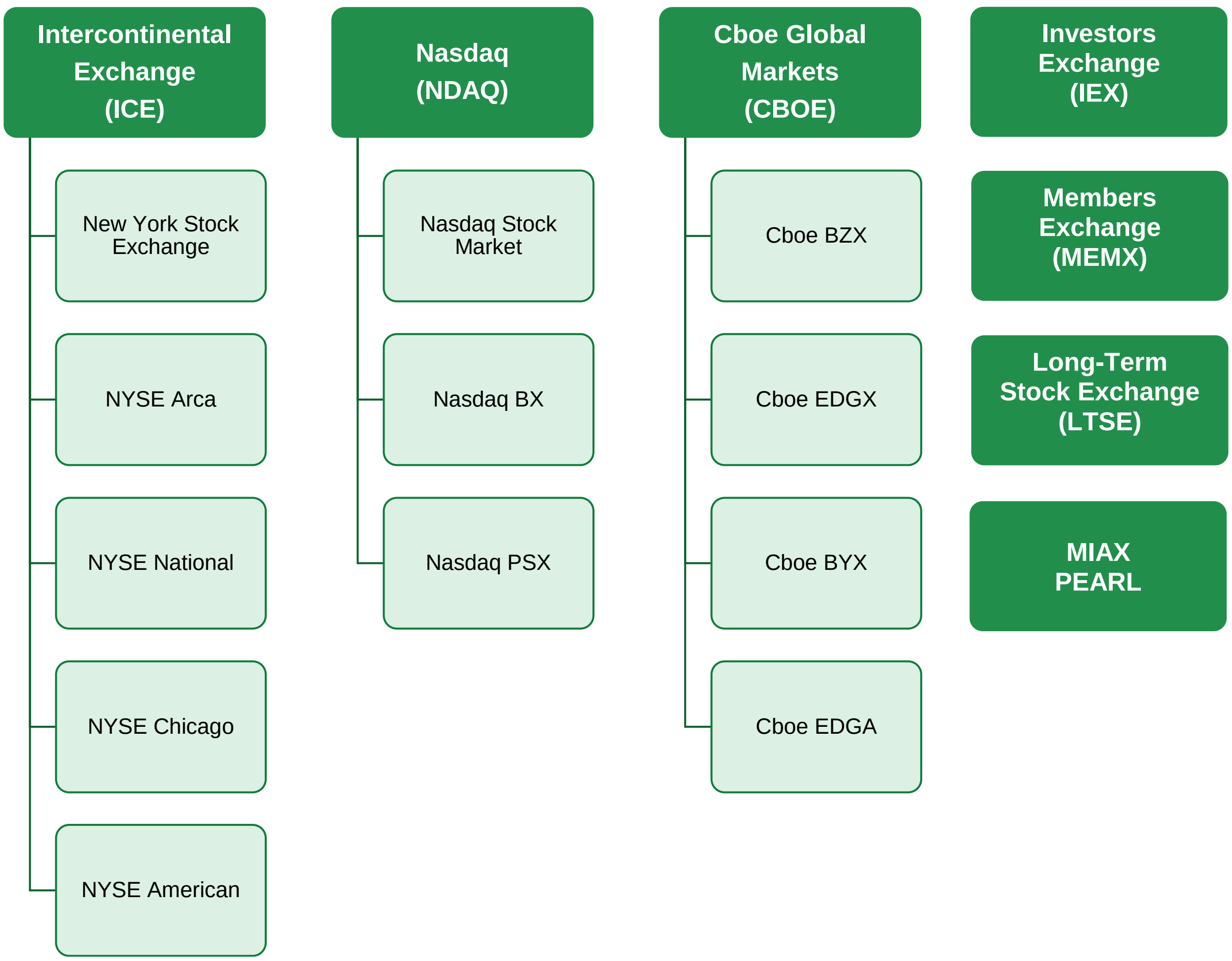
Source: Bloomberg, SIFMA estimates

Interestingly, the total average return since 1990 of +9.3% is the same as what we calculated in the previous section for the average equity strategist upside potential for the S&P 500 in 2022. This would be a substantial shift from the 2021 return of +32.8%. Yet, it would be more in line with the return seen in 2020, +10.5%, which was an interesting year having experienced both the COVID crash and then the recovery takeoff in markets.

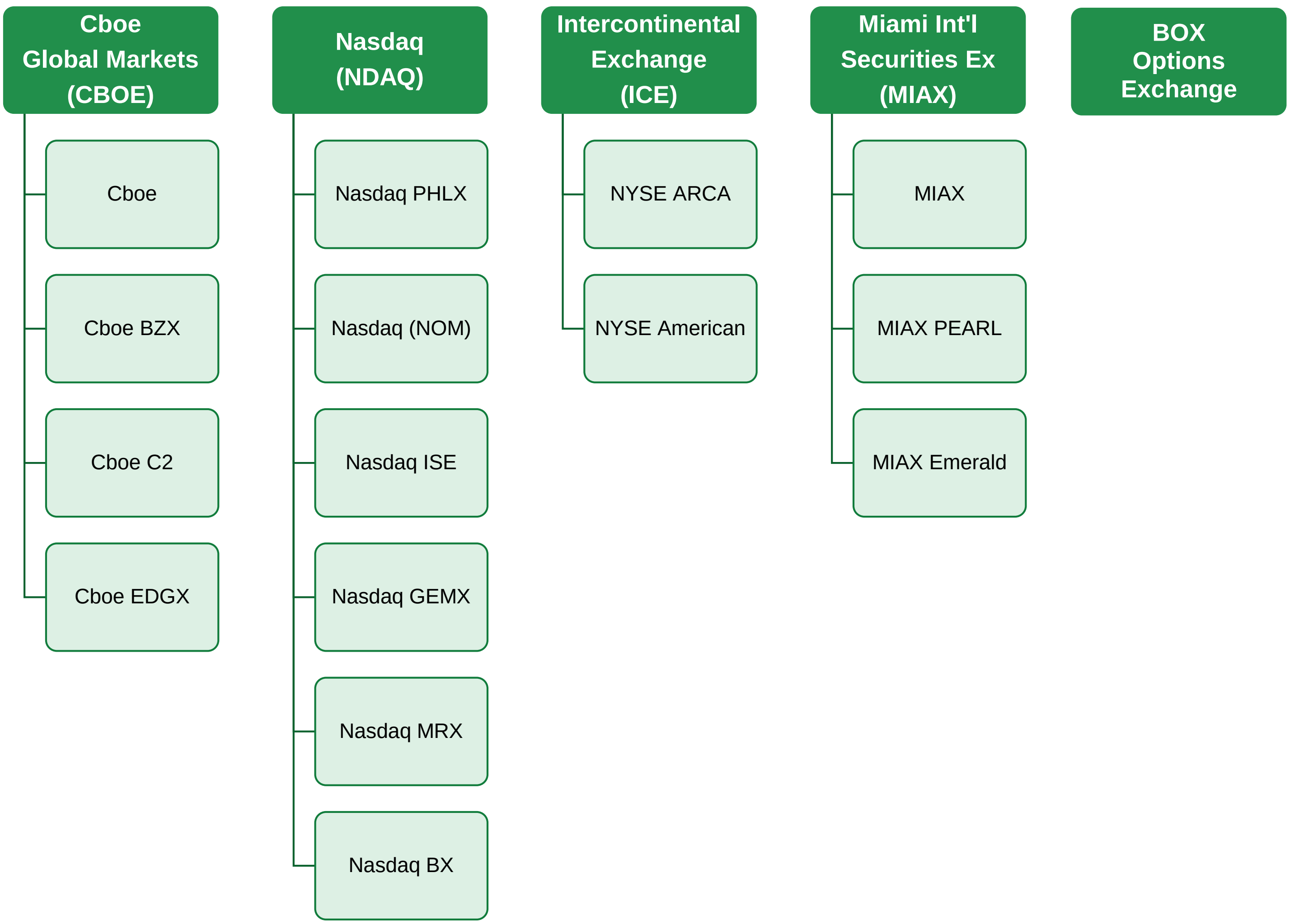
Another aspect to consider is the end of the free flow of Fed money. Since the global financial crisis (GFC), Fed programs have sent a significant amount of money into markets. The average return during this time was +13.6% (or the price of the S&P 500 increased 350.7% from the low in 2009, from 948.05 to 4,272.97). The 13.6% return was a +4.3 pps increase to the long-run average return since 1990.

The reversion to the mean theory would say that markets should not be able to keep up the pace seen since the GFC, rather resort back to the longer run average. The turning off of the Fed money faucet could support this theory. Stay tuned, it should be an interesting year.

Appendix: US Equity Exchange Landscape



Appendix: US Multi-Listed Options Exchange Landscape



Appendix: Market Index Definitions

- **Dow Jones Industrial Average (DJIA)**: A price weighted index that tracks 30 large, publicly-owned companies trading on U.S. exchanges. It has historically been a widely-watched benchmark index for U.S. blue-chip stocks.

- **S&P 500**: A market capitalization weighted index of the 505 largest U.S. publicly traded companies. The index is regarded as the best gauge of large-cap U.S. equities.

- **Nasdaq Composite (Nasdaq)**: A market capitalization weighted index made up of the 3,668 equities listed on the Nasdaq stock exchange. Its composition is over 50% technology (this percentage has come down over the years), followed by consumer services, health care and financials.

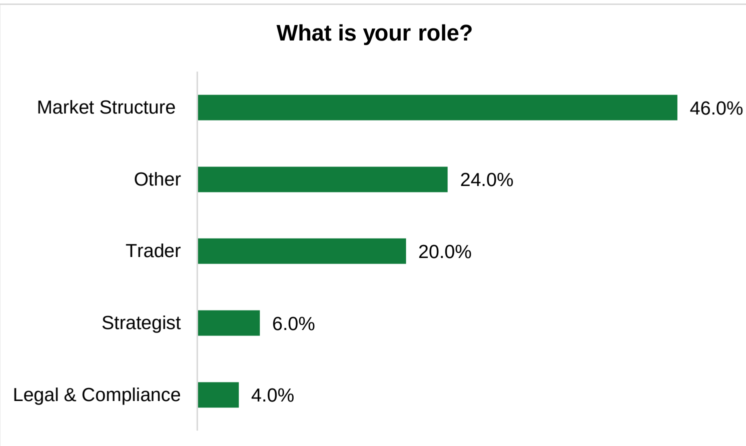
- **Russell 2000**: A market capitalization weighted index representing 10% (the bottom two-thirds aggregate market cap) of the Russell 3000 index, a larger index of 3,000 publicly traded companies that represents 97% of the investable U.S. stock market. The index is regarded as a gauge of small cap, U.S. centric companies.

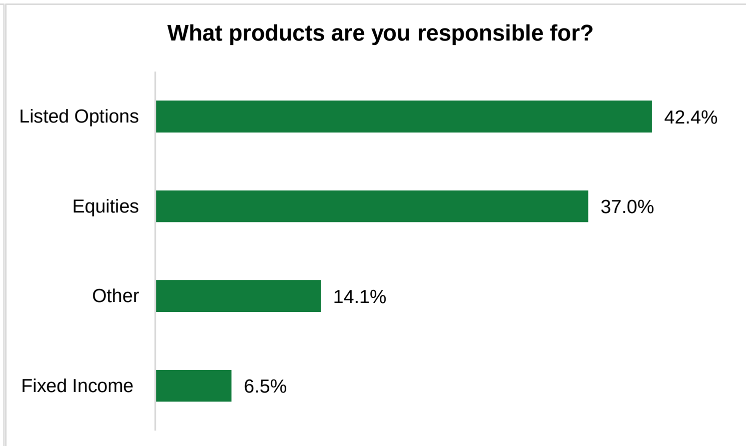
- **CBOE Volatility Index (VIX)**: A real-time market index that represents the market's expectation of 30-day forward looking volatility, as derived from the price inputs of S&P 500 index options. It measures market risk and investor sentiment (fear, stress) and is often called the fear index

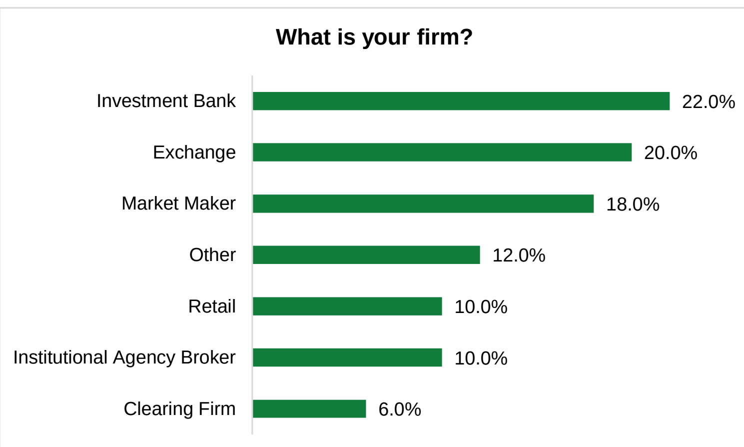
Appendix: Market Structure Survey Structure

This survey was populated between January 4 to 21. We had 67 respondents from 40 unique firms, with some firms filing individual business unit responses while other firms chose to respond with one survey on behalf of all divisions. The group of firms represented depicts key market participants in equities and listed options: investment banks, market makers, retail trading firms, exchanges, etc. We estimate that the responses capture around 65–70% of both equity and options volumes.

We note that the survey was conducted before the geopolitical events involving Russia and Ukraine began.







Source: SIFMA market structure survey
Note: Other, role = sales, executive, COO, research, exchange lead, management, regulatory supervision, product manager, trading operations & market structure, business development. Other, firm = interdealer broker, HFT, CPP

Appendix: Terms to Know

FINRA	Financial Industry Regulatory Authority
SEC	Securities and Exchange Commission
ADV	Average Daily Trading Volume
ATS	Alternative Trading System
Best Ex	Best Execution
CAT	Consolidated Audit Trail
Dark Pool	Private trading venues, not accessible by the public
EMS	Equity Market Structure
MM	Market Maker
NMS	National Market System
OPR	Order Protection Rule
OPRA	Options Price Reporting Authority
PFOF	Payment For Order Flow
Reg NMS	Regulation National Market System
SIP	Security Information Processor
SRO	Self Regulatory Organization
Tick Size	Minimum price movement of a security

Bid	An offer made to buy a security
Ask, Offer	The price a seller is willing to accept for a security
Spread	The difference between the bid and ask price prices for a security, an indicator of supply (ask) and demand (bid)
NBBO	National Best Bid and Offer
Locked Market	A market is locked if the bid price equals the ask price
Crossed Market	A bid is entered higher than the offer or an offer is entered lower than the bid
Opening Cross	To determine the opening price of a stock, accumulating all buy and sell interest a few minutes before the market open
Closing Cross	To determine the closing price of a stock, accumulating all buy and sell interest a few minutes before the market close

Order Types	
AON	All or none; an order to buy or sell a stock that must be executed in its entirety, or not executed at all
Block	Trades with at least 10,000 shares in the order
Day	Order is good only for that trading day, else cancelled
FOK	Fill or kill; must be filled immediately and in its entirety or not at all
Limit	An order to buy or sell a security at a specific price or better
Market	An order to buy or sell a security immediately; guarantees execution but not the execution price
Stop	(or stop-loss) An order to buy or sell a stock once the price of the stock reaches the specified price, known as the stop price

Call	The right to buy the underlying security, on or before expiration
Put	The right to sell the underlying security, on or before expiration
Holder	The buyer of the contract
Writer	The seller of the contract
American	Option may be exercised on any trading day on or before expiration
European	Option may only be exercised on expiration
Exercise	To put into effect the right specified in a contract
Underlying	The instrument on which the options contract is based; the asset/security being bought or sold upon exercise notification
Expiration	The set date at which the options contract ends, or ceases to exist, or the last day it can be traded
Stock Price	The price at which the underlying stock is trading, fluctuates continuously
Strike Price	The set price at which the options contract is exercised, or acted upon
Premium	The price the option contract trades at, or the purchase price, which fluctuates constantly
Time Decay	The time value portion of an option’s premium decreases as time passes; the longer the option’s life, the greater the probability the option will move in the money
Intrinsic Value	The in-the-money portion of an option's premium
Time Value	(Extrinsic value) The option premium (price) of the option minus intrinsic value; assigned by external factors (passage of time, volatility, interest rates, dividends, etc.)
In-the-Money	For a call option, when the stock price is greater than the strike price; reversed for put options
At-the Money	Stock price is identical to the strike price; the option has no intrinsic value
Out-of-the-Money	For a call option, when the stock price is less than the strike price; reversed for put options

IPO	Initial Public Offering; private company raises capital buy offering its common stock to the public for the first time in the primary markets
SPAC	Special Purpose Acquisition Company; blank check shell corporation designed to take companies public without going through the traditional IPO process
Bought Deal	underwriter purchases a company's entire IPO issue and resells it to the investing public; underwriter bears the entire risk of selling the stock issue
Best Effort Deal	Underwriter does not necessarily purchase IPO shares and only guarantees the issuer it will make a best effort attempt to sell the shares to investors at the best price possible; issuer can be stuck with unsold shares
Secondary	(Follow-on) Issuance of shares to investors by a public company already listed on an exchange
Direct Listing	(Direct placement, direct public offering) Existing private company shareholders sell their shares directly to the public without underwriters. Often used by startups or smaller companies as a lower cost alternative to a traditional IPO. Risks include, among others, no support/guarantee for the share sale and no stock price stabilization after the share listing.

Underwriting	Guarantee payment in case of damage or financial loss and accept the financial risk for liability arising from such guarantee in a financial transaction or deal
Underwriter	Investment bank administering the public issuance of securities; determines the initial offering price of the security, buys them from the issuer and sells them to investors.
Bookrunner	The main underwriter or lead manager in the deal, responsible for tracking interest in purchasing the IPO in order to help determine demand and price (can have a joint bookrunner)
Lead Left Bookrunner	Investment bank chosen by the issuer to lead the deal (identified on the offering document cover as the upper left hand bank listed)
Syndicate	Investment banks underwriting and selling all or part of an IPO
Arranger	The lead bank in the syndicate for a debt issuance deal

Pitch	Sales presentation by an investment bank to the issuer, marketing the firm's services and products to win the mandate
Mandate	The issuing company selects the investment banks to underwrite its offering
Engagement Letter	Agreement between the issuer and underwriters clarifying: terms, fees, responsibilities, expense reimbursement, confidentiality, indemnity, etc.
Letter of Intent	Investment banks' commitment to the issuer to underwrite the IPO
Underwriting Agreement	Issued after the securities are priced, underwriters become contractually bound to purchase the issue from the issuer at a specific price
Registration Statement	Split into the prospectus and private filings, or information for the SEC to review but not distributed to the public, it provides investors adequate information to perform their own due diligence prior to investing
The Prospectus	Public document issued to all investors listing: financial statements, management backgrounds, insider holdings, ongoing legal issues, IPO information and the ticker to be used once listed
Red Herring Document	An initial prospectus with company details, but not inclusive of the effective date of offering price

Roadshow	Investment bankers take issuing companies to meet institutional investors to interest them in buying the security they are bringing to market.
Non-Deal Roadshow	Research analysts and sales personnel take public companies to meet institutional investors to interest them in buying a stock or update existing investors on the status of the business and current trends.
Pricing	Underwriters and the issuer will determine the offer price, the price the shares will be sold to the public and the number of shares to be sold, based on demand gauged during the road show and market factors
Stabilization	Occurs for a short period of time after the IPO if order imbalances exist, i.e. the buy and sell orders do not match; underwriters will purchase shares at the offering price or below to move the stock price and rectify the imbalance
Quiet Period	(Cooling off period) The SEC mandates a quiet period on research recommendations, lasting 10 days (formerly 25 days) after the IPO

Reg S-K	Regulation which prescribes reporting requirements for SEC filings for public companies
Reg S-X	Regulation which lays out the specific form and content of financial reports, specifically the financial statements of public companies
Form S-1	Registration statement for U.S. companies (described above)
Form F-1	Registration statement for foreign issuers of certain securities, for which no other specialized form exists or is authorized
Form 10-Q	Quarterly report on the financial condition and state of the business (discussion of risks, legal proceedings, etc.), mandated by the SEC
Form 10-K	More detailed annual version of the 10Q, mandated by the SEC
Form 8-K	Current report to announce major events shareholders should know about (changes to business & operations, financial statements, etc.)
Greenshoe	Allows underwriters to sell more shares than originally planned by the company and then buy them back at the original IPO price if the demand for the deal is higher than expected, i.e. an over-allotment option
Tombstone	An announcement that securities are available for sale. (Also a plaque awarded to celebrate the completion of a transaction or deal)
EGC	Emerging Growth Company

Appendix: SIFMA Insights Research Reports

Monthly Market Metrics and Trends: www.sifma.org/insights-market-metrics-and-trends

- Statistics on volatility and equity and listed options volumes
- Also highlights an interesting market trend

SIFMA Insights Market Structure Primers: www.sifma.org/primers

- Capital Markets Primer Part I: Global Markets & Financial Institutions
- Capital Markets Primer Part II: Primary, Secondary & Post-Trade Markets
- Electronic Trading
- US Capital Formation & Listings Exchanges
- US Equity
- US Multi-Listed Options
- US ETF
- US Fixed Income
- SOFR: The Transition from LIBOR
- The Evolution of the Fintech Narrative

SIFMA Insights Equity Market Structure Analysis Series:

- Analyzing the Meaning Behind the Level of Off-Exchange Trading
- Analyzing the Meaning Behind the Level of Off-Exchange Trading Part II
- Why Market Structure and Liquidity Matter

SIFMA Insights: www.sifma.org/insights

- Market Structure Survey (2021): Volatility, Volumes, Market Levels & Retail Investor Participation
- SPACs versus IPOs
- A Look Back at 2020 Market Structure Themes
- US Capital Formation's 2020 Journey
- Market Structure Download: Post-Election Update
- Market Performance Around US Presidential Elections
- Market Volatility Around US Presidential Elections
- Market Structure Download
- A Deeper Look at US Listed Options Volumes
- The Cboe Trading Floor Reopened – Revisiting Volume Data
- NYSE Goes All Electronic – What Does It Mean?
- The NYSE Trading Floor Reopened – Revisiting Market Share Data
- COVID-19 Related Market Turmoil Recap: Part I (Equities, ETFs, Listed Options & Capital Formation)

- 2020, the Year of the SPAC
- The 2020 Market Madness
- The VIX's Wild Ride
- The 10th Anniversary of the Flash Crash
- DTCC's Important Role in US Capital Markets

Author

SIFMA Insights
Katie Kolchin, CFA
Director of Research
kkolchin@sifma.org