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Global Quantitative & Derivatives Strategy
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2022 Equity Derivatives Outlook

Volatility Forecasts and Trade Ideas

Global Quantitative and Derivatives Strategy

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See page 100 for analyst certification and important disclosures, including non-US analyst disclosures.

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Equity Derivatives Outlook

Outlook for Markets and Volatility

2021 was not an easy year for active investors. While the strong tailwind of recovery from the pandemic set an overall positive tone for risky assets, performance of various investment strategies was often thrown off by new COVID waves leading to market volatility, steepening/flattening of yield curves, and style rotations. At the beginning of the year, cyclical assets rallied in the aftermath of vaccine rollout and optimism that the pandemic would be over by the summertime. Brief periods of volatility driven by short squeezes in meme stocks and hedge fund liquidation did not disrupt the recovery and reflation trade. Yields reached the year's high by the end of March (~1.75% for the 10Y US yield) and cyclical assets recovered nearly all pandemic losses (relative to defensive assets). However, when the delta variant appeared in India, the rotation stalled and started reversing later in the spring, with the variant emerging in the UK and eventually the US later in the summer. Yields went back to the lows and reflation and reopening trades were unwound completely. With COVID cases on a decline early-autumn, reflation, yields, cyclicals and commodities were ready to rally again, and they did – reaching March highs again in October. Shortly after, confusion about monetary policy liftoff (e.g. Bank of England) injected new volatility and pain into various active portfolios. Markets regained their footing, only to be put in another tailspin by the omicron variant scare that caused a spike in equity and bond volatility. Where does this leave us in December and how do we see 2022?

Our view is that 2022 will be the year of a full global recovery, an end of the pandemic, and a return to normal economic and market conditions we had prior to the COVID outbreak. In our view, this is warranted by achieving broad population immunity and with the help of human ingenuity, such as new therapeutics expected to be broadly available in 2022. This would result in a strong cyclical recovery, a return of global mobility, and a release of pent up demand from consumers (e.g. travel, services) and corporates (in particular inventory, capex, and buyback recovery). We stress that this demand would happen in a backdrop of still-easy monetary policy (zero rates and incrementally smaller but positive quantitative easing). For these reasons, we remain positive on equities, commodities and emerging markets, and negative on bonds. We expect the outperformance of cyclical assets and value, recovery of riskier and more volatile assets, and headwinds for defensive bond proxies and market segments that benefited from the pandemic. Increases in bond yields, inflation and reopening should also set back parts of the market that benefited from extreme monetary accommodation and COVID, and whose valuations are at unsustainable speculative levels – such as bond proxies, low volatility strategies, electric vehicles, digital assets, lockdown beneficiaries, high-multiple growth stocks, and parts of ESG.

Our 2022 price target for the S&P 500 is 5050. This represents a smaller percentage appreciation compared to our 2021 forecast; however, we do think international equities, emerging markets and cyclical market segments will significantly outperform and deliver 2-3 times higher returns. The reason for this is our expectation for increasing interest rates and marginally tighter monetary policy that should be a headwind for high multiple markets such as the Nasdaq. Within the US, we like reopening and reflationary themes and beneficiaries of higher bond yields. For bond yields, we expect the US 10Y to reach 225bps by year-end. China was a headwind for performance of various assets this year, but we believe China growth will accelerate from -3.1%ar last quarter to 5.7% in 2022, which should further provide support for global equities and cyclical assets. We believe that commodities, and particularly Energy assets, are in a supercycle driven by COVID recovery, monetary debasement, geopolitical tensions and supply/demand frictions built over the past years (e.g. we recently upgraded our long term forecast for Oil to $80, as compared to the current market price of ~$60 for long-dated contracts).

What are the risks to our view? As the recovery runs its course, markets will begin adjusting to tighter monetary conditions, a process that will likely inject volatility. There are other risks that investors will need to monitor and manage in 2022. They include increased geopolitical tensions in Europe and Asia (in particular related to Ukraine and Iran), a looming energy crisis, uncertainties around high inflation, and the path of monetary policy normalization. Political events will also merit investors' focus, with important US elections in November and several elections in Europe. The market reaction to risks will likely amplify towards the end of the year as the economic recovery and positioning of discretionary and systematic investors peaks, and the Fed starts increasing rates. Regardless of risks, we believe that 2022 will be a strong year for economic recovery and performance of cyclical assets.

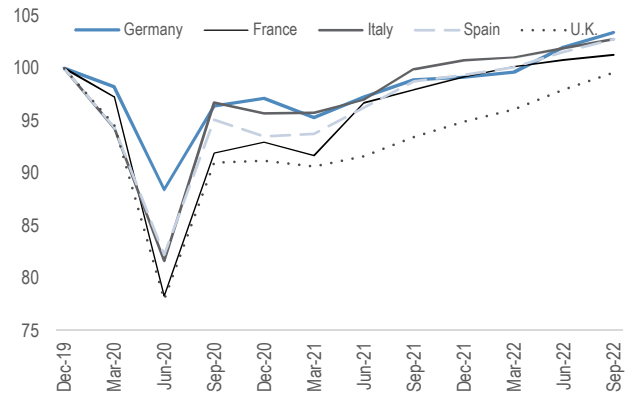
The VIX has averaged ~19.5 year to date (down from an average of ~29 in 2020), spending most of the year in a medium volatility regime. Somewhat elevated volatility levels persisted this year, despite above-trend growth and a record-setting

rally in equities, given lingering uncertainty around the pandemic and its effects on various parts of the economy, a strong pullback in volatility risk premium selling flows, and weak market liquidity. Given the backdrop for markets and risks discussed above, **we expect volatility to fall modestly further in 2022, with the VIX most likely averaging ~17.** However, volatility levels could be higher in 2H22 than 1H22 if persisting high inflation drives a hawkish shift in monetary policy. Volatility also correlates with various macroeconomic variables related to economic growth, employment, housing, consumer confidence, etc. We analyzed ~100 of these relationships and found that nearly all of them indicate the VIX should be lower, pointing to an average near our forecast for next year of ~17. Below we highlight region-specific drivers of market volatility:

Europe: The emergence of the Omicron variant is casting clouds on the outlook for risk in the short term but does not materially alter the longer-term positive picture. Vaccination rates are high and vaccine hesitancy is receding, partly thanks to a broader adoption of Covid passes and selective restrictive measures on the un-vaccinated. Even if vaccine efficacy against the new variance turns out to be lower, the new antiviral drugs are expected to remain highly effective. We therefore think that the Omicron variant will slow down rather than stop the ongoing process of volatility compression, which should continue into 2022. In our view, the main risk linked to Omicron is an overreaction from European governments rather than the impact of the variant itself.

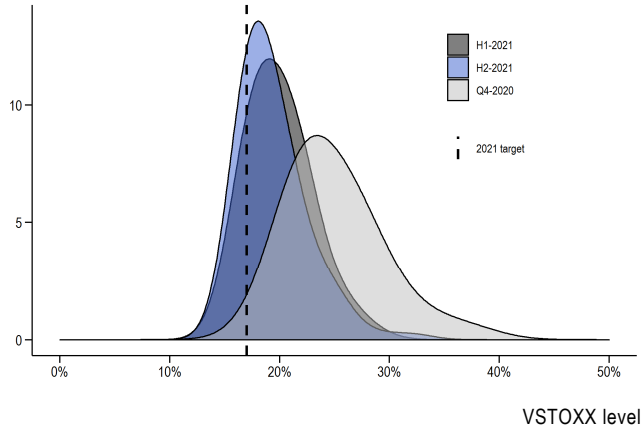
The VSTOXX median level in 2021 was 19.1, slightly higher than our expectations at the end of 2020. We expect an average VSTOXX level for 2022 of ~17, in line with the VIX (Figure 2); in other words, we expect to remain in a medium volatility regime despite a moderate resumption of the volatility compression.

Figure 1: We expect European countries to continue growing above trend and fully recover pre-COVID-19 real GDP levels in 2022
GDP level (rebased at 100 in 4Q19)



Source: Eurostat, ONS, J.P. Morgan.

Figure 2: We expect the VSTOXX to decline slightly in 2022 but to remain in a medium volatility regime
VSTOXX distribution (density) and 2022 target range



Source: J.P. Morgan Equity Derivatives Strategy.

GDP: JPM economists forecast that in the first part of 2022 the main European economies will have recovered pre-COVID-19 levels of real GDP. While it is true that revisions in European economic expectations have largely been negative in Q4 2021, the expected **growth rate is still substantially above trend**, providing a support for reflationary trades and further risk premia compression (Figure 1).

Monetary and fiscal stimulus: Central banks' support is the main pillar of our view on further European risk premia compression. The ECB is expected to remain supportive throughout the year, expanding its balance sheet further in 2022 and pushing back policy rate normalization into 2023. Fiscal stimulus was a big support in the region in 2021 and will turn into a net negative in 2022, with the largest fiscal drag expected for the UK. Our fixed income colleagues expect a bear steepening for European rates, which should be supportive of Banks and reflation trades.

Political risk: European politics will be a more negative factor for markets and risk in 2022, after being a net positive in 2021. The upcoming **French presidential elections** will likely be a source of uncertainty, but likely to a much lower extent

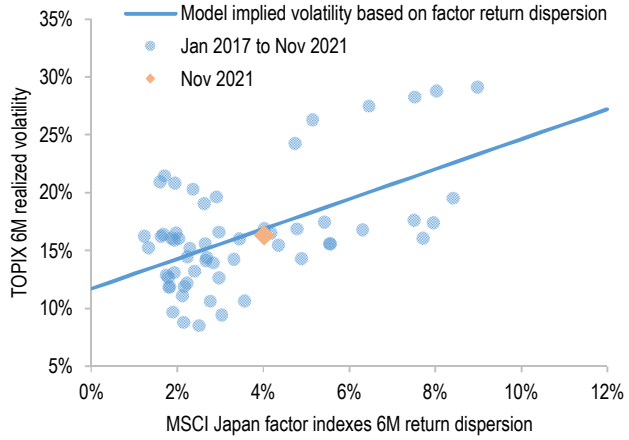
than in 2017. Furthermore, there is a moderate risk that **Draghi** will be elected as President of the Republic of Italy in early 2022, thus leaving his PM role and triggering early parliamentary election in 2022. Political upsets remain a possibility but should pose limited risks to markets and peripheral spreads thanks to continued monetary policy support.

Trade and Brexit: Trade tensions between the US and China are likely to subside in 2022, and Europe should be a net beneficiary of this trend. There are, however, trade-related risks linked **to Brexit** as there is a chance that the UK will **invoke Article 16**, which would impair trade with the EU further and likely have an impact, albeit moderate, on growth.

At current spot levels **structured product** re-hedging dynamics are not very impactful on volatilities, skew, dividends, and funding. Issuance of new products is depressed, while the number of knock-outs remains elevated, leading to an overall reduction in risk over time. The high number of KO events is expected to persist at least until Q2, and issuance will normalize further but is unlikely to revert to pre-Covid levels anytime soon.

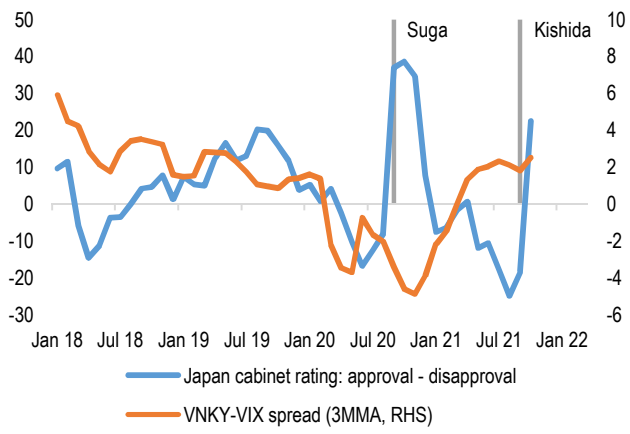
Asia: Implied volatility in major Asian markets has reset lower in 2021, though the degree of normalization varies. The VNKY and VHSCEI have averaged ~21.1 and ~23.6 year to date compared with an average of 26.5 and 26.6 in 2020. The VNKY better tracks the trend of risk compression in US equity markets, though doubts on PM Kishida's economic policy proposal caused a brief outperformance in VNKY versus the VIX in October 2021. In comparison, the VHSCEI has been among the most resilient equity risk measure in the region, which can be in part attributed to the decline of investors' confidence in storm-hit China in our view. **For 2022, we expect Asian implied volatility to trade moderately lower, while country-specific drivers will make the path of further risk normalization uneven.** We think the VNKY and VHSCEI will likely reach a yearly average of ~19-20 and ~21-22 by end-2022.

Figure 3: In Japan, a lack of factor leadership sets the stage for declining volatility risk premia. Historically lower factor return dispersions are consistent with lower realized volatility levels



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. Note: MSCI Japan Value, Growth, Momentum, Quality, Dividend Yield and Min Vol are included, factor dispersion is measured by the average distance of individual factor 6M returns to TOPIX 6M returns.

Figure 4: After PM Abe's term ended in September 2019, VNKY tends to outperform VIX in periods when Japan cabinet disapproval ratings outweigh approval ratings



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

In Japan, a lack of factor leadership sets the stage for declining volatility risk premia. As highlighted in the Japan Yeah Ahead 2022 (see here), growth and quality outperformed value factors in 2020 in a bifurcated market, followed by a reversal in 2021 as value factors turned positive and 12-month momentum factors were sharply negative. After movements over the past two years differentials both in valuations and performance between value/growth are close to trend-lines, and we think it is hard for either to establish a clear, unilateral direction under these conditions. As measured by the average distance of individual factor returns to TOPIX returns, lower factor return dispersions are consistent with lower realized volatility levels (see Figure 3). The historical relationship suggests that if factor return dispersion were to fall to bottom quartile levels of ~2% from the current level of ~4% (70th percentile in 5 years), there could be a 2-3 vol pt decline in realized volatility. We think Japan volatility could be higher in 2H22 depending on the administration's policy direction. A major political event is the Upper House elections in the summer of 2022. A victory for the ruling bloc would raise the prospect for long-term political stability, but at the same time it could prompt discussions on tax hikes and a greater focus

on income redistribution. Changes in political stability would produce implications on volatility as we have witnessed in recent years. After PM Abe's term ended in September 2019, VNKY tends to outperform VIX in periods when Japan cabinet disapproval ratings outweigh approval ratings (Figure 4). Toward the end of the year, there will likely be more uncertainty over the sustainability of the BOJ's monetary policy as Governor Kuroda's term in office will end in April 2023.

In Hong Kong/China, we expect China-related risk factors to be the main drivers of volatility in 1H22. Investors with China exposure have been dealing with a raft of issues, ranging from slower economic growth to tougher regulations on sectors this year. Those issues had a compounded effect in the repricing of equity volatility, propelling VHSCEI to post-COVID highs of ~40 in early July 2021. Our VHSCEI risk attribution model (see here), which ranks the significance of volatility drivers against a list of macro, fundamental, and market variables, has pointed to a shift in volatility drivers from one that is nearly solely driven by changes in US equity volatility in 1H21 to one that is more driven by local factors including USDCNY moves, China data surprises, and China credit spread 2H21 to date (Figure 5). We expect VHSCEI to decline moderately in 1H22 as we see improvement in a number of factors with high explanatory power of VHSCEI moves. The pre-conditions behind our moderately lower volatility forecast in HK/China include USD/CNY to stay around 6.35 throughout 1H22 (see here), the global economy to rebound sequentially into 2022 (see here), and China HY spreads can grinder tighter from stressed levels (see here). For 2H22, we expect US-China relation-related headlines to gain more attention. The possibility of easing US-China tariffs is a non-consensus tailwind for US and China equities (see here). Heading into 2022 US midterms, easing tariffs could align with Biden's campaign commitment, support the party's election strategy, and address business concerns. We see the US-China relationship as a big swing factor. A better US-China relationship, if materialized, should trigger repricing of volatility risk premia below our base case VHSCEI forecast. Looking at 2022 as a whole, we expect China's economic-policy regime change to limit the degree of decline in average volatility levels (see here). While growth remains important, other objectives such as financial stability, de-carbonization, and stable housing prices are starting to take center stage. The Chinese government's higher tolerance for slower growth makes it hard to justify VHSECI trading at sub-20 levels for a sustained period as most recently happened in 2019 (average VHSCEI levels was 19.3) on the back of a temporary U.S.-China trade truce.

Figure 5: Our VHSCEI risk attribution model has pointed to a shift in volatility drivers from one that is nearly solely driven by changes in US equity volatility in 1H21 to one that is driven by local factors in 2H to date

1H21

Rank	Variable	Measure	Sign of Coefficient	R2
1	US equity volaitlity	VIX net change	+	38%
2	China data surpise	CESICNY net change	-	9%
3	USDCNY	USDCNY percent change	+	7%
4	China credit spread	JACI China Z-spread net change	+	5%
5	Global Earnings Expect	MXWD F12M EPS percent change	+	1%
6	Commodity	Nanhua commodity index percent	-	1%
7	China Earnings Expecta	MXCN F12M EPS percent change	+	1%
8	DXY	DXY percent change	+	0%
9	US treasury yield	USGG10Y net change	-	0%
10	Global data surpise	CESIGL net change	-	0%

July-Nov 21

Rank	Variable	Measure	Sign of Coefficient	R2
1	USDCNY	USDCNY percent change	+	16%
2	China data surpise	CESICNY net change	-	13%
3	Global data surpise	CESIGL net change	-	13%
4	China credit spread	JACI China Z-spread net change	+	12%
5	US equity volaitlity	VIX net change	+	7%
6	Global Earnings Expect	MXWD F12M EPS percent change	+	3%
7	Commodity	Nanhua commodity index percent change	-	3%
8	US treasury yield	USGG10Y net change	-	3%
9	DXY	DXY percent change	+	2%
10	China Earnings Expecta	MXCN F12M EPS percent change	+	2%

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

In terms of the structured product dynamics, technical flows from outstanding product re-hedging are currently not a significant risk driver. As a result of declining interest and re-investment demand this year, vega outstanding has declined to below historical average levels on major underlyings including the Nikkei 225, H-shares, and KOSPI 200. Looking ahead, we expect structured product issuance to recover, more so in the Japanese market driven by a combination of improving sentiment and light positioning. The new issuance will result in a significant increase of volatility supply, suppressing longer-dated downside volatility. In the second half, after re-accumulation of vega positions from new structured product issuance, Asian volatilities would be more vulnerable to spot dependency of dealer hedging flows. Specifically, in case of a moderate spot correction, dealers will need to further sell volatility to re-hedge for risk profile with higher vega outstanding. This would in turn drive longer-dated volatility lower.

Volatility Supply and Demand

Performance of short volatility strategies

In line with our expectations, 2021 has been a good year for short-volatility strategies, both in absolute and risk-adjusted terms, with the notable exception of some Asian indices (Table 1). The year saw a number of dips, while volatilities declined and the implied-to-realized volatility risk premium remained relatively high across global indices on average. The risk-adjusted returns for selling volatility systematically (Figure 6) were close to those observed in 2017, which was a standout year for carry strategies.

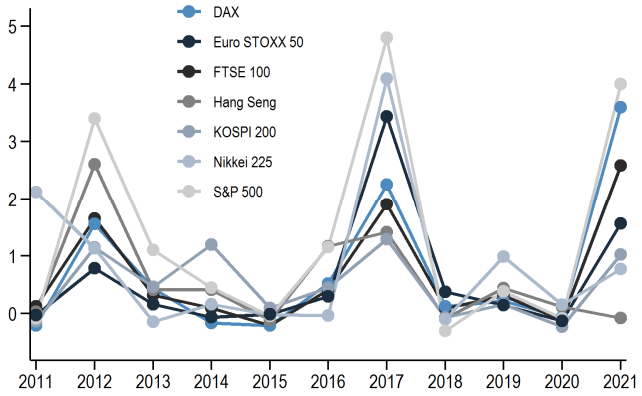
Table 1: Short volatility strategies on US and European indices performed significantly better relative to Asian indices

Index	Median PnL	Max 1M loss	Adj. VaR(99)*	Avg Vol Premium	Adj. Sharpe*
S&P 500	4.9%	0.0%	-0.5%	6.7%	4.00
Euro STOXX 50	4.3%	-8.4%	-5.3%	5.7%	1.56
FTSE 100	4.3%	-3.6%	-3.0%	5.4%	2.58
DAX	5.9%	-4.9%	-2.4%	7.4%	3.59
Nikkei 225	2.6%	-7.5%	-6.0%	3.4%	0.77
Hang Seng	1.2%	-22.2%	-20.0%	1.7%	-0.08
KOSPI 200	2.8%	-10.0%	-6.3%	3.5%	1.02

Source: J.P. Morgan Equity Derivatives Strategy, Calculated based on the PnL of 1M var swap positions (2.5x capped) taken to expiry, daily overlapping 1M periods, 1 vol point bid-mid for all indices. PnL figures are expressed in vegas. * Adjusted Sharpe is corrected for skewness and kurtosis to take into account non-normality; Adjusted VaR is an univariate Cornish Fisher VaR.

Figure 6: Adjusted Sharpe Ratios for systematically selling 1M variance swaps

Adjusted Sharpe Ratio** for systematic 1M var swap strategy*

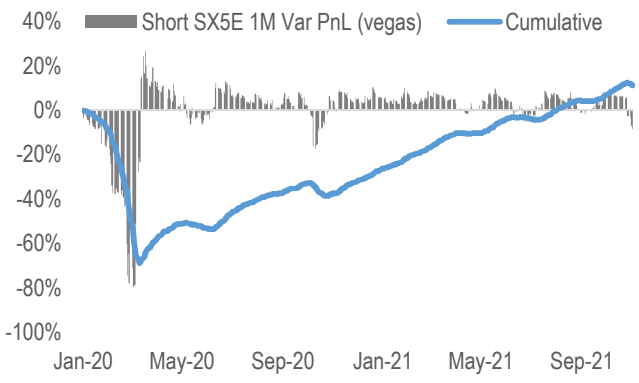


Source: J.P. Morgan Equity Derivatives Strategy, * Calculated based on the PnL of 1M var swap positions taken to expiry, daily overlapping 1M periods, 1 vol point bid-mid for all indices
** Adjusted for skewness and kurtosis to take into account non-normality.

Dispersion between indices was large due to the much poorer performance of short volatility strategies on Asian indices compared to US and European indices. This dispersion is also evident in the worst-draw-down and VaR metric of these indices, which were, however, benign in an historical context. The carry gained over the year was sufficient to offset the large losses experienced in 2020 (Figure 7). Systematically selling 1M variance would have fully recovered losses by August 2021 for the Euro STOXX 50 and by May 2021 for the S&P 500.

Figure 7: By August 2021 Euro STOX50 short var strategies had fully recovered the Covid crisis drawdown

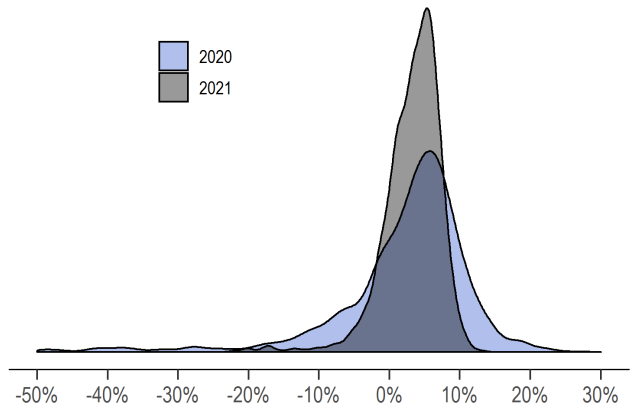
Short 1M SX5E var swap monthly and cumulative PnL (vegas)



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 8: The distribution for short volatility returns across global indices in 2020 and 2021

Density



Source: J.P. Morgan Quantitative and Derivatives Strategy

Looking into 2022, we expect volatility carry strategies to deliver positive performance, but we expect the risk-reward of these strategies to be less attractive than this year and in line with the long-term average. We hold a positive view on risky assets, and we also believe there is scope for a wider investor participation in volatility carry strategies. Positioning indicators do not appear stretched, thus reducing the fragility of equity derivatives carry trades. Our assessment would change should we see significant evidence of a build-up of leverage and high participation in volatility carry strategies.

Regional Trends in Volatility Supply/Demand

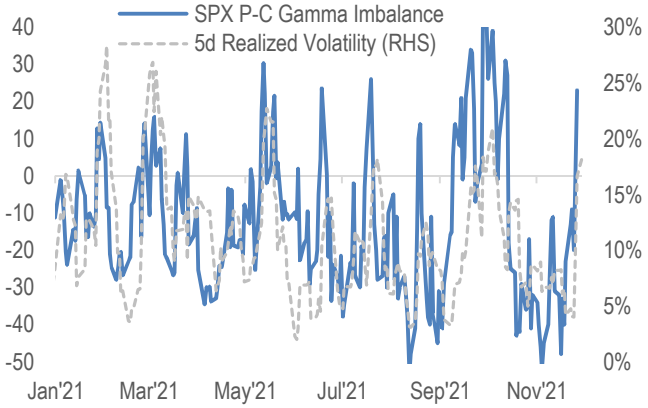
US:

Short-Dated Volatility

The dominant flow in short-dated S&P 500 volatility remains supply of ATM/upside volatility through overwriting, collars, and other yield generation/volatility risk premia strategies (e.g., selling straddles, strangles, iron condors, etc.) given the continued search for yield among investors with rates near zero and still elevated volatility levels, **and demand for downside volatility for protection** through a variety of put-based hedging strategies. This flow is a key driver of the structurally steep S&P 500 skew in recent years (see the Skew section for discussion). A combination of increased investor positioning, the record-setting market rally, lingering pandemic risks, and falling volatility levels as last year's spike decayed led to both increased hedging demand overall and increased use of outright puts rather than put spreads this year, driving skew to record steepness.

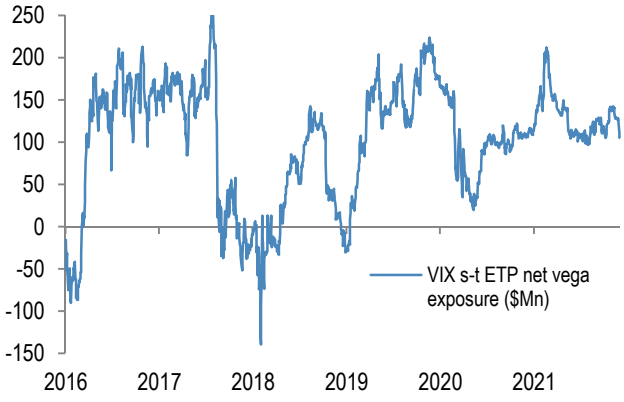
The continuation of these structural option flows maintained a **strong correlation between dealers' gamma positioning and market volatility** again this year (Figure 9). Once the market starts to roll over, dealers are quickly taken short gamma, and their hedging flows reinforce market moves in both directions, leading to a significant boost in realized volatility. Then, once the market recovers and we rally into a range with more calls outstanding than puts, dealers turn long gamma and their hedging activity suppresses market moves/volatility. The effects of these flows were further reinforced by weak liquidity conditions—liquidity collapsed to record lows early in the pandemic and has only partially recovered—which causes flows to have outsized price impact.

Figure 9: Market realized volatility exhibited strong correlation to our proxy for dealer gamma positioning



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 10: VIX ETP investors were significantly long vega throughout 2021



Source: J.P. Morgan Equity Derivatives Strategy.

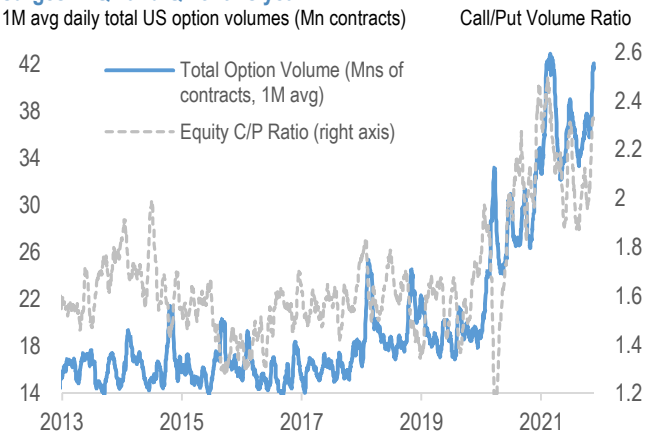
VIX ETPs remain a driver of volatility at the short end of the curve; however, their influence decreased and become more asymmetric after the Feb'18 inverse VIX ETP collapse (see our account of this event here and here). We discussed in past Outlooks how VIX ETPs acted like a "long gamma" overhang to short-dated volatility; since investors were buying long/levered ETPs when volatility was low to position for the next VIX spike, and taking profit on these plus buying inverse ETPs on VIX spikes to play a reversion, VIX ETP flows were dampening swings in both directions. The disappearance, effectively, of inverse VIX products since Feb'18 resulted in a weakening of the ETP overhang, but it remained impactful during the pandemic as investors monetized VIX spikes in 1Q20 and 1Q21, and then rebuilt long positions as volatility declined. VIX ETP investors held sizable long vega positions throughout 2021 to hedge the risk of a renewed volatility spike/market selloff, with some profit-taking in late Feb/early March when the VIX surged to the high-20s (Figure 10). As a

result, VIX ETPs' rebalancing flows acted to steepen the front end of the VIX futures curve and S&P 500 term structure (see discussion in the Term Structure section). The current net long position remains a moderate headwind for volatility spikes as we are likely to see investors take profit on these positions to monetize the next VIX spike.

Activity in **volatility risk premia strategies** collapsed last year as the largest volatility spike in over 30 years delivered sharp losses, leading many of them to close or sharply pare back activity. These strategies have been slow to return, despite elevated risk premia and a significant normalization of volatility levels this year, and those that returned are mostly selling risk premia via vanilla options (e.g., call/put writing, selling straddles/strangles), while systematic variance selling strategies that were prevalent pre-pandemic have all but disappeared. As a result of these trends, along with strong hedging demand this year, a number of derivatives risk premia remain elevated, such as the implied to realized volatility spread, skew, and convexity (see the Skew section below for discussion). We expect volatility risk premium sellers to continue to gradually return, lured by these elevated risk premia that become harder to justify as we emerge from the pandemic.

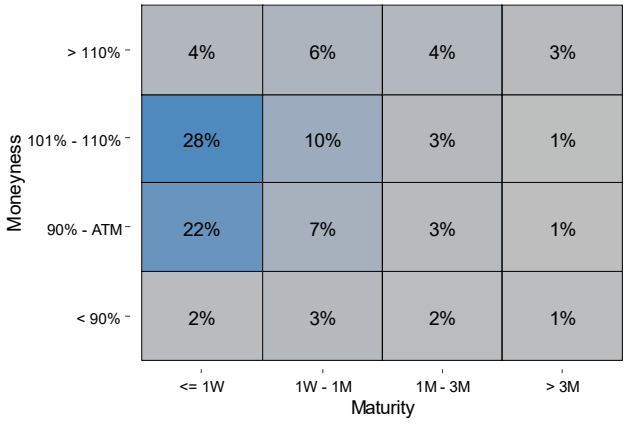
Retail investors and momentum/tech option traders also continued to exert sizable impacts on option markets in 2021. We discussed last year how option volumes surged to record levels during the pandemic, initially driven by activity in mega-cap momentum and Tech names such as FAAMNG and TSLA. This year, meme stocks were added to this list as speculative activity in popular names on Reddit (such as GME, AMC, EXPR, PLTR, etc.) drove a surge in their volatility and led to a broader squeeze of heavily shorted names in Q1. The resulting activity drove option volumes to new record highs this year (Figure 11). Indeed, in 2021, the participation of retail traders represents a structural change in options markets. Our estimates of retail option trading activity follow very similar trends to overall volumes shown in Figure 11, indicating the retail activity to a large extent spurred the increase in broad market option volume, even though volatility has declined significantly this year compared to last year. Therefore, it appears that thanks to retail traders, the overall market has benefitted from higher liquidity. The caveat is that the injection of liquidity is highly localized on the vol surface. As Figure 12 shows, the added liquidity is dominated by shorter dated options as over 50% of all option volume traded by retail investors is concentrated in maturities of one week or shorter to expiry.

Figure 11: Option volumes increased to record highs and volumes tilted increasingly toward calls during the pandemic, with notable surges in Q1 and Q4 of this year



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 12: > 50% of the options traded by retail investors are 1-week or shorter to expiry



Source: J.P. Morgan

Do retail options trading introduce volatility to the market and cause "gamma squeeze" in certain meme stocks? In individual case studies, we have not found conclusive evidence of gamma squeeze induced by options trading specifically attributable to retail investors (see AMC and GME and TSLA). Therefore, while gamma hedging and retail investor trading in underlying equities may increase stock volatility, we are skeptical of the claim that option trading by retail investors is the main culprit.

Long-Dated Vol

Supply/demand in the long-dated US volatility space traditionally comes from three primary sources: insurance companies hedging long-dated products such as variable annuities (VAs), structured products, and vol spread players (with dealers managing residual risk/timing mismatches between these groups). The balance between insurance demand and structured product supply has been increasingly tipping toward the supply side in recent years, due to both decreased insurance hedging demand and increased issuance of S&P 500-linked structured products. These trends similarly impact implied dividends—long-dated puts bought by insurers are long volatility and dividends (since they're short forwards), and structured products that sell puts are short both volatility and dividends. The result of these shifting structural supply / demand drivers has been gradual pressure on long-dated S&P 500 implied volatility and dividend levels. Meanwhile, activity in vol spread trading plunged during the pandemic and has yet to meaningfully recover (particularly cross-regional spreads that were long vol in Asia/Europe vs. short the US). We discuss these trends below.

As we highlighted in past Outlook reports, **insurance hedging flows** have waned in recent years as a number of issuers scaled back or shut down their VA businesses after sustaining losses in the 2008/9 GFC, while new products being issued have shifted toward using volatility/risk control indices, charging higher fees, and offering less generous features, and thus have lower demand for hedges.[1] Based on anecdotal flows, long-term S&P 500 volatility demand from VA hedgers remained subdued again this year, with low net vega demand (though roughly unchanged y/y) and a shortened hedging tenor—that is, activity was again concentrated primarily in the 6M-3Y bucket, with limited flows 5Y and out. Demand overall remained low by historical standards (e.g., compared to the early/mid 2010s) given net VA flows were negative and new issuance remained historically low.

We expect relatively subdued VA hedging demand for long-term volatility again next year. JPM Insurance analyst Jimmy Bhullar projects VA sales will increase 16% in 2021 as a whole, but off a low base as sales had fallen y/y in seven of the prior eight years and 2021's expected total sales remains 34% below 2011 levels. Also, despite the rebound in sales this year, our analyst retains a negative longer-term view on the VA business as the product's complexity, high fees, and limited liquidity preclude it from capturing a greater share of retirement assets over time. Net flows have been strongly negative the past eight years (see Figure 3 here), and depressed sales, combined with redemptions of maturing policies, should drive net outflows in the overall VA market for the foreseeable future. This suggests continued weak demand for long-term volatility, since most of the incremental VA hedging demand typically comes from new issuance (and the legacy products rolling off generally have more aggressive features, and thus higher hedging needs, than new sales). However, insurer flows are likely to periodically surge opportunistically, and given the shorter hedging tenor these products have been using in recent years, hedges will need to be rolled periodically.

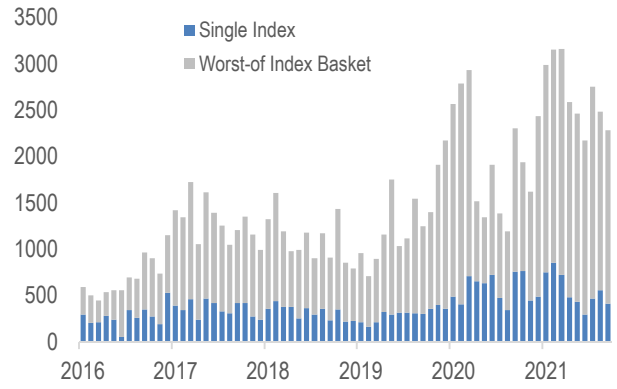
Additionally, RILAs (Registered Index-Linked Annuities) are an insurance product that has been rapidly gaining prominence in recent years, which net supply long-dated volatility (i.e., compounding the effect of diminished VA hedging demand on the vol supply/demand picture). RILAs are market-linked deferred annuities that typically offer a floor return and capped upside, i.e., they generally embed a short put to fund a long call spread. Thus, these products are typically net short long-dated volatility and skew. LIMRA estimates that RILA sales surged to ~$19Bn in 1H21 (+104% y/y) and the product continues to capture an increasing share of annuity sales.

Activity in cross-regional **volatility spreads** remained light this year. In our view, this is due to 1) weakened appetite for these trades after the COVID-19 crisis delivered losses to popular vol spread trades last year as S&P 500 volatility outperformed during the Mar'20 spike (in fact, this was the third major negative P/L event for these trades in roughly two years as 1Q18 and 4Q18 vol spikes also saw S&P 500 volatility outperform); and 2) since structural drivers for these trades weakened given lower structured product issuance in Asia this year, and the persistent market rally that saw products rallying away from KI barriers resulted in lighter local vanna profiles. As we noted last year, Russell 2000 vs. S&P 500 was one volatility spread trade that performed well during the pandemic and which we had frequently recommended trading (e.g., here, here, here, here) given the combination of structured products' pressure on Russell long-dated volatility and skew, the potential for a demand spike for RTY volatility on a large sell-off due to structured product dynamics, attractive carry, and extreme positioning and valuation on Value stocks. This spread continued to deliver this year thanks to strong style rotation flows, with Russell 2000 realizing ~9 points above S&P 500 YTD.

[1] See Variable Annuity Market Trends, 8-Jun-2021, and Market Share Bible, 15-Oct-2021, for additional details on the VA market.

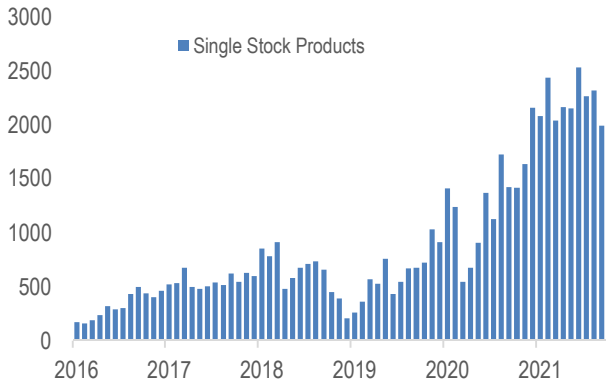
US equity index-linked structured product issuance has been strong this year (Figure 13) due to the low yield environment (as these are yield generating products), strong market returns that saw many products knocking out and notional being rolled into new structures, and still elevated equity volatilities in the aftermath of last year's crisis. However, issuance of index products decelerated over the course of the year due to a shift from index to single-stock products and a slowing in product knock-outs as the Russell 2000 traded range-bound for the middle two quarters of the year. **Single-stock structured products** saw record issuance this year, both because of the same drivers discussed above for index products as well as stocks' higher implied volatilities (which allow autocallable products to offer higher yields) due to the retail trading renaissance that has seen a record surge in option trading volumes during the pandemic (e.g., see here), and heavy rotation flows between tech/lockdown beneficiaries and cyclicals/reopening/reflation names that boosted volatilities across many single names but were offsetting at an index level. In Volatility Review, 28-Sep-2021, we examined the single-stock autocallable market in more depth, including name-by-name estimates of structured product risk, allowing us to identify US stocks that could be most impacted by autocallable re-hedging dynamics. **We expect robust structured product issuance next year,** with most of the notional in called products subsequently rolled into new structures as autocallables remain an attractive proposition for investors given the near-zero yields available in fixed income, still elevated implied volatility levels, and likely healthy investor risk appetite once we get past the current Omicron variant scare.

Figure 13: Issuance of US index-linked autocallables was strong…
Monthly equity index-linked callable structured product issuance ($Mn)



Source: J.P. Morgan Equity Derivatives Strategy, SRP

Figure 14: …while single-stock autocallables saw record issuance this year
Monthly US single stock autocallable issuance ($ Mn)

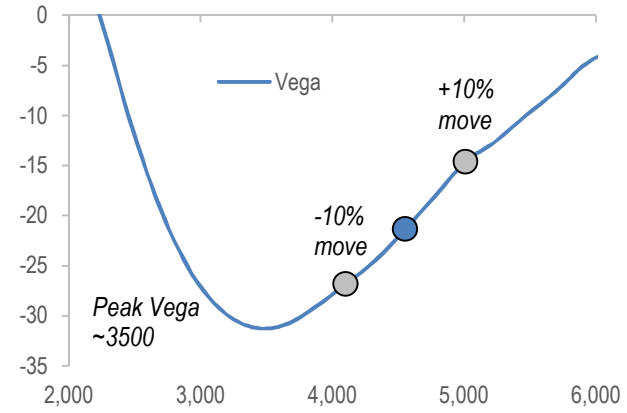


Source: J.P. Morgan Equity Derivatives Strategy, SRP.

Structured product flows continue to have a smaller impact on S&P 500 volatility compared to several other major global indices (e.g., Euro STOXX 50, Nikkei, Russell 2000, etc.), but their influence continues to grow as the relative drivers for long-term volatility shift. Annualized issuance through October in S&P 500-linked structured products in the US is running moderately ahead of its record pace last year. While re-hedging flows from S&P 500-linked autocallables are material, they are more modest relative to option liquidity vs. other major indices and can be offset at times by long-dated volatility demand from the insurance industry (while insurance demand for long-dated vol is far less prominent for other major indices). For example, we note in Figure 16 how S&P 500 autocallable vega exposure is a significantly smaller proportion of the its listed option market compared to several other indices.

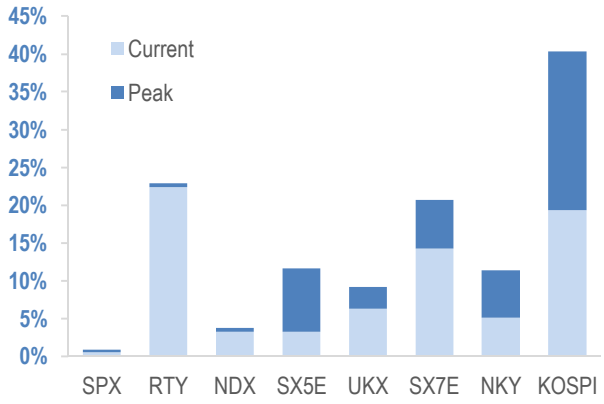
The total vega and mu risk in S&P 500-linked structured products decreased since our last update due to the market rally and product KOs. We estimate structured products have ~$20-25Mn vega outstanding in the **S&P 500** currently, down from ~$35Mn in September, and the index is trading ~30% above our estimated peak vega level of ~3500. Mu risk from structured products also remains low, and there is limited mu spot sensitivity locally, suggesting still limited risk from technical selling of dividends in case of a market sell-off.

Figure 15: S&P 500 autocallable vega profile
S&P 500 vega vs. spot profile of outstanding products ($ Mn)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 16: S&P 500 structured products are much smaller compared to the index's listed option market vs. other major indices
Ratio of estimated autocallable vega to total vega notional outstanding in listed options with >6M to maturity

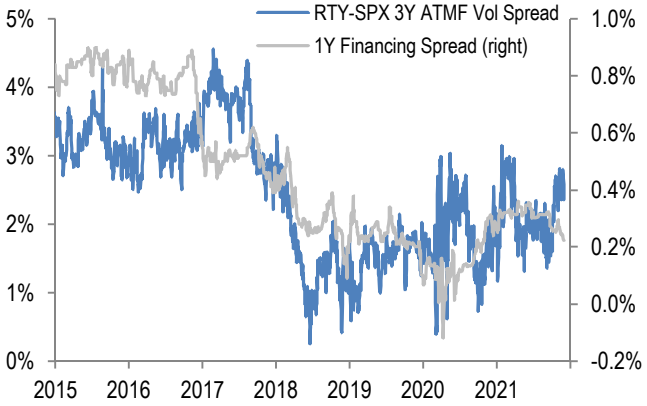


Source: J.P. Morgan Equity Derivatives Strategy.

Structured product flows continue to exert more meaningful influence on the **Russell 2000** due to issuance that is large compared to the index's limited option liquidity and the limited natural buyers of long-dated volatility. In our deep dive on Russell 2000 structured products, we discussed how this issuance leads to downward pressure on long-dated volatility, a flattening of long-term skew, and upward pressure on equity funding rates. In Figure 17 we illustrate how long-term volatility and financing spreads between the Russell 2000 and S&P 500 remain low relative to historical levels (i.e., pre-2017) due to the impact of continued large Russell 2000-linked structured product issuance.

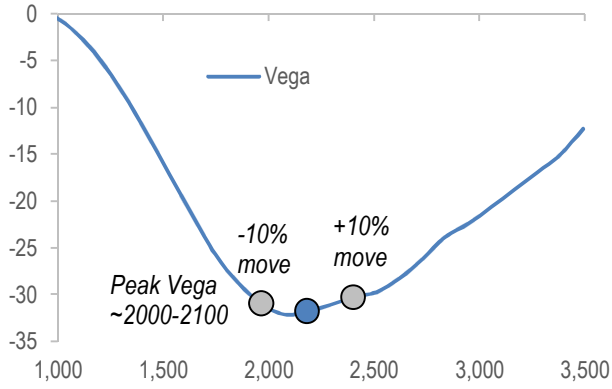
Russell 2000-linked structured product issuance this year is running ahead of last year's record level, but the pace of issuance moderated since early this year in line with the trends discussed above. As a result of the index's outperformance in October and the first half of November that led to a number of products knocking out, the vega supply/risk originating from Russell 2000 structured products decreased since our last update in September. We estimate structured products have ~$30Mn vega outstanding in the Russell 2000 currently, down from ~$65Mn in September, and the Russell 2000 is currently trading ~5-10% above our peak-vega estimate of ~2000-2100 (Figure 18). Since we're close to the peak vega level, autocallables have limited local vanna sensitivity, but exotic desks would need to buy back significant short vega positions in case of a sell-off below ~1800.

Figure 17: The spread between Russell 2000 and S&P 500 long-dated vol and financing rates remains low
3Y ATMF Vol Spread | 1Y Implied Financing Spread



Source: J.P. Morgan Equity Derivatives Strategy.

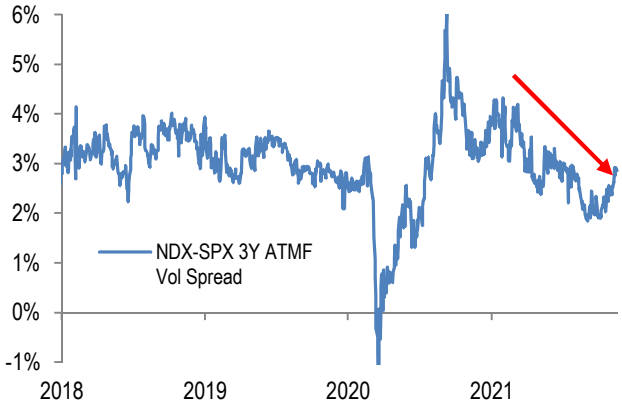
Figure 18: RTY autocallable vanna is low locally since we're near peak vega levels but would increase significantly below ~1800
Russell 2000 vega vs. spot profile of outstanding products ($ Mn)



Source: J.P. Morgan Equity Derivatives Strategy.

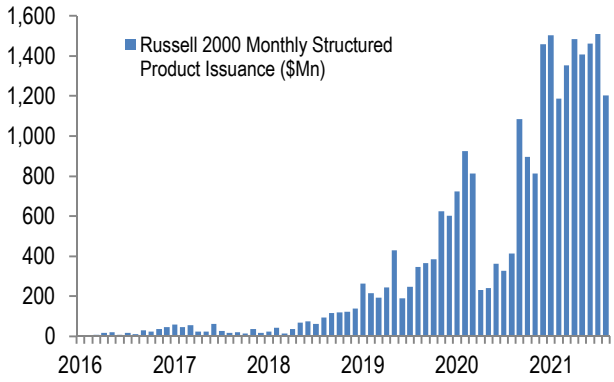
We discussed in April how issuance of **Nasdaq 100-linked structured products** had grown significantly in the past few years as US worst-of index autocallables were increasingly including the Nasdaq in their baskets (typically alongside the Russell 2000 and/or S&P 500). As a result, autocallable re-hedging dynamics are increasingly impacting the index's volatility curve, and the surge in new issuance this year likely contributed to the Nasdaq's long-dated volatility underperformance (Figure 19). We estimate autocallable structured products have ~$8Mn vega outstanding in the Nasdaq 100 currently vs. ~$18Mn in September, and the index is currently trading ~15% above our peak-vega estimate of ~14,000. Despite continued high issuance levels of Nasdaq 100 products, the autocallable risk tied to the Nasdaq dropped due to the index's spot outperformance (e.g., it outperformed the S&P 500 by ~5% and Russell 20000 by ~20% since the end of Q1) and product knock outs during this period.

Figure 19: NDX long-dated volatility was pressured by increased structured product supply this year
Nasdaq 100 less S&P 500 3Y ATMF implied volatility spread



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 20: Issuance of Nasdaq 100-linked structured products surged to new record levels this year
NDX-linked autocallable notional issuance USD Bn

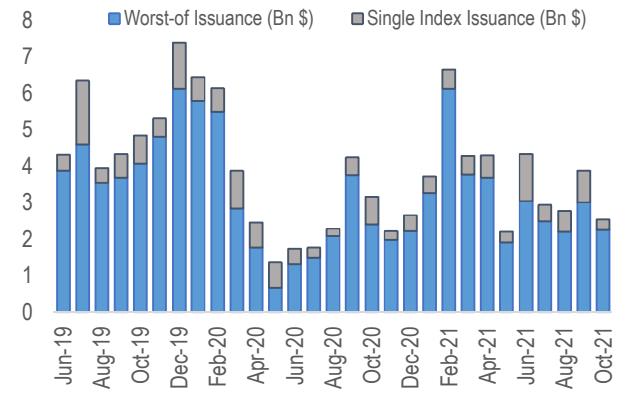


Source: J.P. Morgan Equity Derivatives Strategy, SRP.

Europe:

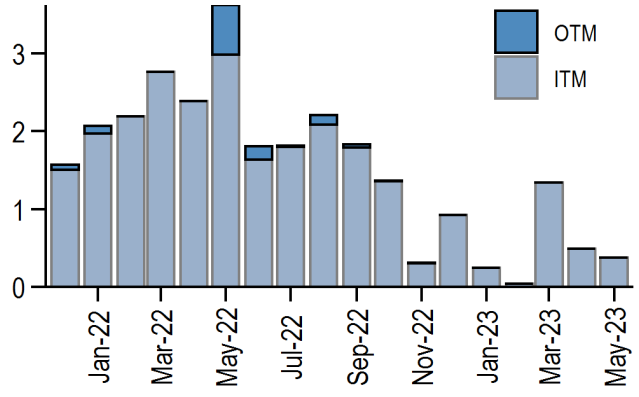
Issuance of European index autocallables picked up from the 2020 lows but remained below pre-Covid levels (Figure 21). The diminished issuance took place concurrently with a large number of knock-out events, indicating that a significant fraction of autocallables that knocked-out was not rolled into new products. Overall the effect of these changes was a net reduction of risk from autocallable throughout the year, and the rally in spot levels led to a further reduction of the risk originating from outstanding structured products. 2021 saw only a partial resumption of long-dated variance spread trades, which were common until 2018. We expect greater participation in these trades in 2022.

Figure 21: Issuance of Euro STOXX 50 structured products has not yet fully recovered to pre-Covid levels
Euro STOXX 50 structured product monthly issuance ($Bn)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 22: Knock-out observation dates are concentrated in the first part of 2022
Euro STOXX 50 autocallable notional by next KO observation date ($Bn)

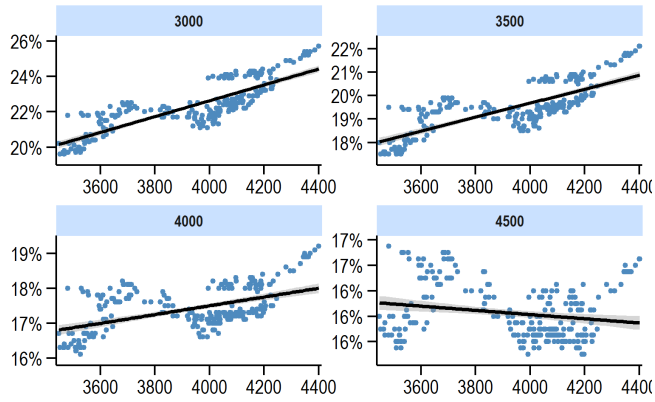


Source: J.P. Morgan Equity Derivatives Strategy, StructuredRetailProducts.com.

Despite the relatively benign dynamics and low issuance, structured product re-hedging had a material impact on Euro STOXX 50 long-dated volatilities in 2021. The vega change due to the spot rally and due to the knock outs led to a consistent positive correlation between Euro STOXX 50 long-dated, low-strike volatilities and the Euro STOXX 50 spot level (Figure 23). This "spot up, vol up" dynamic was driven by the re-hedging flows originating from exotic desks, which bought back long-dated puts that they had previously sold upon issuing autocallables.

Figure 23: Euro STOXX 50 low strike long-dated volatilities behaved in a spot up, vol up way during 2021

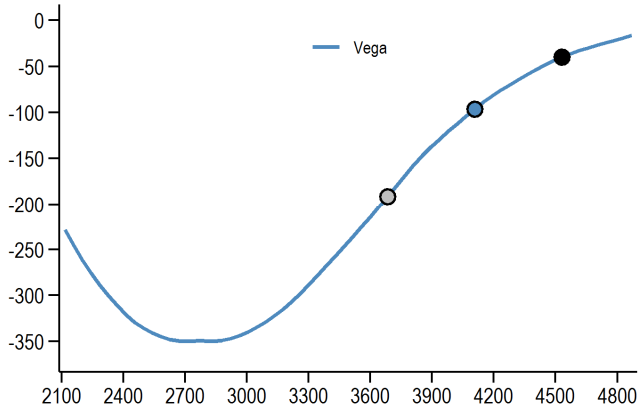
Euro STOXX 50 Dec-23 fixed strike vol (y-axis) vs. spot (x-axis) over 1Y



Source: J.P. Morgan Equity Derivatives

Figure 24: The Euro STOXX 50 d vega / d spot profile is relatively steep at current spot levels, but will flatten on a further rally

Euro STOXX 50 vega vs. spot profile of outstanding products ($ Mn)

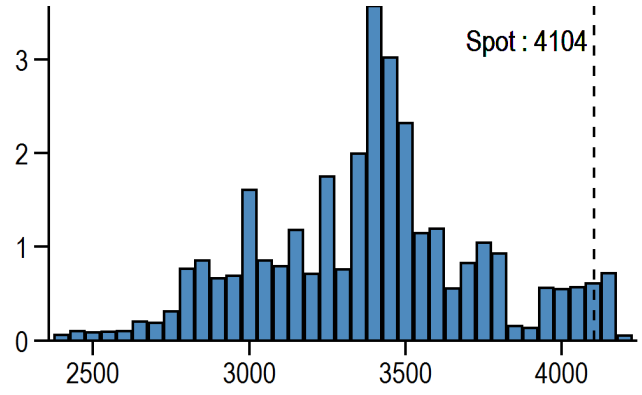


Source: J.P. Morgan Equity Derivatives Strategy, StructuredRetailProducts.com. Based on monthly issuance data and average spot levels. Please reach out to us if you are interested in the full methodology

We expect a continuation of the knock-out to last well into Q2 2022 (Figure 22), and we think that issuance will continue to recover slowly. These factors in combination with the positive spot outlook and the current, relatively steep vanna profile (Figure 24) will likely lead to a **continuation of the "spot up, vol up" dynamics in the first part of 2022**. The dynamics should lose some of their strength in the second part of the year after the majority of the knock-out events will have taken place. Currently a large fraction of the Euro STOXX 50 structured products are ITM with respect to their knock outs, and this picture would not materially change even after a mid-sized correction (Figure 25). The likelihood that the knock-out events will take place is therefore high, while the uncertainty stems from the new issuance levels and vanna.

Figure 25: Almost all Euro STOXX 50 single index autocallables are in the money with respect to their knock out levels

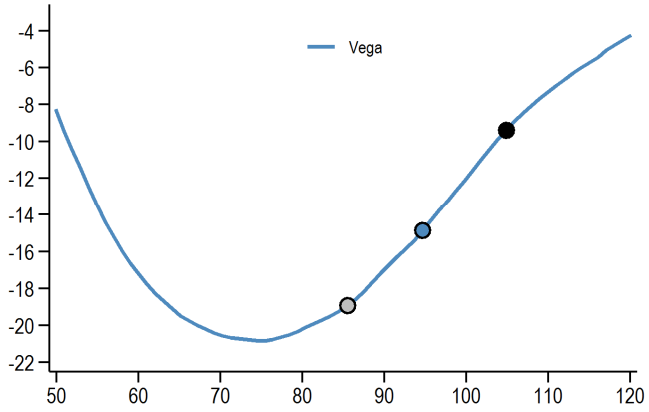
Euro STOXX 50 autocallable notional by KO level ($Bn)



Source: J.P. Morgan Equity Derivatives Strategy, StructuredRetailProducts.com.

Figure 26: The SX7E index is trading closer to peak vega than the Euro STOXX 50

SX7E vega vs. spot profile of outstanding products ($ Mn)



Source: J.P. Morgan Equity Derivatives Strategy, StructuredRetailProducts.com.

Looking at other major indices in Europe we find the picture for the **SX7E** particularly interesting. The SX7E spot is closer to the peak vega level relative to the Euro STOXX 50 and has a steep vanna profile (Figure 26). This allows structuring interesting long-dated volatility and skew relative value plays, in our view.

Asia:

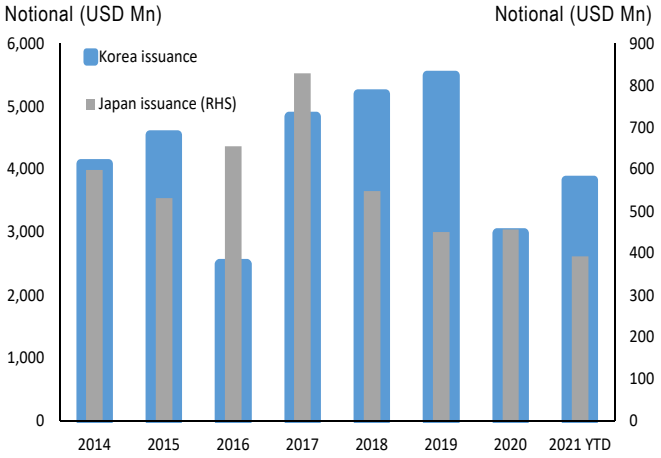
Volatility supply: Autocallable issuance saw a modest recovery this year in Korea. Based on data as of October-end, average monthly issuance notional stands at $3.8bn (Figure 27), which represents +28% yoy growth versus the monthly average in 2020. However, issuance remains weak compared to longer history (average monthly issuance is ~$4.2bn in 2016-2020). Relatively low reinvestment interest is among the major factors behind the sluggish issuance levels. This can be seen in materially higher redemptions of existing autocallable products versus issuance of new products, especially in 1H21 (see here). Back then, retail investors exhibited a strong interest in participation in the Korean stock market rally. We suspect the capital from structured product redemptions was deployed in cash equity investment, hence leading to lower than expected re-investment demand (see here). Another factor for the slow recovery of autocallable issuance is the persistent weakness in the H-shares in 2H21: spot has been trading below major knock-out barriers for most of the second half and thus prevented early redemptions of existing products. This in turn further delayed the redemption-reinvestment cycle of the ELS market (see here). In terms of underlying mix, S&P 500, Euro Stoxx 50, and KOSPI 200 are the most popular underlyings, making up 33%, 25%, and 14% of the total issuance notional based on 10M21 data. Market share of S&P 500 continues to rise this year, at the expense of H-shares and Nikkei 225.

In Japan, issuance activity for Uridashi products further deteriorated this year. As of October-end, we estimate $393mn Nikkei 225-linked products were issued on a monthly average basis this year. The number is 33% lower than that in the past five years (Figure 27). We attribute the soft demand to 1) subdued retail appetite in the product, potentially due to more attractive investment returns elsewhere and 2) lack of reinvestment demand in the second half, with Nikkei spot mostly trading below major knock-out barriers. With relatively muted issuance, Nikkei-linked autocallable products have yet to accumulate substantial notional outstanding: current Vega continues to sit around five-year low levels at around ~$20mn (based on data as of October-end).

Despite relatively low vega outstanding, we observed notable **volatility moves associated with autocallable vega re-hedging dynamics.** For example, in Japan, Nikkei longer dated volatility exhibited strong positive correlation versus Nikkei spot throughout the year (Figure 28). The “spot up, volatility up” phenomenon was most noticeable during sharp spot rallies such as those in 1Q21 and Sep21. Nikkei back-end volatility climbed higher as Vega profile slided up and autocallable dealers bought back significant amount of short longer-dated volatility positions. On the other hand, Nikkei longer dated volatility declined amid the spot grind lower in the summer and the material correction in October, driven by dealer re-hedging activity in response to higher vega outstanding (hence sold more longer-dated downside volatility).

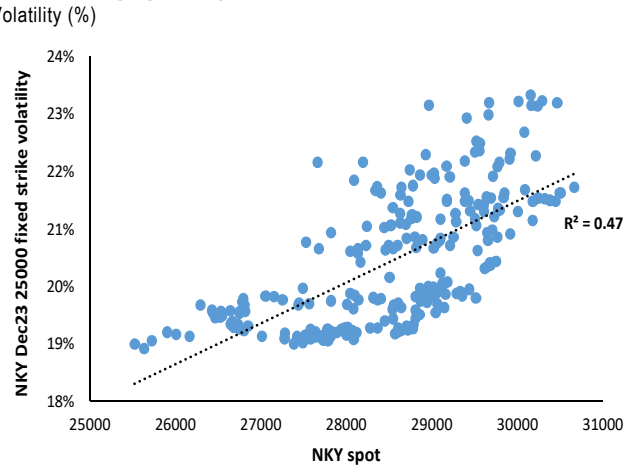
Among popular Korean autocallable underlyings, H-shares also experienced material dealer re-hedging impact this year. In July, due to a sharp sell-off and significant underperformance versus other indices in July, the H-shares saw a substantial increase of vega outstanding. Consequently, dealers were forced to supply more longer-dated volatility to the market. This in turn drove historic inversion of the H-shares back-end term structure (see Term Structure section). To a lesser extent, we also saw dealer re-hedging dynamics playing out on the KOSPI2 due to worst performer status in worst-of baskets, which the H-shares are not a part of.

Figure 27: Average monthly autocallable issuance in Korea and Japan



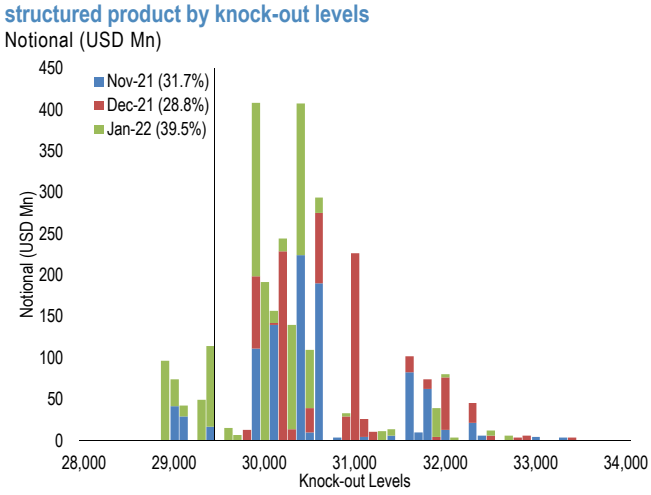
Source: J.P. Morgan Equity Derivatives Strategy, KSD, KIS Pricing, Bloomberg Finance L.P.
* Based on the issuance data as of October 2021 end, 2021 estimate is based on annualized issuance of 10M20 monthly average issuance.

Figure 28: Nikkei 225 longer-dated downside fixed strike volatility exhibited positive correlation versus Nikkei driven by autocallable dealer re-hedging activity



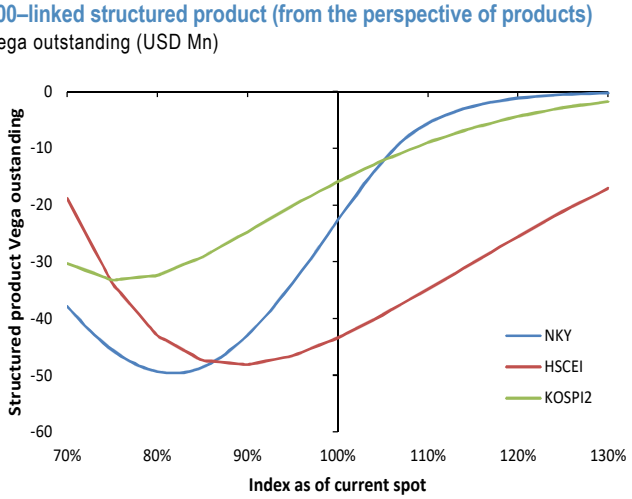
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Data from Nov 15, 2020 to Nov 15, 2021

Figure 29: Distribution of outstanding notional for Nikkei-linked structured product by knock-out levels



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Data for Japan issuance is for public offerings only and therefore may not represent an accurate picture. We believe private placements are about 1-1.5 times larger in notional.

Figure 30: Estimated vega profile for Nikkei 225, H-shares, and KOSPI 200–linked structured product (from the perspective of products)



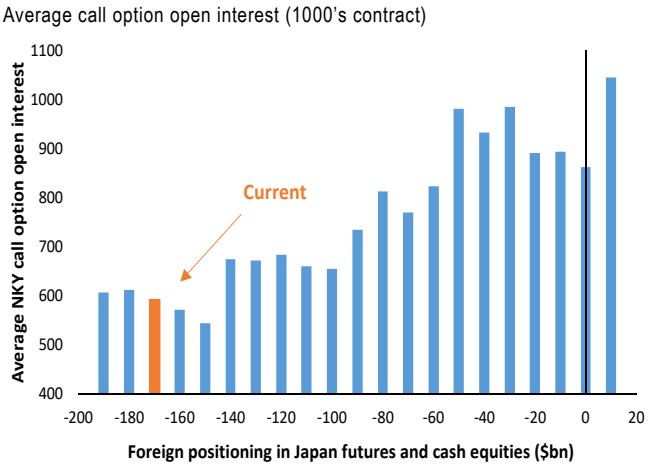
Source: J.P. Morgan Equity Derivatives Strategy, KSD, KIS Pricing, Bloomberg Finance L.P.
* Based on the issuance data as of October 2021 end. Data for HSCEI, and KOSPI2 includes Korean issuance only. Data for NKY includes both Japanese and Korean issuance. Data for Japan issuance is for public offerings only and therefore may not represent an accurate picture. We believe private placements are about 1-1.5 times larger in notional.

Looking ahead to next year, we expect structured product issuance to remain at similar levels in Korea but recover from a low base in Japan. While Korean issuance saw moderate recovery in the past couple of months, it was partly driven by rising coupon levels (due to higher implied volatility), in our view. Looking ahead, we think implied volatility will unlikely stay at elevated levels for a sustained period of time, which would limit the appeal of the structured products. The outlook for re-investment is also not supportive for a near-term recovery in autocallable issuance. H-shares spot continues to trade below major knockout levels, hence the redemption-reinvestment cycle will likely be further delayed, barring a meaningful recovery in H-shares spot (see here). Later next year, we could see comparatively higher re-investment demand assuming legacy products will gradually knock out. In Japan, we expect a relatively more notable pickup of demand from this year's low base. In the near term, a potential ramp-up of issuance activity could come from higher re-investment demand. Nikkei spot is currently trading just below major knock-out barrier concentration between 30,000 and 31,000

(Figure 29). If a sustained rally in Japanese equities into 2022 materializes (per our strategist's expectations), the vast majority of the legacy Nikkei-linked products will be knocked out by the end of next January. This will free up capital for re-investment on new products. Overall, we note the current autocallable notional outstanding remains at historically low levels, and we expect issuance to pick up from here.

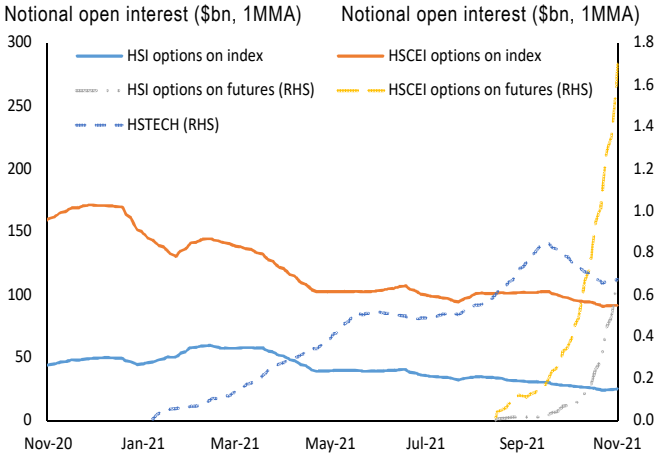
Next year, the spot dependency of vega hedging flows will likely remain an important factor for Asian volatilities; however, we think it is unlikely to become a major risk factor in the first half. Current notional outstanding of existing products remains at historically low levels, and re-accumulation will take at least a few months. Among popular underlyings of the Korean products, H-shares currently has the highest vega outstanding (due to worst performance in popular worst-of baskets). In case of further downside on the index toward the peak Vega zone, incremental supply of H-shares Vega will likely be limited. A sharper sell-off (spot moves significantly past peak Vega) will lead to dealers buying back short volatility positions. However, we think the scenario is a remote risk considering marginally better macro backdrop. On the other hand, KOSPI 200 is more vulnerable to Vega supply in case of moderate sell-off. In an extreme scenario, if the index sells off 20% and moves to the peak Vega zone, we estimate dealers' re-hedging flows could supply ~$20mn of KOSPI 200 vega (Figure 30). For Japanese products, we expect a more pronounced recovery of issuance from this year's low levels; we hence expect a faster re-building of vega outstanding in Japan. **In the second half, autocallable Vega re-hedging flows will likely become a more important risk to monitor, following a meaningful build-up of Vega outstanding.** A moderate spot correction will result in material volatility supply by autocallable dealers, and we will likely observe a "spot down, volatility down" phenomenon. While a remote risk, a sharper spot sell-off to the left of the peak Vega zone (more than 15% decline in spot) would lead to dealers buying back short volatility positions, driving longer-dated downside volatility higher (i.e., a "spot down, volatility up" phenomenon).

Figure 31: Demand for Nikkei 225 upside optionality remains muted as foreign positioning stayed at subdued levels



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Analysis only includes Osaka exchange listed Nikkei futures. Foreign positioning in Japan futures and cash equities is based on cumulative net inflows in futures and cash equities combined since 2016.

Figure 32: Liquidity materially increased for options on futures on HSI and HSCEI, as well as for options on the HSTECH Index; although overall option demand remains soft in Hong Kong



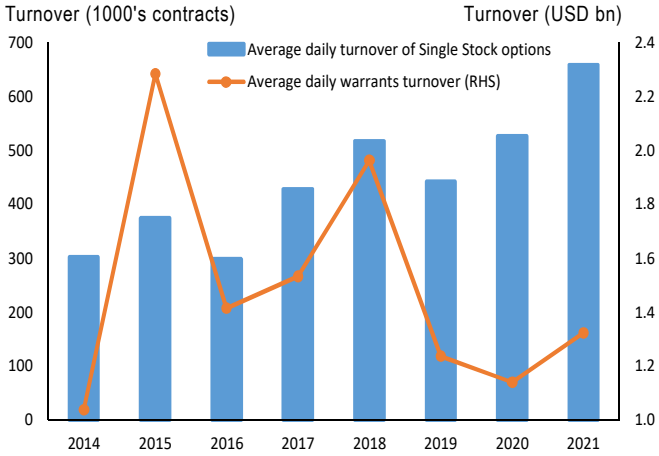
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Volatility demand: In Japan, demand for volatility remains subdued this year. Total open interest on Nikkei 225 call options recorded new lows over the past five years (in contract terms). We observe that the drop of Nikkei call open interest in recent years is in line with the trend of persistent foreign outflows (from both futures and cash equities, Figure 31). This suggests to us foreigners are among major demand drivers for Japan volatility, and the lack of foreign interest in Japanese equities in recent years is a key reason behind the muted volatility demand. Looking forward, we think demand for optionality continues to hinge on foreign investment flows in Japan. A potential recovery of buying activity by overseas investors could lead to a pickup of interest in Nikkei options from current depressed levels. This could occur in case of a sustained strong rally of Japanese equities.

In Hong Kong, liquidity in the listed option space further deteriorated this year, partially due to the US Executive Order on certain constituent companies that induced trading restrictions on the Hang Seng and H-shares. However, **we see encouraging signs of broadening availability and increasing adoption of new derivative tools** in Hong Kong. In August, the Hong Kong Exchange launched options on Hang Seng and H-shares futures, which are not affected by the Executive Order. While still early stages, the options on futures have attracted significant interest. In addition, we note the new Technology-focused flagship index, Hang Seng Tech, has also gradually gained popularity as an option underlying (Figure 32). On the warrant front, demand remains relatively low, despite a modest pickup compared to that last year. The muted growth in warrants contrasts with continued strong growth (+25% yoy) on single-stock options listed on the HKEx (Figure 33). As a result, volatility impact from the warrant dynamics is minimal this year. **Looking ahead, we expect warrant demand to remain relatively muted in the near term; a meaningful recovery of warrant demand hinges on material improvement of risk sentiment in the Hong Kong / China market.**

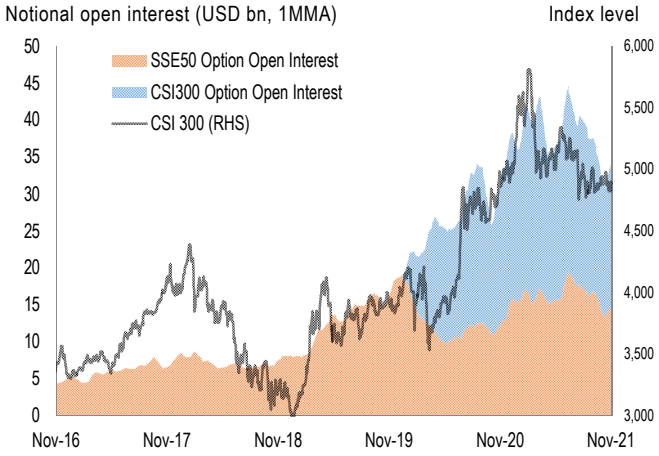
Unlike the Hong Kong market, the China onshore market continued to see healthy growth of option trading activity. Total notional open interest of listed options (across SSE50 and CSI 300) saw a +7% increase on a yoy basis, even after a significant drop from the highs in 1H21 (Figure 34). Outside of listed options, anecdotal evidence suggests structured products have become increasingly popular in the China onshore market this year. **We expect derivative activity to further rise in the China onshore market next year, driven by a structural trend of increasing adoption of derivatives.**

Figure 33: Hong Kong single-stock option activity further improved this year, while warrant turnover remains historically low



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P., HKEx * 2021 data is as of Nov 17, 2021.

Figure 34: Total China A-shares listed option notional open interest recorded new highs in 1H21 but trended lower as equities declined



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

On longer dated tenors, interest in volatility relative value strategies remains low but saw some modest recovery this year. The trade, where volatility arbitragers / pension funds go long volatility / skew in Asia and short that in developed markets to mitigate the cost of carry, suffered significant losses during the COVID shock as well as in Feb '18 and Dec '18, when DM realized volatilities materially overshot Asian counterparts. Mindful of the sharp losses in recent years, volatility arbitrage investors have started to seek more innovative implementations, with better match of risk profile and lighter exposure to DM downside risks, to trade volatility RV. For example, there has been increasing interest on synchronous variance spread, where the variance sampling is done at the same time for both legs in Asia (sampling on the DM leg is on futures), and corridor variance swap (CCVS) with the DM leg as the corridor observation leg has also started to gain traction. Interest in convexity risk premia collection strategies (through pair trades of variance / volatility, variance / vanilla and variance / up-variance spreads, etc.) also remains subdued, despite persistent elevated convexity risk premia (see Skew section). **In 2022, we expect volatility relative value and convexity risk premia collection strategies to continue to recover gradually** as investors further adopt the more innovative trade implementations.

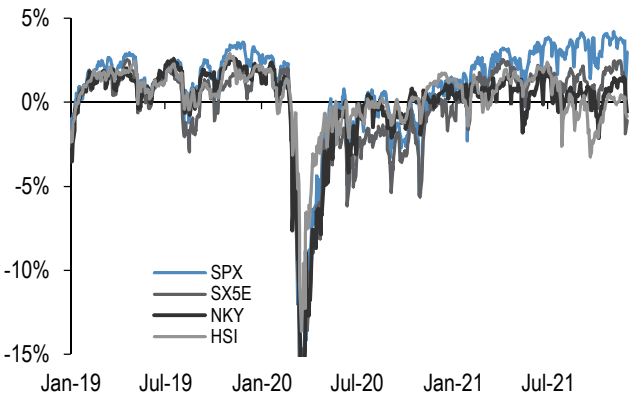
Term Structure

Global term structures continued to normalize this year from the sharp inversion caused by a large volatility spike early during the COVID-19 pandemic (Figure 35). We entered 2021 in a medium- to high-volatility regime with relatively flat global term structures. We then transitioned to a medium volatility regime and upward sloping term structures for most of the last three quarters of 2021 as vaccination spread and the recovery progressed. However, hedging demand (e.g., given lingering uncertainty around the pandemic and its effects on various aspects of the economy and policy) and more limited supply from structured products in Europe and Asia supported medium/longer-term parts of the curve, even as the shorter end was pulled toward the relatively low realized volatility this year. As a result, global term structures were upward sloping for most of the year but for most indices remained flatter than pre-pandemic (Table 2). However, term structures flattened significantly (in some cases inverting) on the recent Omicron variant scare. We see scope for further normalization of short-dated volatility in 2022 and steepening of the front-end of term structures, particularly in Asia where term structures remain relatively flatter.

Table 2 shows 12M-3M term structure stats across indices and compares their YTD averages to the past few years. Below we discuss the volatility term structure drivers for each region in greater detail.

Figure 35: Term structures continued to normalize from their sharp inversion at the start of the pandemic last year...

12M-3M ATM implied volatility spread



Source: J.P. Morgan Equity Derivatives Strategy.

Table 2: … and were upward sloping for the majority of 2021

12M-3M ATM Vol Spread	2021 YTD Avg	2020 Avg	2019 Avg	Y/Y chg in Realized Vol	% of 2021 Upward Sloping
SPX	2.7%	-1.8%	1.7%	-21.6%	98%
NDX	1.7%	-2.5%	1.3%	-18.2%	86%
RTY	-0.3%	-4.2%	1.0%	-21.1%	43%
SX5E	1.3%	-2.9%	0.8%	-17.7%	90%
UKX	1.2%	-2.7%	0.9%	-16.4%	92%
DAX	1.6%	-2.7%	1.0%	-18.9%	95%
NKY	0.6%	-1.8%	1.3%	-6.9%	81%
HSI	0.4%	-0.8%	1.2%	-2.9%	69%
HSCEI	0.5%	-0.5%	1.6%	-0.9%	72%
AS51	1.3%	-1.7%	1.3%	-17.9%	95%
KOSPI2	0.5%	-2.1%	0.9%	-11.0%	73%

Source: J.P. Morgan Equity Derivatives Strategy.

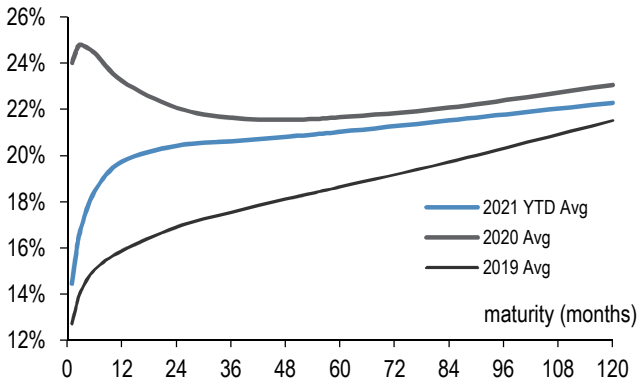
US: Volatility term structures on US large-cap indices normalized late last year after the first approvals of COVID-19 vaccines and the US election and remained upward sloping through most of 2021 on the S&P 500 and Nasdaq 100 as we remained in a medium volatility regime and the market grinded higher for most of the year. While front-end S&P 500 volatilities significantly normalized from their spike last year, ~1-2Y volatilities remained stickier given robust hedging demand and as they priced in longer-term market worries (e.g., around inflation/monetary policy tightening), leading to a steep S&P 500 term structure (Figure 36). Additionally, investors retained significant net long vega positions in VIX ETPs throughout this year (discussed in the Volatility Supply and Demand section), leading these products' rebalancing flows to steepen the 1-2M part of the curve (since their VIX futures holdings are rebalanced every day by selling the front contract and buying the second month contract, in order to maintain a fixed 1M average tenor).

In the longer-dated space, as discussed in the Volatility Supply and Demand section, the shift in demand/supply dynamics continued this year with still subdued demand from VA hedgers and robust supply from structured products and RILAs, though little supply via vol spread trades. Although the structural shift in demand/supply would suggest long-dated volatility should have underperformed, this year the 1-5Y part of the curve moderately outperformed on a beta-adjusted basis (though fell in absolute terms, along with the rest of the curve). While we can't fully explain the cause of the outperformance of this part of the curve, two factors are likely at play: 1) increased hedging demand in the shorter end of that bucket as we anecdotally saw strong demand for OTM puts in 6M-2Y tenors this year and 2) the persistent/strong market rally and the S&P 500's outperformance vs. the Russell 2000 throughout most of this year meant that autocallable vol supply in the S&P 500 was more limited/short-lived and most was subsequently bought back as worst-of products' vega exposure shifted to the

Russell 2000 (as the worst performing index), and/or products rallied away from KI put strikes or were called. **In 2022, we expect recent long-dated S&P 500 volatility structural demand/supply trends to remain in place, keeping pressure on this part of the curve** due to increased supply from structured products and RILAs and subdued demand from variable annuities. Since we forecast moderate upside in the S&P 500 (2022 year-end target of 5050) and for the Russell 2000 to outperform, autocallable vol supply may be stickier, creating increased pressure on long-dated S&P 500 volatilities in 2022.

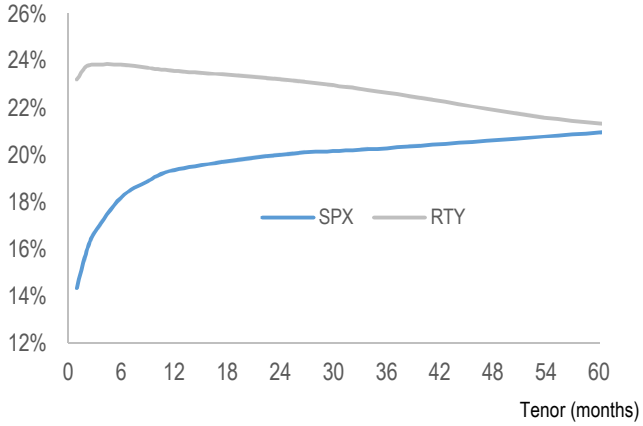
The Russell 2000 was a standout from the above-discussed trends, with its term structure staying inverted for most of this year (Figure 37). As we discussed in our 2021 Outlook, this disconnect between the Russell and S&P term structure was driven by the Russell's higher volatility during the pandemic recovery due to investors rotating between lockdown and recovery beneficiaries, the much larger impact of structured product dynamics on the Russell, and the larger natural demand for long-term volatility on the S&P 500 for hedging programs. Given the Russell's heavier autocallable issuance (discussed in the Volatility Supply and Demand section), the index's outperformance in 4Q20/1Q21, and again in 4Q21, resulted in many products knocking out, while those that remained had significantly lower vega exposure as the product rallied away from the KI put strike, causing dealers to buy back short vega positions as the spot rallied (Figure 18). This put upward pressure on Russell shorter-dated implied volatilities (since the tenor of these products shortened), while notional from newly issued products was rolled into new products that pressured the back end of the curve.

Figure 36: The vol curve continued to normalize this year but with outperformance of 1-5Y vols on a beta-adjusted basis
S&P 500 ATMF vol by tenor



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 37: Structured product dynamics and higher realized volatility on RTY sustained the divergence between RTY and SPX term structures this year
YTD average ATM volatility



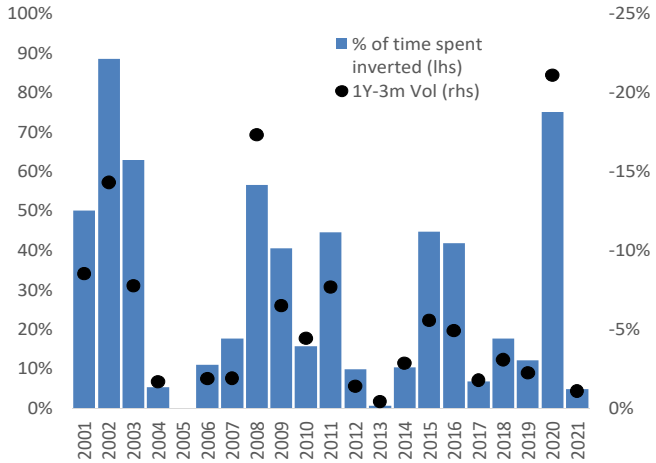
Source: J.P. Morgan Equity Derivatives Strategy.

Europe:

Along with other risk premia, term-structures across European indices have normalized and, until recently, were steep, upward sloping. This has rapidly changed with the arrival of Omicron and the steep increase in risk premia. Nevertheless, while for much of 2020 the term-structure in Euro STOXX 50 was inverted reflecting heightened risk aversion, 2021 saw a term-structure that was rarely inverted. Indeed, rarely over the last 20 years have we seen the term-structure (1Y-3M ATM) in any given year remain upward sloping so consistently as can be seen in Figure 38.

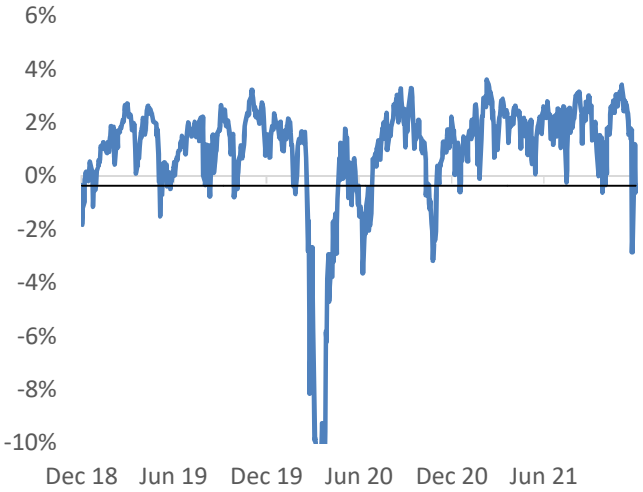
Figure 39 shows the more reactive, front end of the curve of SX5E (3M-1M ATM Vol) showing the steep inversion recently witnessed. However, for most of 2021 through the various, short corrections we have seen the term-structure hardly inverted, reflecting the underlying bullish confidence of market participants, reverting invariably and quickly to "buy the dip." We believe the market will ultimate look through Omicron, and the retracing of term-structure inversion already seen suggests this view is proving correct.

Figure 38: While much of 2020 the term-structure in Euro STOXX 50 was inverted reflecting heightened risk, 2021 was all about normalization back to historically low levels of "invertedness"
SX5E 1Y-3M ATMF volatility



Source: J.P. Morgan Equity Derivatives Strategy.

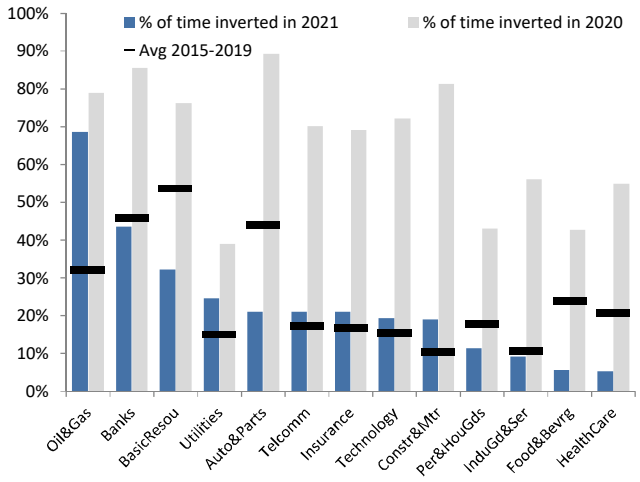
Figure 39: The same is true on the very front end of the curve even if the recent Omicron scare triggered the first pronounced inversion
SX5E 3M-1M ATMF volatility



Source: J.P. Morgan Equity Derivatives Strategy.

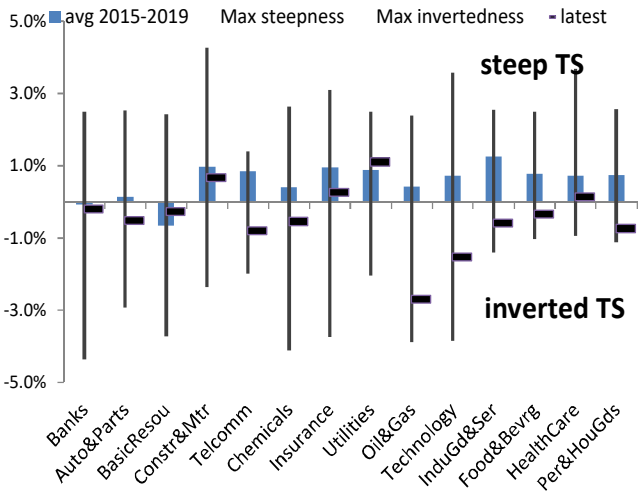
At the sector level the same picture emerges. The term-structures (1Y-3M ATMF Vol) of most sectors spent considerably less time being inverted during 2021 compared to 2020 and compared to longer term averages (Figure 40). The only notable exception is the Oil & Gas sector where for much of the year the term-structure was inverted, despite the strong rally we have seen in the underlying commodity but commensurate with the lackluster performance of the sector in the first half of the year. However, as we approach the end of the year, Omicron triggered an inversion across most sectors (Figure 41).

Figure 40: At the sector level term-structures showed similar levels of normalization during 2021 with average to below average amount of time spent inverted – notable exception is the Oil & Gas sector
European Sectors: 1Y-3M ATMF volatility term structures



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 41: As we approach the end of 2021, Omicron triggered an inversion of the term-structure across most sectors
European Sectors: 1Y-3M ATMF volatility term structures



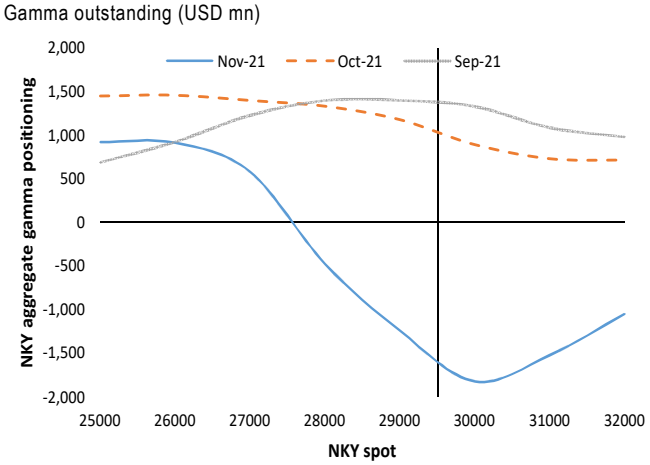
Source: J.P. Morgan Equity Derivatives Strategy.

Asia:

Front end: Front-end volatility term structures on major Asian indices were upward sloping most of the time this year. The portion of time 12M – 3M ATMF volatility spread is positive stands at 85% on the Nikkei 225, 72% on the KOSPI 200, and 76% on the H-shares at the time of writing. The term structure inversion moves observed this year were mainly driven by

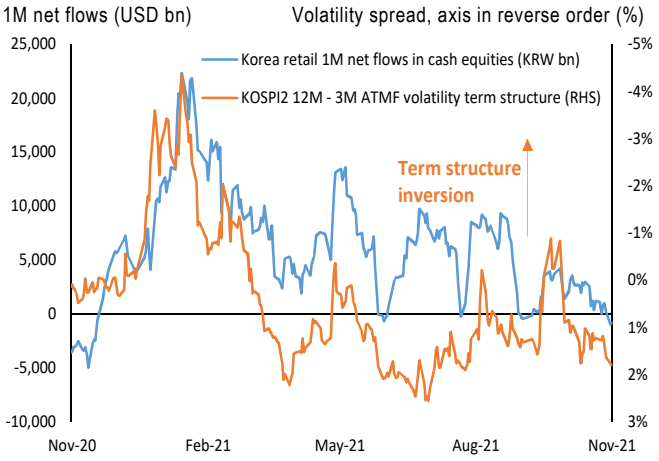
idiosyncratic risk factors for various indices. In Japan, the political uncertainty in 2H21 and derivative hedging flows were among major drivers of front-end volatility spikes. Our analysis suggests dealers were overall short gamma on the Nikkei 225 in September and October (due to relatively high option demand), when political uncertainty was at the heights. In November, dealers turned long gamma as the political uncertainty diminished when Kishida was elected as the new LDP leader (Figure 42). Driven by the dealer hedging activity from this dynamics, the Nikkei spot moves were amplified in September and October, which in turn led to term structure inversions. However, in recent weeks, dealer hedging activity has suppressed realized volatility as dealers turned overall long gamma. For the Korean market, retail activity became a major volatility driver: intense retail inflows coincided with inversion / flattening of the 12M - 3M ATMF volatility term structure in the past year, especially in 1Q21 (Figure 43). Outside of retail flows, we note the interest rate hike cycle in Korea (first hike in the EM complex) also contributed to higher volatility in the second half (see here). In Hong Kong / China, concerns over Property debt default risks intensified in the second half, amid the Evergrande liquidity crisis. Changes in China credit spread became a key factor for VHSCEI moves. For example, VHSCEI experienced a sharp increase in September at the heights of the widening of China credit spread (Figure 44, see here for more details).

Figure 42: Estimated Japan index-linked derivatives net gamma outstanding in Sep, Oct, and Nov (USD Mn, from the perspective of products)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Gamma is aggregated across major sources including listed options, autocallables and leveraged ETFs.

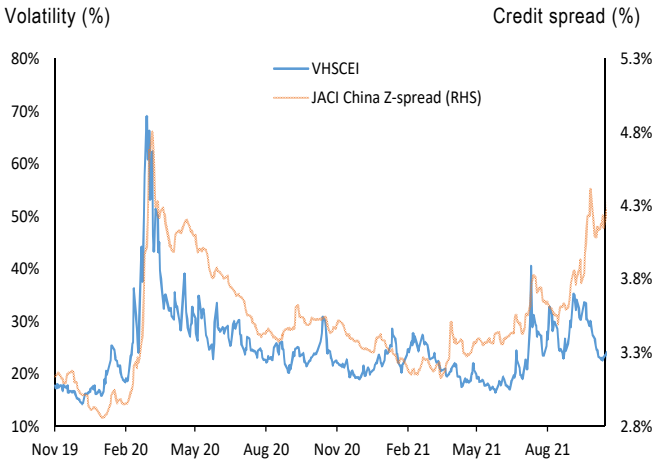
Figure 43: KOSPI 200 1Y – 3M ATMF volatility term structure versus 1M rolling sum of Korea retail net flows in cash equities



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

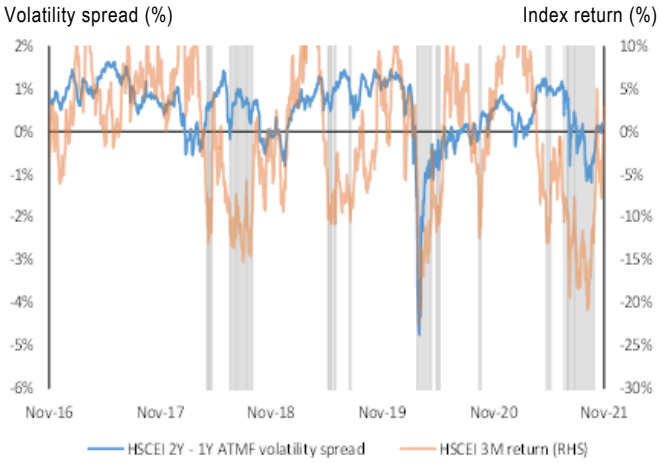
Mid to back end: With sluggish structured product issuance, we saw relatively light selling impact from newly issued products on Asia back end volatility (see Volatility Supply and Demand section). On the other hand, re-hedging dynamic of existing products remained influential on the Asian volatility term structure. This is most noticeable on the H-shares. In 3Q21, H-shares spot experienced a sharp drawdown and the index became the worst performer in popular Korean autocallable worst-of baskets. Consequently, a large portion of vega outstanding was shifted to the H-shares, and dealers had to further supply significant amount of longer-dated downside volatility to the market to re-hedge, which in turn led to notable inversion of the H-shares 2Y – 1Y ATMF term structure (Figure 45).

Figure 44: H-shares volatility (VHSCEI) versus China corporate bond spread (JACI China Z-spread)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 45: H-shares back-end term structure (2Y – 1Y ATMF spread) versus spot 3M returns



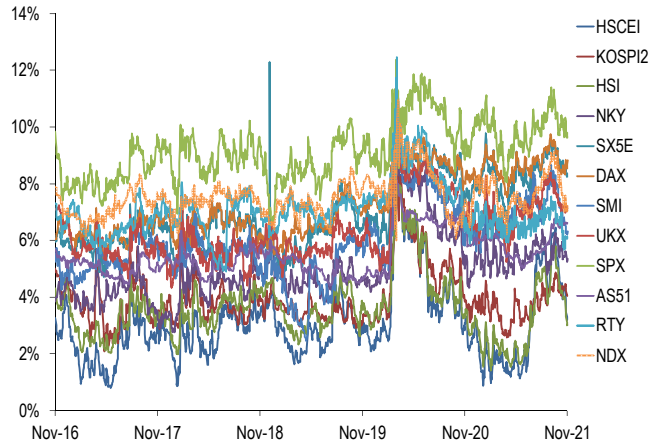
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Shaded area correspond to periods where H-share 3M return is below -10%.

Looking ahead in 2022, we see potential for further normalization of front-end term, particularly for the Nikkei. In Japan, dealer gamma positioning and related hedging impact will remain a major driver for short-dated volatility. Our analysis suggests that aggregate dealer gamma has shifted toward the long side following the conclusion of the general elections. Dealer hedging activity should continue to suppress realized volatility in the near term. However, in case of a significant shift of derivatives positioning (potentially driven by a risk catalyst), and dealers turning significantly short gamma on aggregate, we could observe periods of higher volatility on the short end. In Hong Kong / China, our analysis suggests H-shares volatility could decline from current levels driven by a narrowing of China credit spread and bottoming of global data (see Outlook for Markets and Volatility section). **On the back end of Asian term structures, we expect a more pronounced recovery of autocallable issuance in Japan,** which will exert downward pressure on back-end volatility on the Nikkei 225 next year. **Middle to back-end term structure will likely flatten** as a result (see Volatility Supply and Demand section).

Skew

In 2021, skews of major global indices continued to trade relatively rich, notwithstanding an absence of significant global risk shocks. Hedging demand remains relatively strong throughout the year as investors seek to protect gains from the impressive equity rally. In September, global equity skews reached highs driven by concerns of inflation and bond volatility. However, the risk shock soon normalized, and skews have flattened somewhat in 4Q. At the time of writing, the S&P 500 ranks the highest in terms of absolute skew levels, followed by major European indices such as DAX and Euro Stoxx 50. On the other hand, Asian skews are comparatively less distressed, with Hang Seng and H-shares ranking the lowest in terms of 6M 90% - 110% volatility spread. On a relative basis, skews of DAX and ASX 200 are among the highest compared to their own history, sitting at the 88%ile over the past five years (Table 3).

Figure 46: Global index skews continue to trade at relatively steep levels in 202



Source: J.P. Morgan Equity Derivatives Strategy.

Table 3: Summary of 6M skews across the globe – sorted by current 6M 90%-110% skew spread

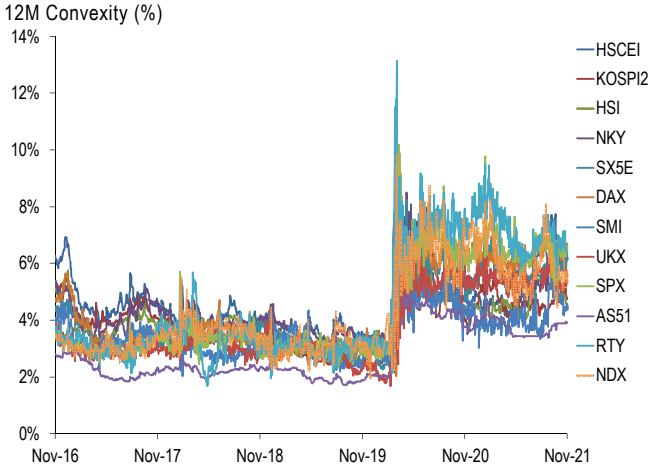
6M 90%-110%

Skew	Current	5Y %tile	Avg	Max	Min
SPX	9.7%	71%	9.2%	12.4%	6.6%
DAX	8.8%	88%	7.3%	9.8%	5.2%
SX5E	8.4%	78%	7.0%	12.3%	4.7%
NDX	7.2%	34%	7.5%	11.0%	6.0%
UKX	7.2%	79%	6.4%	10.9%	4.3%
AS51	6.6%	88%	5.5%	8.1%	4.4%
SMI	6.3%	67%	6.0%	10.8%	2.5%
RTY	6.2%	10%	7.1%	12.5%	4.9%
NKY	5.4%	74%	5.0%	9.4%	2.8%
KOSPI2	4.1%	69%	4.0%	9.5%	2.1%
HSCEI	3.2%	62%	3.1%	8.4%	0.8%
HSI	3.1%	32%	3.6%	8.0%	1.4%

Source: J.P. Morgan Equity Derivatives Strategy.

Convexities, as measured by the spread between variance and ATMF volatility, also stayed at historically elevated levels. The persistent hedging demand and the muted activity of convexity risk premia strategies are likely the main reasons behind the stressed convexities. At the time of writing, 12M convexities are trading above respective 70%iles over the past five-year history across major global indices. In absolute terms, 12M convexity is the highest on the DAX and S&P 500, while SMI and ASX200 rank at the bottom by the same measure (Table 4).

Figure 47: Index convexities across major global indices stayed elevated throughout the year



Source: J.P. Morgan Equity Derivatives Strategy.

Table 4: Summary of 12M convexities across the globe – sorted by current 12M convexity level

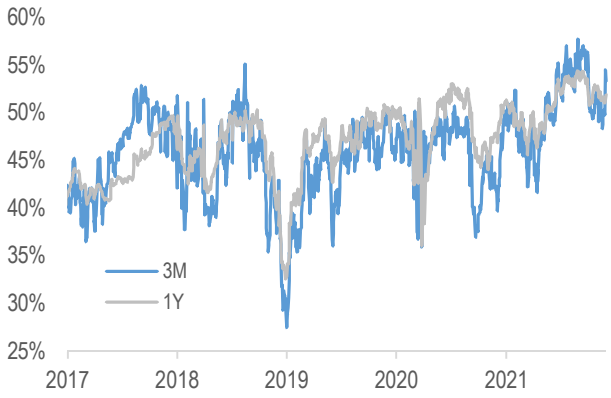
12M

Convexity	Current	5Y %tile	Avg	Max	Min
DAX	6.6%	93%	4.4%	8.2%	2.0%
SPX	6.5%	83%	4.3%	12.1%	2.1%
RTY	6.4%	71%	4.6%	13.1%	1.7%
SX5E	6.1%	91%	4.1%	8.5%	1.9%
NKY	5.6%	83%	4.6%	9.2%	2.1%
HSCEI	5.5%	83%	4.6%	8.4%	2.8%
UKX	5.3%	78%	3.8%	7.1%	1.7%
NDX	5.3%	72%	4.2%	9.9%	1.9%
KOSPI2	4.7%	81%	4.0%	8.3%	2.2%
HSI	4.4%	71%	4.1%	7.5%	2.7%
SMI	4.4%	82%	3.6%	10.2%	2.0%
AS51	3.9%	81%	2.8%	6.2%	1.7%

Source: J.P. Morgan Equity Derivatives Strategy.

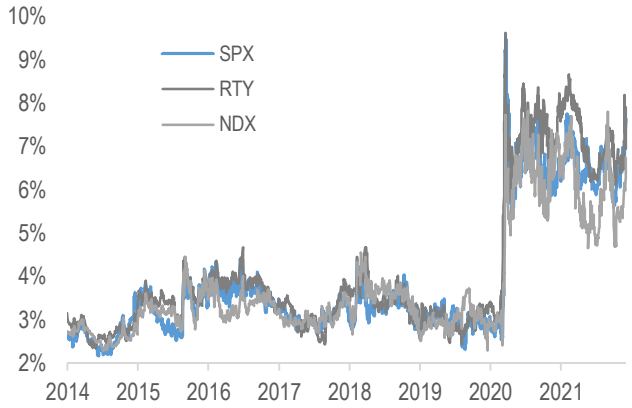
US: Despite the strong market rally to record highs this year, S&P 500 skew (Figure 48) and convexity (Figure 49) continued to trade at distressed levels and put skew steepened further this year to reach record highs during the delta variant wave over the summer (as we discussed here). In our view, this was driven by a combination of 1) strong hedging demand as investor positioning increased (e.g., we note the S&P 500 put/call OI ratio also surged to record highs this summer and remains elevated at the time of writing), while markets had to climb a wall of worry throughout the year related to the pandemic, inflation, monetary policy, speculative flows potentially boosting some segments unsustainably, etc., that kept investor sentiment subdued; and 2) the slow recovery of volatility risk premium strategies after they suffered steep losses during last year's crisis, which reduced supply. We continue to favor monetizing these distressed derivatives risk premia, particularly after they surged again during the Omicron variant scare, and discuss our favored ways to do so in the Trade Ideas section. Even if implied skew/convexity levels remain elevated (in case selling flows remain limited and insufficient to bring them down), selling these risk premia makes for an attractive carry trade to play the implied to realized spread.

Figure 48: S&P 500 skew is near record steep…
S&P 500 25d skew as a % of ATMF vol



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 49: …and convexity continues to trade at distressed levels
1Y Variance-ATMF spread



Source: J.P. Morgan Equity Derivatives Strategy.

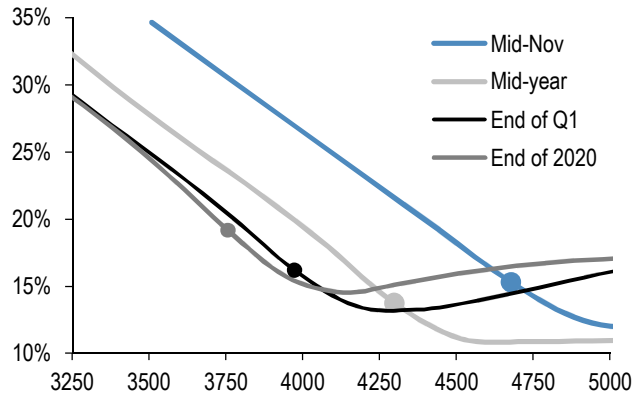
Additionally, as we discussed in past Outlooks, a number of factors continue to contribute to the S&P 500's structurally steep skew:

1. Structural demand/supply forces—as discussed in the Volatility Demand and Supply section, we generally see robust demand for OTM put hedges on the S&P 500, and persistent upside call supply from overwriters to generate yield.
2. In conjunction with these structural flows, the effects of dealer gamma hedging of the large index option complex reinforces a steep skew. Given a clustering of hedges (dealer short put positions) below the spot level and overwrites (dealer long call positions) above the spot, dealers typically turn short gamma during sell-offs and long gamma when the market rallies. This causes a large dependency of realized volatility on relative spot movements (Figure 9), which is priced into the skew.
3. Regulatory and capital requirements support steep skew as they require dealers to hold additional capital against instruments that are subject to losses in stress scenarios, such as being short puts. Given the S&P 500's deep option liquidity and the US market's large market cap share of global equity markets, the S&P 500 is the world's main hedging underlier and is thus the main contributor to the capital requirements surrounding banks' index option books.
4. S&P 500 long-dated skew remains steeper than its major international counterparts due to its relatively smaller structured product market and the demand for long-dated puts from the Insurance industry (discussed in the Volatility Supply and Demand section). However, the relatively larger impact of structured product hedging and lower natural hedging demand on the Russell 2000 and Nasdaq continues to drive a significant divergence between Russell 2000 and Nasdaq vs. S&P 500 longer-dated skew (Figure 51).

For the first half of the year, S&P 500 volatility was in largely a "sticky strike" regime—as volatility continued to normalize from last year's spike, short-dated volatility mostly slid down the skew. However, around midyear the market found a floor volatility level (e.g., VIX ~15) and from there generally traded in a "sticky delta" regime, where the skew slid to the right and fixed strike implied volatilities reset higher alongside the spot (Figure 50).

Figure 50: S&P 500 implied volatility was largely in a sticky strike regime in H1 and a sticky delta skew regime in H2

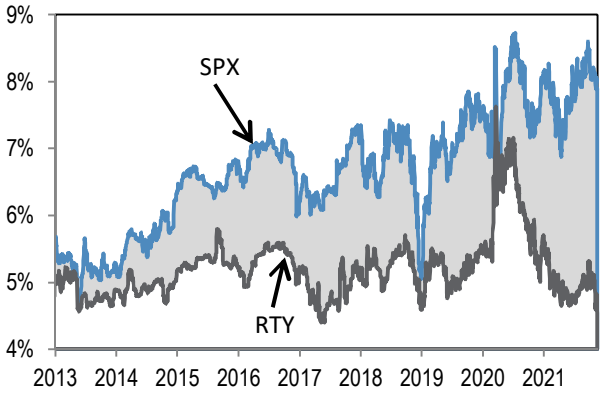
3M Fixed Strike Skew



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 51: The spread between Russell 2000 and S&P 500 long-dated skew remained wide last few years due to structured product flows and more limited hedging demand in the former

1Y 90-110% Skew

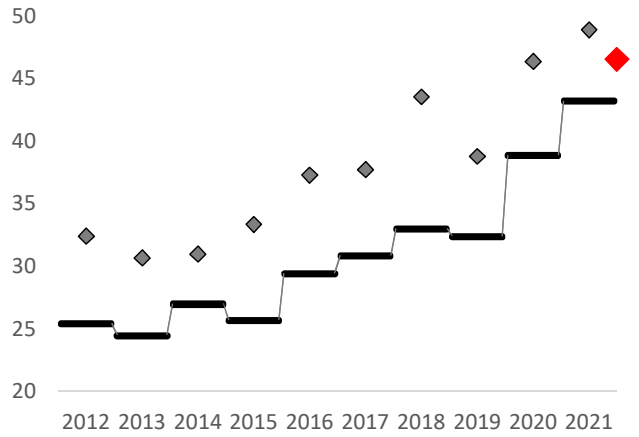


Source: J.P. Morgan Equity Derivatives Strategy.

We expect the same skew drivers to largely remain in place heading into 2022, keeping S&P 500 skew steep (i.e., continued structural protection demand and overwriting supply, gamma hedging effects, persisting regulatory impacts, and more limited structured product supply effects), **but we could see incremental flattening on a rebound of vol risk premia selling.** We are also likely to see skew continue to flatten during large market corrections as option demand/supply dynamics shift during these events—i.e., we often see a plunge in the put/call OI ratio as investors reduce exposure via delta-1 vehicles rather than buying expensive puts, monetize their existing hedges, and buy calls to hedge right tail risk from being underweight or short equities (as discussed here). The current steep S&P 500 skew makes short skew structures attractive, in our view, which we discuss in the Trade Ideas section.

Europe: Skew is perhaps the single most important derivatives risk premium "non-derivatives" fund managers should pay attention to. With the advent of Covid-19 in 2020 and economies shutting down we saw an extreme and wholesale rise in risk premia, which has subsequently normalized over the course of 2021 (even if this has reversed recently due to Omicron). Indeed, up to the Omicron scare in many areas the normalization had gone past pre-Covid levels (e.g., equity valuations, dividends, index volatility, term-structure, etc.). Skew (along with convexity) on the other hand, is one of the few risk premia that remained stubbornly elevated and never "normalized" to average pre-Covid levels but, instead , remained at average 2020 levels on a simple 90/110% forward vol basis. Adjusted for ATMF volatility, skew stands out even more. On this basis skew has in fact steepened further over the course of 2021 across all major indices in Europe in contrast to other risk premia, as the graph showing normalized 25 delta skew in the Euro STOXX50 illustrates in Figure 52. The recent spike due to Omicron is clearly visible. One driver for this phenomenon may well be the cancellation of structured products and the subsequent, necessary unwinding, i.e., repurchase of short, long-dated OTM vanilla puts by exotic desks as we commented on here. While this may be a contributing factor on the long end of the curve, it is hard to argue the same on the short end of the term-structure where we see the same phenomenon across indices as the two-year percentiles of normalized 25 delta skew for various option maturities in table Figure 53 shows. Heightened risk perception and fear for any market correction would be the conventional explanation on the short-end. But again, we did not see similar fear being priced in other places prior to Omicron. While we do not have any exhaustive explanation for the unusually high level in skew, making it tricky to advocate pure skew plays, we think at the these levels long delta via short skew structures are superior to straightforward delta 1 and as such steep skew presents an excellent opportunity to express directional views, perhaps of particular interest to "non-derivatives" fund-managers. We have expressed our bullish view on European equity indices accordingly throughout the year and continue to do so looking into 2022.

Figure 52: Euro STOXX50 skew shifted up as the pandemic hit and, unlike other risk parameters, did not normalize in 2021 but extended further. Omicron only exacerbated this feature.
SX5E 3M, normalized 25D Skew – annual avg and max (dot); latest (red dot).



Source: J.P. Morgan Equity Derivatives Strategy.

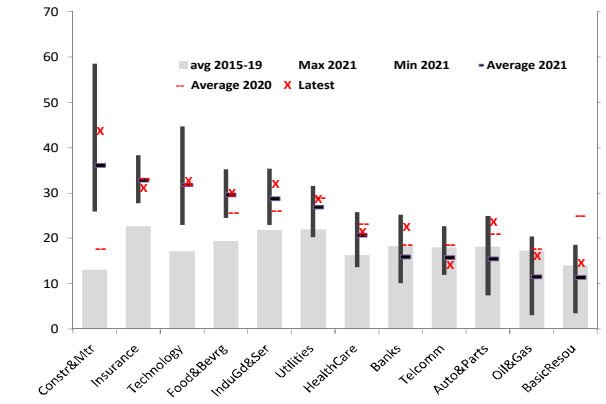
Figure 53: This phenomenon can be observed consistently across the term-structure and across all major European country indices
Percentiles (2 years) of 3M, normalized 25D Skew

2%ile	3m	6m	9m	12m	24m
SPX	91%	76%	76%	77%	84%
SX5E	92%	96%	87%	82%	71%
DAX	96%	95%	86%	92%	53%
UKX	90%	89%	61%	69%	37%
SMI	85%	93%	91%	88%	22%
FTSEMIB	95%	83%	69%	95%	12%
CAC	84%	89%	84%	73%	64%
IBEX	80%	86%	92%	93%	98%
OMX	89%	95%	97%	98%	99%

Source: J.P. Morgan Equity Derivatives Strategy.

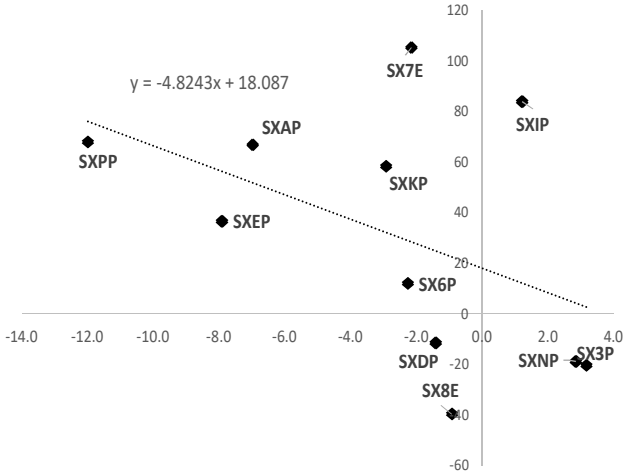
At the **sector level**, a disparate picture emerges. Normalized 3m 25 delta skew in defensive sectors and some less liquid cyclical sectors continued to trade at similarly elevated levels observed in 2020 and, thus, above pre pandemic levels. This was contrasted by the sharp declines in skew we had seen in cyclical sectors throughout the year which has reversed only recently due to Omicron (see Figure 54). Especially, in Oil & Gas, Basic Resources, Autos, and to a lesser extent, in Banks skew traded at extreme lows earlier in the year, often with inverted upside-skew driven by large demand for upside exposure in these sectors as economies opened up and confidence in economic recovery returned. This prompted us to recommend call spreads, call ratios, call ladders, or appearing call spreads, as efficient ways to express our preference for these pro-cyclical, recovery plays at the time (see here, here). Figure 55 illustrates how the largest y-o-y declines in skew took place in these cyclical, value sectors, even if levels have moved back up to longer term average levels since, and indeed, in some instances, such as in Autos or in Banks to sufficiently steep levels that we are now recommending taking advantage of elevated skew and net sell vol via call-spread collars to gain upside exposure in these sectors.

Figure 54: Until the arrival of Omicron, European sector skew painted a disparate picture with defensive and some less liquid cyclical sectors continuing to trade well above pre-pandemic levels, while we saw extreme lows earlier in the year in SXEP, SXPP and SXAP
3M, normalized 25D Skew



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 55: Value-exposed sectors have seen the steepest decline in y-o-y avg skew levels
Change in 3M, norm'd 25D Skew (avg 2021-2020) vs Value factor score (Y-axis)



Source: J.P. Morgan Equity Derivatives Strategy.

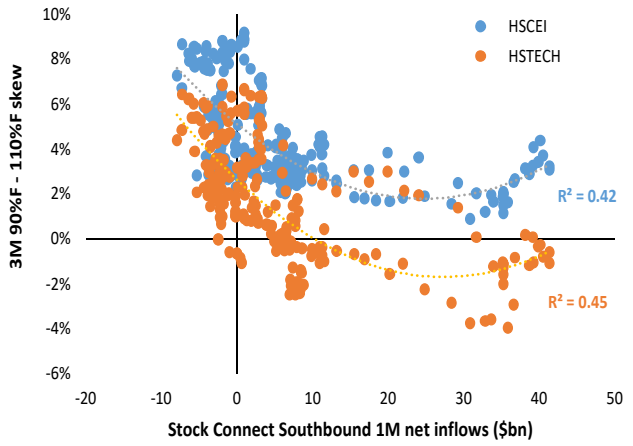
Asia: Short-dated skews have generally flattened across major Asian indices in the first half of the year, although re-steepened in the second half, in response to a series of idiosyncratic risk factors. In Hong Kong, investment flows from onshore China investors (via Stock Connect) have become an increasingly significant risk driver. The sharp Southbound buying inflows at the beginning of the year led to material skew flattening on the H-shares and Hang Seng Tech. However, as Southbound investors later significantly de-risked in 3Q21 (likely driven by concerns around strengthened regulation on the Internet and Property sectors), and Hong Kong / China skews saw extreme steepening moves. The elevated skew observed on the H-shares is the most distressed in recent years outside of the COVID sell-off period. Throughout the year, H-shares and Hang Seng Tech skews exhibited a notable negative correlation against Southbound net flows (Figure 56). In Japan, political uncertainty was among major skew drivers in 2H21. Nikkei skew steepened and remains elevated in 3Q21 amid declining approval rating of the Suga administration, although later on flattened following the resignation of PM Suga and the conclusion of the general elections, on the back of diminishing political uncertainty.

For the mid to long end of Asian skews, structured product re-hedging dynamic was a main driver. The impact was most notable on the H-shares: following a sharp spot sell-off in July, most of the structured product Vega outstanding was shifted to the H-shares, and autocallable dealers had to supply significant amount of downside volatility in order to re-hedge the lower Vega risk profile (see Volatility Supply and Demand section). This in turn resulted in lower longer-dated downside volatility, and we observed a "spot down, volatility down" phenomenon on the H-shares.

Next year, we expect Asian skews to flatten from current levels, especially on the Nikkei 225. We think the introduction of a sizable stimulus package should lead to better risk appetite in Japan (see Outlook for Markets and Volatility section). Meanwhile the earnings outlook continues to improve. We think hedging demand could decline from the extreme levels seen this year, and skew risk pricing could normalize as a result. On the longer tenors, we expect Japanese structured product issuance to recover next year, and the new issuance will put downward pressure on longer-dated downside volatility and skew on the Nikkei 225 (see Volatility Supply and Demand section). In Hong Kong / China, we think skew spread could narrow, provided that risk appetite by retail investors substantially recovers and warrant activity materially picks up. This could occur if China equities were to see a meaningful catch-up rally, as our strategist expected (see here).

Figure 56: Stock Connect Southbound flows are among main drivers of skew moves on H-shares and Hang Seng Tech this year

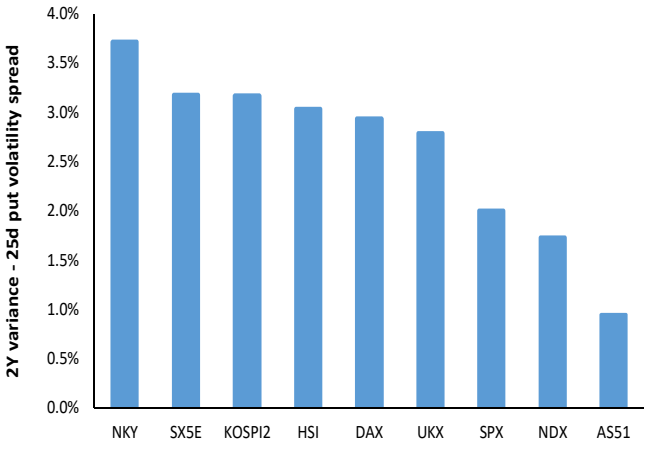
Volatility spread (%)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Data from Nov 17, 2020 to Nov 17, 2021

Figure 57: 2Y variance – 25d put volatility spread for major global indices

Volatility spread (%)



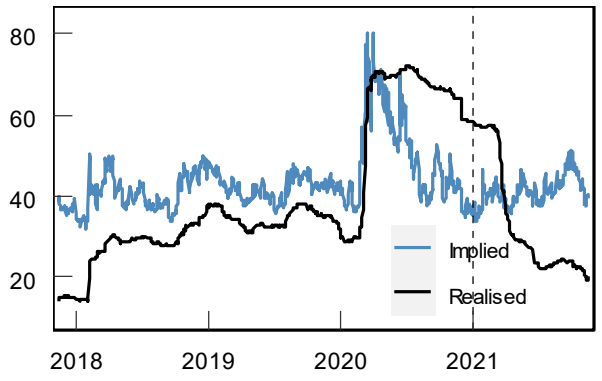
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Asian convexities continued to trade at distressed levels this year. Nikkei currently exhibits the highest back-end convexity among major global and Asian indices (Figure 57). Convexity demand, driven by volatility relative value trade activity, remains low but saw some modest recovery from 2020 levels. Synchronous variance spreads, where variance sampling of the US leg is observed at Asia time on futures, have gained popularity as an alternative volatility RV implementation. **Looking forward to the next year, we think Asian index convexities could further normalize from elevated levels.** We expect a recovery of autocallable issuance (especially in Japan) and a potential pickup of convexity risk premia collection activity to exert more downward pressure on Asian convexities. The incremental supply could potentially offset the demand from the volatility relative value trades and drive Asian convexities to less distressed levels.

Correlation

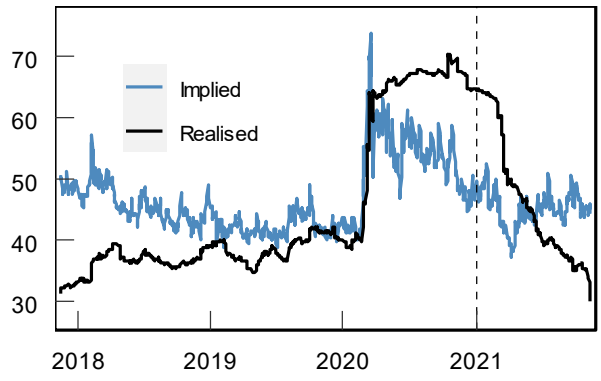
In 2021 we witnessed an interesting divergence between implied and realized correlation dynamics. On the one hand, implied correlations appear to have reached long-term support levels, and on the other, realized correlation declined rapidly. As a result, a substantial gap between implied and realized correlation has appeared in both the US and European markets (Figure 58 and Figure 59).

Figure 58: S&P top 50 rolling 1Y implied and realized correlation



Source: J.P. Morgan

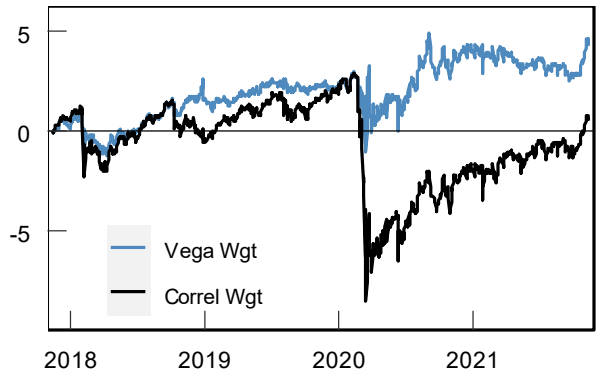
Figure 59: SX5E rolling 1Y implied and realized correlation



Source: J.P. Morgan

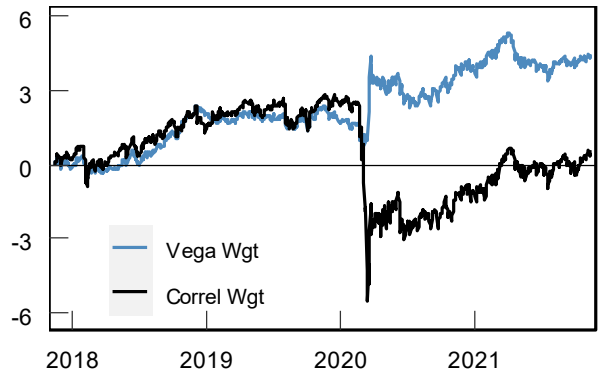
The significant implied/realized correlation has also translated into favorable dispersion P&L, as seen in Figure 60 and Figure 61, where we show the hypothetical cumulative P&L of the 1Y volatility swap dispersion trade.[2] In particular, given the declining implied volatility, the correlation weighted positions outperformed the vega weighted positions.

Figure 60: Cumulative P&L for S&P 500 top 50 1Y dispersion trade
P&L in vega



Source: J.P. Morgan

Figure 61: Cumulative P&L for SX5E 1Y dispersion trade
P&L in vega

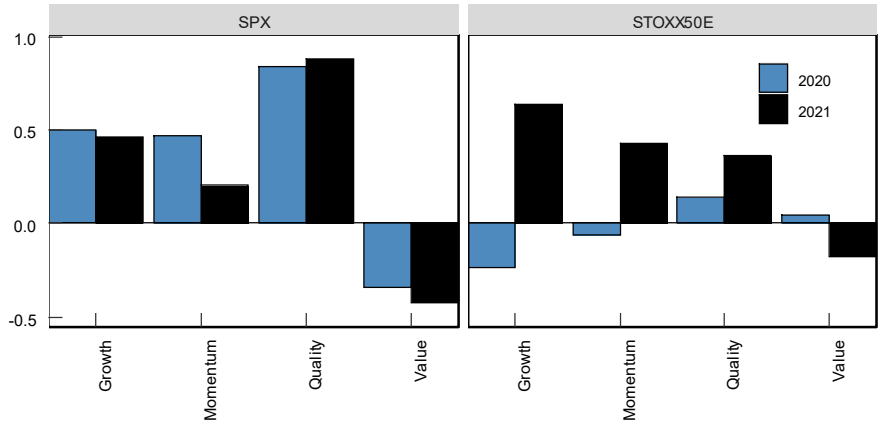


Source: J.P. Morgan

Looking forward, we maintain a more cautious stance on dispersion, in particular the correlation-weighted strategies (Figure 60). As the global central banks look to taper and potentially withdraw liquidity next year, the profitability of carry strategies may face challenges. Moreover, both SPX and SX5E indices now carry similar factor exposure (Figure 62), thus reducing the diversification benefit of vanilla dispersion strategies.

[2] Vega-weighted dispersion P&L = (Index Implied – Index Realised) + (Singles Realised – Singles Implied)
Correlation weighted dispersion P&L = (Index Implied – Index Realised) + sqrt(Implied Correlation) x (Singles Realised – Singles Implied)

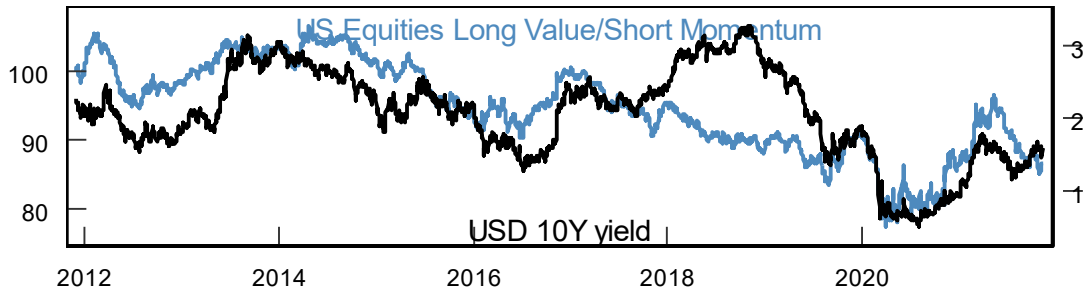
Figure 62: Index fundamental factor exposures
Factor loading (Z-score between -3 and +3)



Source: J.P. Morgan Equity Derivatives Strategy.

US: In our view, a couple of factors act as headwinds to outright shorting S&P 500 correlation. At the most simplistic level, realized correlation has declined substantially and therefore may be susceptible to sudden spikes due to correlation being a mean-reverting measure. More importantly, shorting correlation on the SPX index, which has a strong long Growth/short Value bias, could be unfavorable given the macro outlook next year. First and foremost, the Fed has started the tapering process and could start hiking rates in 2022. Higher rates have historically benefitted Value and hurt Growth/Momentum stocks (Figure 63). Moreover, infrastructure spending and tariff relief are also potential catalysts that could lead to Value outperformance over Growth/Momentum. As such we favor vega-weighted strategy for its long volatility profile over correlation-weighted.

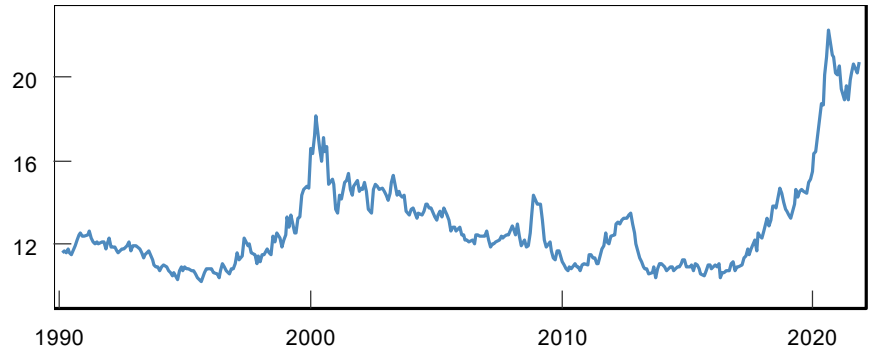
Figure 63: Historical performance of long Value/short Momentum factors (Indexed to 100 in Dec 2011)



Source: J.P. Morgan Equity Derivatives Strategy.

Finally, the concentration of the largest SPX members is now more extreme than ever (Figure 64). Vanilla dispersion as a result has a high concentration risk. We continue to see value in constructing factor-aware bespoke dispersion portfolios and recommend searching outside the top 50 universe for more diverse factor exposures. **In our trade ideas section, we propose a dispersion trade constructed based on fundamental factors.**

Figure 64: Combined Weight of top 5 tickers in the SPX index

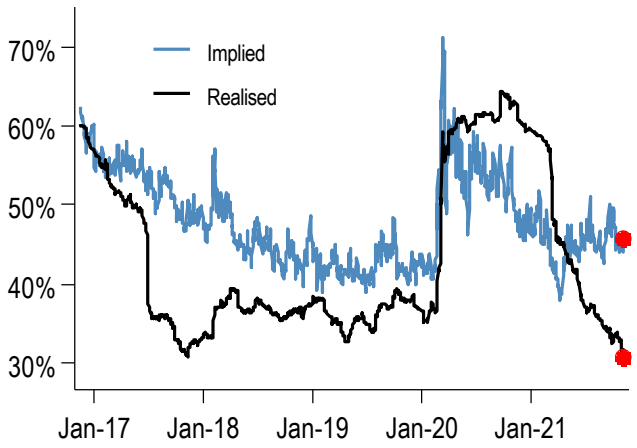


Source: J.P. Morgan Equity Derivatives Strategy.

Europe: Entering into 2021, implied correlation dropped from extreme levels reached in 2020 on the back of the Covid-19 driven sell-off. Since then, both implied and realized correlation levels have been coming down as markets continue to normalize post the Covid shock. Currently, the level of implied correlation still screens elevated compared to pre-Covid levels, while realized correlations are at the bottom of the range seen in the last few years.

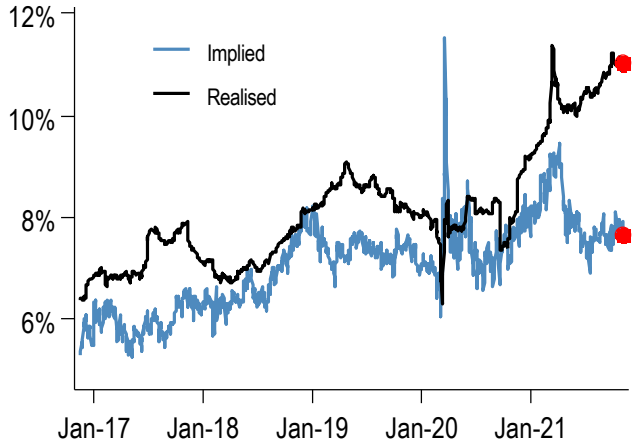
Going forward, with supply chain pressures starting to ease, our Equity strategists think Cyclical/reflation market segments are likely to outperform as they are more levered to a supply chain recovery. In such a scenario, we think the aggressive style and sector rotations toward value/cyclicals will likely keep realized correlation levels low. Similarly on style, we expect to see investors rotate in/out of Value from Growth/Momentum as supply chain bottleneck eases.

Figure 65: SX5E 1Y implied and realized correlation



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 66: SX5E 1Y index and single stock volatility spread

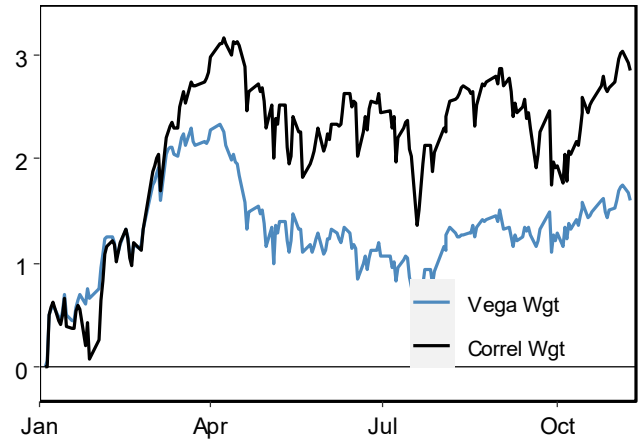


Source: J.P. Morgan Equity Derivatives Strategy.

In Figure 67 we show the pro forma cumulative PnL of 1Y volatility swap dispersion strategy on Euro STOXX 50. We find correlation-weighted dispersion outperformed vega-weighted dispersion during 2021, helped by the short index volatility leg.

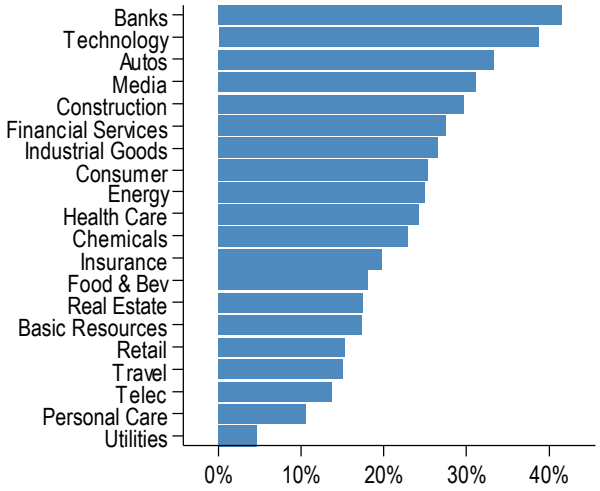
Looking to next year, we continue to favor dispersion trades, but with a more cautious stance as current entry levels are challenging. J.P. Morgan equity strategists see a continuation of the current equity market rally into 2022 driven by further sector and style rotation into cyclicals/value stocks, an environment that would be supportive for dispersion strategies. We have a preference for vega-weighted dispersion over correlation-weighted dispersion going into 2022; as experienced in 2020, vega-weighted dispersion tends to outperform during periods of crisis as the strategy is long volatility.

Figure 67: Cumulative P&L for SX5E 1Y dispersion trade
P&L in Vega



Source: J.P. Morgan Equity Derivatives Strategy.

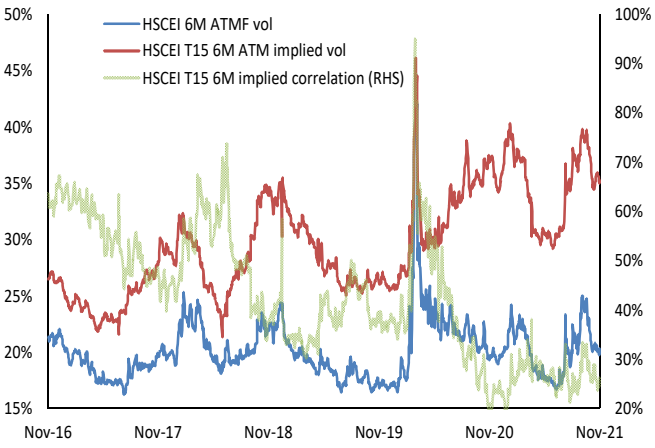
Figure 68: European sector performances YTD



Source: J.P. Morgan Equity Derivatives Strategy.

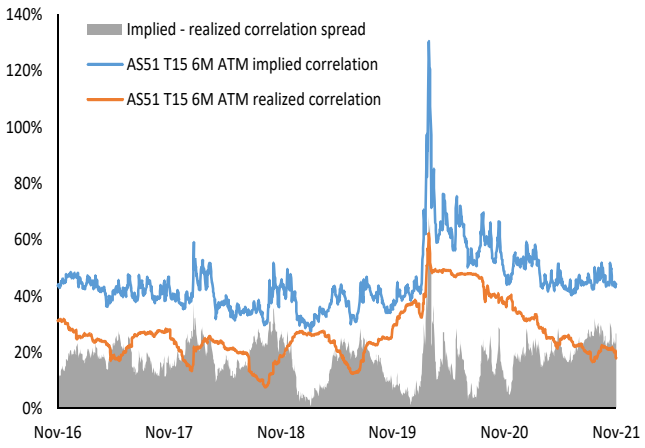
Asia: Implied correlations normalized from elevated levels this year across major Asian indices. The decline is most notable on Hong Kong / China indices. In particular, we note average H-shares 6M implied correlation declined to 27% in 2021 and is currently trading at five-year lows. The lack of reaction in the correlation risk metric is somewhat unexpected, considering the index experienced a more than -20% sell-off from the highs. Rotational flows driven by policy changes are a major factor behind the muted implied correlation move. While sectors that experienced regulatory tightening (e.g., Internet and Property) embedded elevated downside risk pricing, sectors that are positively impacted by the new policy initiatives (such as NEV, Decarbonization, and Tech Hardware) saw much better sentiment. As a result, the derivatives market prices limited risk of a sell-off across the board. Rather than repricing of implied correlation, H-shares volatility moves were mainly driven by single-stock volatility this year (Figure 69). In Australia, implied correlation remains relatively rich, especially vs. realized correlation, which has declined to pre-COVID lows. Consequently, ASX 200 6M implied versus realized correlation spread has significantly widened, currently standing at the 92%tile over the past five years (Figure 70).

Figure 69: The sharp spike in H-shares volatility in 2H21 was mainly driven by a rise in single stock volatility, implied correlation remained historically low
Correlation (%)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 70: ASX 200 Top 15 6M ATM implied and realized correlation
Correlation (%)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Next year, we expect H-share correlation to remain relatively muted. We expect dispersion of sector performance to continue as the policy initiatives introduced this year are unlikely to change course dramatically in the near term. This will continue to suppress correlation in the coming year. **On the ASX 200, we think implied correlation could see moderate compression toward average levels pre-COVID.**

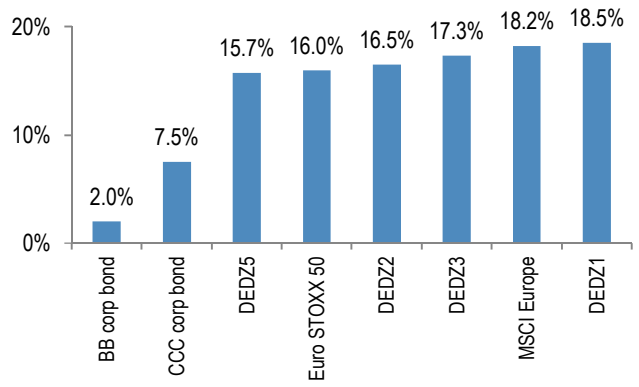
Implied Dividends

Euro STOXX 50 Dividends

Performance review: Euro STOXX 50 dividends delivered double-digit returns across the curve, in line with our expectation at the end of 2020. Dividend futures strongly outperformed credit but delivered slightly lower total returns compared to European equities (Figure 71). The performance relative to credit should be put in context of the strong credit outperformance from the previous year, when dividends were penalized relative to credit by the ECB policies during the crisis, which expanded the asset purchase programs to include high yield debt, and restricted Banks dividend payments. The flows on Euro STOXX 50 dividend futures based on our trade-by-trade attribution analysis of block and screen transactions interestingly indicates that 2021 futures saw the most buying pressure (Figure 72).

Figure 71: Year-to-date total returns across comparable asset classes (total return equity indices and € HY credit)

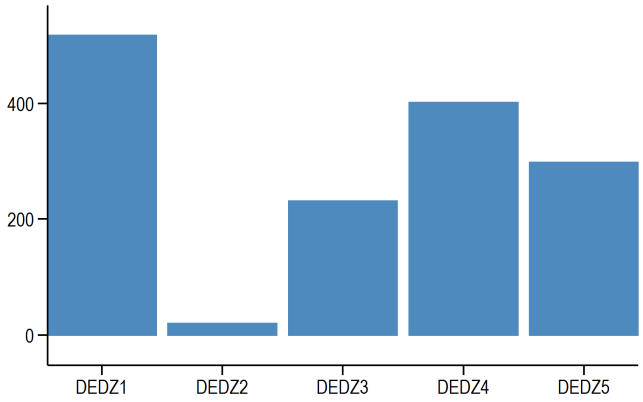
Year-to-date performance (as of 01-Dec-21)



Source: J.P. Morgan Equity Derivatives Strategy. Excess return for dividend futures.

Figure 72: Euro STOXX 50 dividend futures net buy/sell imbalance was higher for the front-year and for long-dated tenors

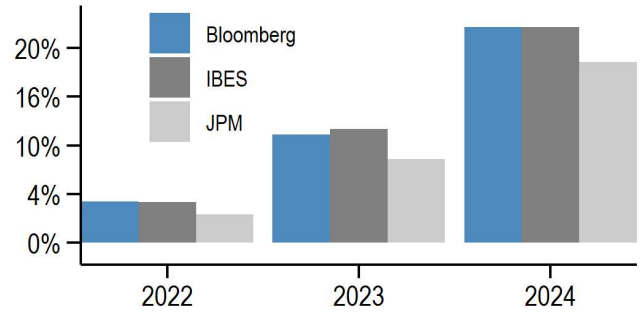
Aggregate trade imbalance based on per-trade attribution YTD (€ Mn)



Source: J.P. Morgan Equity Derivatives Strategy.

Looking to 2022, we expect Euro STOXX 50 dividends to provide positive returns over the year, but with greater differentiation across the curve compared to 2021 and with lower returns. The upside return potential is supported by the discounts to bottom-up estimates (Figure 73) and by the positive revisions in dividend expectations, which we expect will persist at least in the first part of 2022. We favor 2023 futures over 2022, which are already trading relatively close to par based on JPM analysts' expectations.

Figure 73: Expected returns to bottom-up estimates

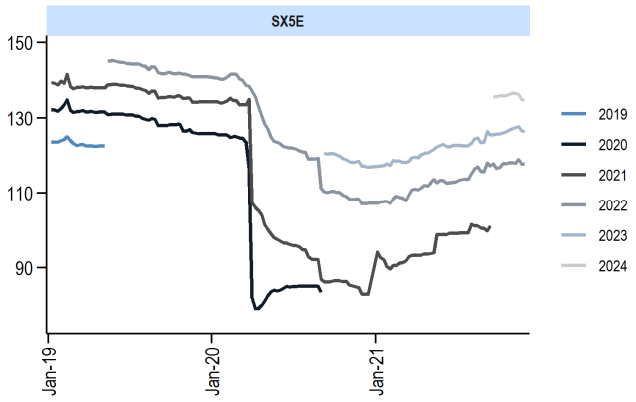


Year	JPM	JPM Upside	Bloomberg	Bbg Upside	IBES	IBES Upside	Implied
2022	116.3	2.9%	117.8	4.2%	117.7	4.2%	113
2023	122.9	8.6%	125.8	11.1%	126.4	11.7%	113.2
2024	130.8	18.6%	134.7	22.1%	134.7	22.1%	110.3

Source: J.P. Morgan Equity Derivatives Strategy. Excess return for dividend futures.

Figure 74: Bottom-up estimates have been trending up in 2021

Euro STOXX 50 IBES bottom-up (index points)

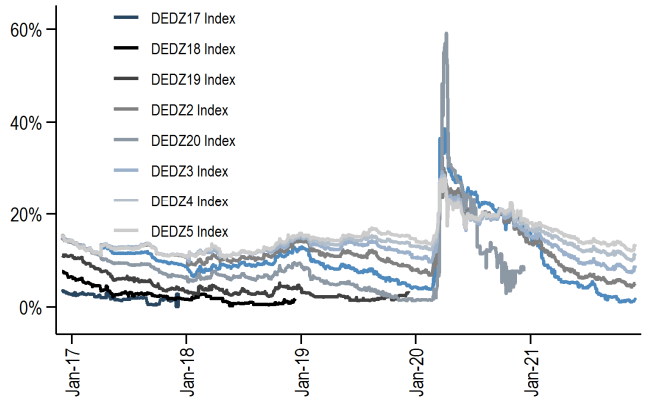


Source: J.P. Morgan Equity Derivatives Strategy.

Dividend options implied volatility has been declining throughout 2021 not only in absolute terms but also as a fraction of like expiry equity index volatility (Figure 75). Following this move dividend volatility does not appear rich anymore, especially for the shorter-dated part of the curve. Longer dated dividend implied volatility does not appear as cheap relative to index volatility when compared to historical values (Figure 76).

Figure 75: Dividend option volatility has been steadily declining both in absolute terms and relative to equity index vol

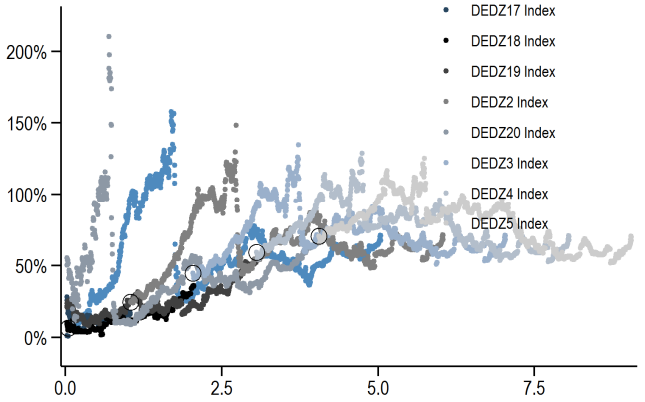
Dividend 50 delta vol as % of like maturity SX5E ATMF vol



Source: J.P. Morgan Equity Derivatives Strategy. Excess return for dividend futures.

Figure 76: Dividend option implied volatility is depressed relative to history for the front three contracts

Dividend 50D vol as % of SX5E ATMF vol (y-axis) vs. years-to expiry (x-axis)



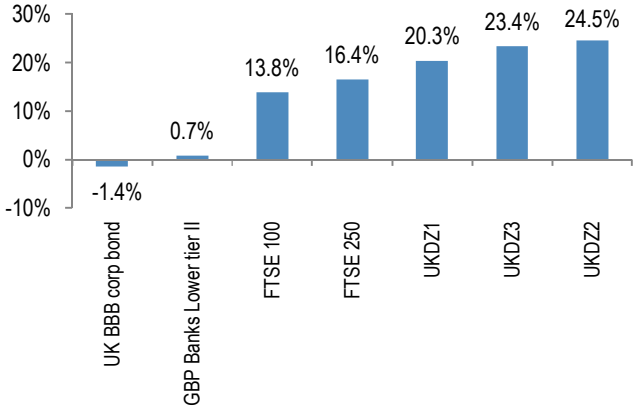
Source: J.P. Morgan Equity Derivatives Strategy.

FTSE 100 Dividends

FTSE 100 dividend futures delivered double-digit returns across the curve, outperforming performing UK equities and UK credit (Figure 77). At the start of the year FTSE 100 dividend futures were still trading at wide discounts to bottom-up estimates due to the large fundamental uncertainty on the progression of the pandemic and on the resumption of dividend payments (Figure 78). The discount has been progressively narrowing throughout the year as vaccines proved their effectiveness and companies delivered better than expected results.

Figure 77: FTSE 100 dividend futures outperformed UK equity and credit investments in 2021

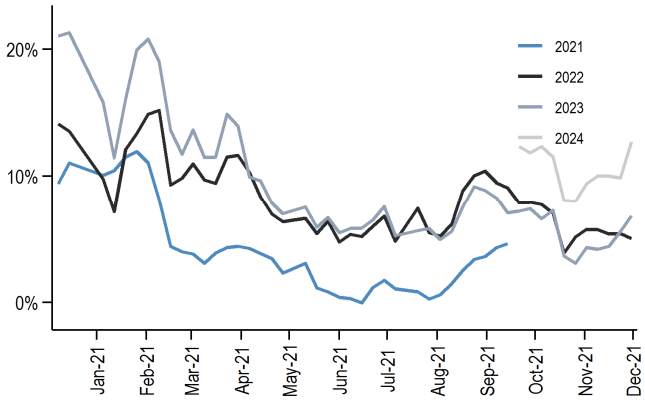
Year-to-date performance (as of 01-Dec-21)



Source: J.P. Morgan Equity Derivatives Strategy. Excess return for dividend futures.

Figure 78: FTSE 100 dividend futures experienced significant risk compression since the start of the year

FTSE 100 dividend futures upside to IBES estimates (%)

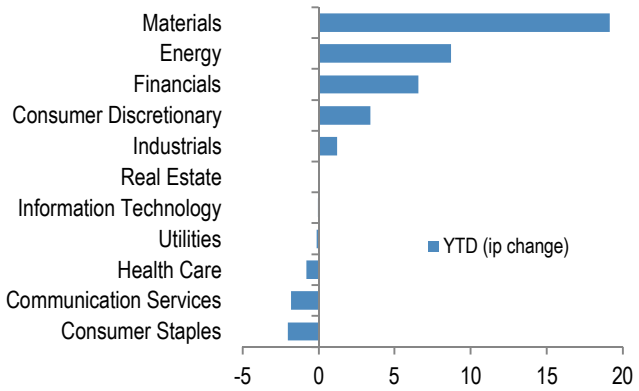


Source: J.P. Morgan Equity Derivatives Strategy.

Dividend estimate revisions have been positive throughout the year and have provided support to the performance of the dividend futures. Revisions of dividend expectations were very concentrated in a few sectors. Materials was by far the largest contributor (Figure 79), with a positive revision of ~19 index points since the start of the year for 2022 estimates. Energy and Financials also saw positive revisions of 8.7 and 6.6 ip, respectively. These three sectors by themselves account for approximately 52% of the current FTSE 100 dividend 2022 bottom-up expectations at 280 (Figure 80).

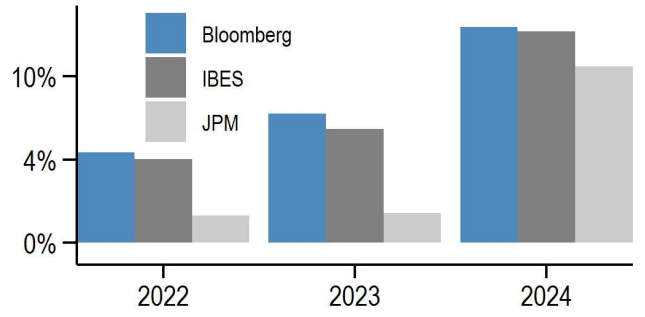
Figure 79: Positive revisions in DPS estimates were driven predominantly by Materials, followed by Energy and Financials

Change in FTSE 100 2022 bottom up estimates (8-Jan-21 to 01-Dec-21)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 80: FTSE 100 bottom-up estimates based on JPM and IBES consensus estimates and their respective potential upside



Year	JPM	JPM Upside	Bloomberg	Bbg Upside	IBES	IBES Upside	Implied
2022	271.4	1.6%	281.5	5.4%	280.4	5.0%	267
2023	268.7	1.8%	284.5	7.8%	282	6.8%	264
2024	286.4	10.6%	292.5	12.9%	291.9	12.7%	259

Source: J.P. Morgan Equity Derivatives Strategy.

FTSE 100 dividend futures will likely continue to have positive returns, and we find the risk-reward of the front-year contract attractive for a pull-to-par trade. The headline discount of FTSE 100 2022 dividend futures to bottom-up is higher than for other European contract and is relatively attractive relative to historical value. On top of that, dividend revision should remain positive, especially for Banks, Energy, and Materials, which should continue to do well in our base case reflationary outlook. Our base-line estimates incorporate the positive impact from the unification of Shell A and B share lines. Our base case estimate also include the negative impact of the proposed BHP share consolidation, which would lead to a single company incorporated in Australia and to the likely removal of BHP from the FTSE 100 index. The most likely scenario sees the removal of BHP from the index ahead of the payment of the March BHP dividend, but there is a chance that the corporate action will happen later, leading to a significant bump in our 2022 bottom-up dividend estimates (~16 ip). The UKDZ2 contracts therefore offer good valuation and some positive optionality.

Dividends – SX7E Dividends

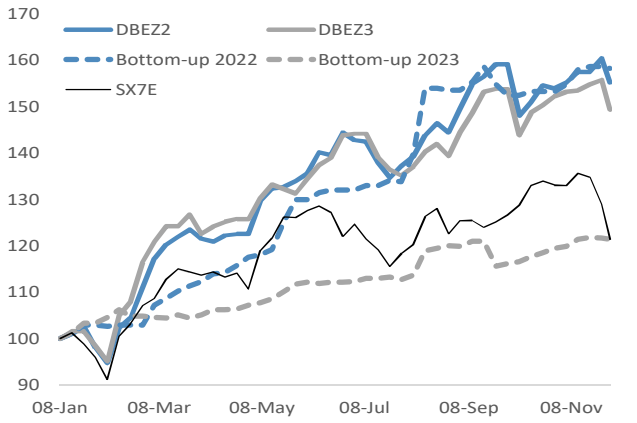
2022 and 2023 dividends outperformed spot by around 30% this year and are up by around 120% since we recommended to buy DBEZ2 last year (here; here). Over the same period 2021 dividends are up 75%, which we chose to avoid due to what we considered to be too much regulatory uncertainty around the ECB's dividend ban, which was in place until September of this year and was removed entirely by the regulator in an announcement made in late July. As we had anticipated, fears of long-term restrictions to pay-out ratios have not materialized and left the prospect of dividends for 2022 and beyond untarnished. Instead, we based our call on the expectation that economic growth and a rising rates environment as economies reopen would provide a strong, fundamental backdrop to underlying earnings and by extension to dividend expectations. The third leg to our recommendation to buy Bank dividends was the expectation that risk premia were unsustainably high. These eroded substantially after the vaccine announcement and the Biden win in early November. DBEZ2 rallied 65% over a two-week period in early November 2020.

Figure 81: Upside potential to bottom-up estimates has narrowed, even if the recent correction offers interesting entry opportunities
Potential upside of SX7E dividend futures vs. bottom-up estimates

Source	2022	Upside Potential	2023	Upside Potential	2024	Upside Potential
JPM Estimates	5.08	6%	5.28	13%	5.67	28%
IBES Consensus	5.23	9%	5.50	17%	5.97	35%
BBG Consensus	5.52	15%	5.64	20%	6.03	37%
Futures	**4.80**		**4.68**		**4.42**	

Source: J.P. Morgan Equity Derivatives Strategy.

Figure 82: Dividends (DBEZ2/3) outperformed spot by close to 30%. Importantly, performance can almost entirely be attributed to upgrades in underlying DPS projections (dotted blue line)
Indexed performance of DBEZ2/3 and Spot vs bottom-up ests for 2022 & 23



Morgan Equity Derivatives Strategy.

By now, risk premia have eroded entirely as we pointed out here and which can to some extent be deduced from the lackluster upside to bottom-up figures in Figure 81 even if the recent correction driven by Omicron increased those and presents a welcome, better entry point. With regulation no longer a concern, this leaves our fundamental view on Bank dividends. This is the key and sole reason we **maintain our long recommendation in Bank dividends in DBEZ2 and DBEZ3.** As Figure 82 illustrates very clearly, the continuous upgrades in consensus expectations for next year have been driving almost entirely the strong performance throughout the year. Consensus bottom-up estimates for SX7E 2022 dividends have gone up by close to 60% YTD compared to DBEZ2 performance of 55%.

In Figure 83 we show the revision backdrop to Financials DPS expectations in Europe from our colleague, Khuram Chaudhry (here). DPS revisions continue to see significant upgrades, and based on the relationship between upgrades and price performance in DBEZ2 and DBEZ3 that we have observed this year, we expect Bank dividend contracts to deliver further positive returns. This said, momentum in DPS revisions has turned negative, which calls for caution at some point further down the line before the absolute level of revisions turns downright negative.

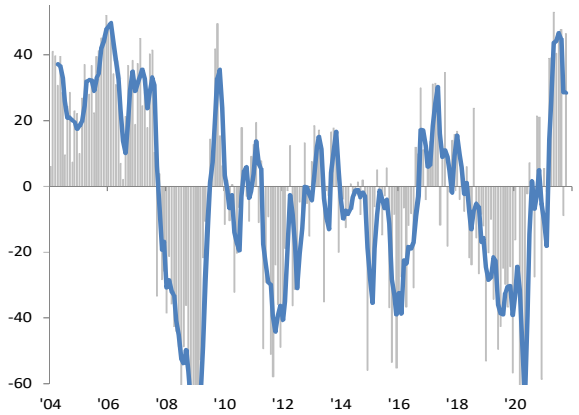
We have less conviction that bank dividends will continue to outperform the underlying cash equities. Much will depend on the evolution of rates. Last year dividends had the strong twin tailwind of extraordinary risk premia and the highly binary outlook on regulatory risk and presented an exceptional opportunity if you were ready to take a long term view. As you can see in Figure 84, the relationship between dividends and spot vs US 10 year rates broke down last year but has now resumed the long-term negative relationship. As rates go up, dividends underperform spot and vice versa. Our house view is calling for higher rates, which would suggest that on a relative basis SX7E cash ought to outperform SX7E dividends. However, on a stand-alone basis, we are very comfortable with our long exposure in SX7E dividends and maintain longs in DBEZ2 and

DBEZ3 into 2023. We expect positive returns beyond what the upside to bottom-up estimates in Figure 81 suggests as EPS and DPS expectation are poised to trend up further.

One of the question marks that has surfaced is share buybacks, which we addressed here for banks and here for SX5E. In banks, we see the key risks around ING, BNP, and Santander. Depending on how these companies decide to return cash to shareholders and the chosen split between cash and share buybacks, this can weigh on performance, but we do not think it will be sufficiently punitive to change our constructive outlook.

Figure 83: DPS revisions continue to see significant upgrades, which should support further positive returns in bank dividends. This said, momentum has turned negative and calls for caution further down the line.

Number of DPS upgrades minus downgrades divided by total changes over 1m (grey) and 3m (blue) for European Financials



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 84: Both the significant increase in risk premia and news flow around the ECB dividend ban meant that relationship to treasuries broke down. This has now resumed, and one should expect spot to outperform dividends in a rising rate environment

70d correlation DBEZ/Spot vs UST10s

Source: J.P. Morgan Equity Derivatives Strategy.

CAC 40 Dividends

In many ways our view on CAC dividends today stands in stark contrast to where it was last year. In our Outlook for 2021, we pointed out the risk premia embedded in CAC40 dividend futures for Dec 2022 and Dec 2023, expressed in the form of the upside potential to consensus bottom-up estimates, as being particularly interesting. We made a point in singling out the Dec 2023 contract and offered a bottom-up analysis and a scenario analysis. Both from a bottom-up and top-down perspective we wrote that the projections looked entirely plausible, and hence we recommended CAC40 dividends to buy as an exceptional opportunity. Even the bear-case in our scenario analysis did not show much downside risk. Much of this has changed looking into 2022.

As it turned out, CAC40 dividends provided indeed strong performance throughout 2021, especially the Dec 2023 contract. Figure 87 shows the performance of the Dec 2022 contract across various European dividend indices indexed at 100. Year to date, CAC Dec 2022 dividends are up 33%, 11% ahead of the underlying cash market and the next best, diversified European dividend index, the FTSE 100, as well as 18% ahead of Euro STOXX50 dividends. Only Bank dividends are up significantly more (+59%), which was our top pick last year but offers a different risk profile as a sector index. The flipside of this exceptional performance is that it makes the upside case for the CAC from here difficult.

Figure 85: CAC 40 upside to bottom-up estimates has declined from very attractive levels last year to uninspiring levels now, even if EPS upgrades remain positive and help to underpin further positive performance from here

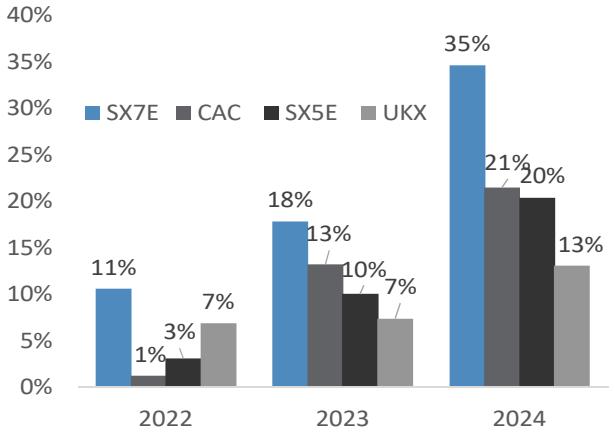
Potential upside of CAC40 dividend futures vs. bottom-up estimates

Source	2022	Upside Potential	2023	Upside Potential	2024	Upside Potential
JPM Estimates	184.6	-0.5%	203.4	10%	219.9	20%
IBES	188.0	1.4%	207.3	12%	222.6	21%
BBG Consensus	189.3	2.0%	210.3	13%	223.0	21%
SSDF	183.7	-1%	186.7	1%	184.0	0%
Bear Scenario	154.0	-17%	162.0	-13%	176.3	-4%
Bull Scenario	233.8	26%	264.8	43%	269.2	47%
Div Future	**185.5**		**185.7**		**183.6**	

Source: J.P. Morgan Equity Derivatives Strategy.

Figure 86: After a very strong performance this year, CAC40 is no longer standing out as clearly as last year in terms of upside to bottom-up estimates among European diversified indices

Potential upside of dividend futures vs. IBES bottom-up estimates



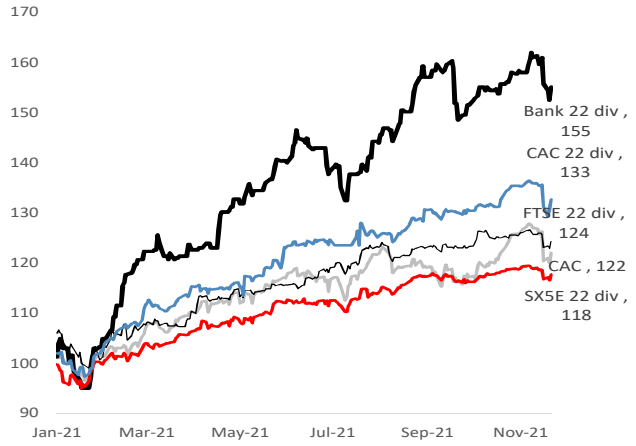
Source: J.P. Morgan Equity Derivatives Strategy.

Figure 85 shows the upside to current bottom-up estimates for CAC 40, with hardly any upside for 2022 and only low-double-digit upside for 2023. For pronounced double-digit upside to bottom-up estimates one has to go out to 2024, three years out. As much as risk premia were plentiful when we wrote our annual Outlook last year, it is eroded now. This is true in absolute terms but also in relative terms to other dividend indices as Figure 86 shows. All in all, not very inspiring.

Last year we drew resolve in how much value was embedded in the risk premia when we compared projected, absolute dividend levels through time. Compared to GDP forecasts that saw the economy recover to pre-pandemic levels by the end of 2022 in absolute terms, these dividend forecasts appeared at the time if anything conservative, if not entirely plausible. Figure 88 depicts how over the last six months the term-structure of dividend futures in CAC 40 shifted progressively upward, until recently the entire three years of observed term-structure exceeded the peak in realized dividends achieved in 2018. Current consensus forecasts for 2023 see dividends realizing almost 15% above 2018 compared to no implied growth over the same time frame for SX5E. For the FTSE 100 the same forecasts remain 7% below 2018. While this comparison could suggest CAC forecasts look stretched and overly optimistic compared to other indices, the implied growth is only slightly ahead of implied nominal growth in GDP over the same period and, as such, we think, plausible. This said, to see significantly more upside from these levels is difficult, and it is hard to ascribe much value to the blue sky, bull-scenario estimate that we are showing, which is implying growth of 45% between 2018 and 2023. The latter is the aggregate of the most bullish forecasts for each constituent. Given that current future levels imply only low-double-digit upside to the base case forecast in 2023 it is hard to get overly excited. For now, EPS revisions for France remain positive albeit with negative momentum as K. Chaudhry shows in Figure 25 here, which should underpin CAC dividends and help to deliver positive returns.

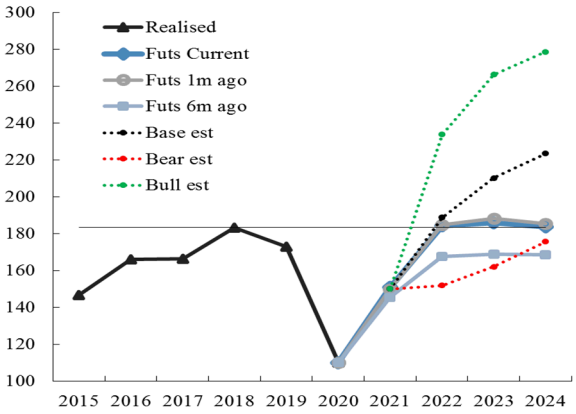
A potential win in the presidential election in April by right-wing candidates Le Pen or Zemmour appears unlikely from today's perspective but is a risk investors need to keep an eye on. Finally, poor liquidity and the commensurate wider bid-offer spread that investors have to cross (~2.5% compared to 0.5% on SX5E) are punitive hurdles to take. Given the prospect of significantly lower returns in 2022 over 2021 and the expectation to deliver similar returns to EuroStoxx 50 make us reticent to recommend CAC 40 dividends over other diversified indices in Europe, even if we expect positive returns across the space.

Figure 87: CAC 40 dividends have delivered 33% YTD, significantly ahead spot and of FTSE 100 and Euro STOXX50 dividends.
YTD, price performance of various European dividend contracts in Dec-22 & CAC spot, indexed at 100



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 88: Term-structure of CAC 40 dividends has progressively shifted upward over the last 6 months and now implies the index to deliver higher absolute dividends than in 2018, with consensus estimates for 2023 being ~15% higher
CAC 40 realized dividends and projections: base, bull, bear vs futures

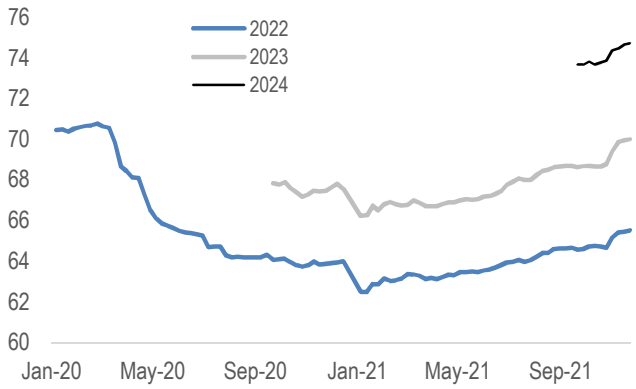


Source: J.P. Morgan Equity Derivatives Strategy.

S&P 500 Dividends

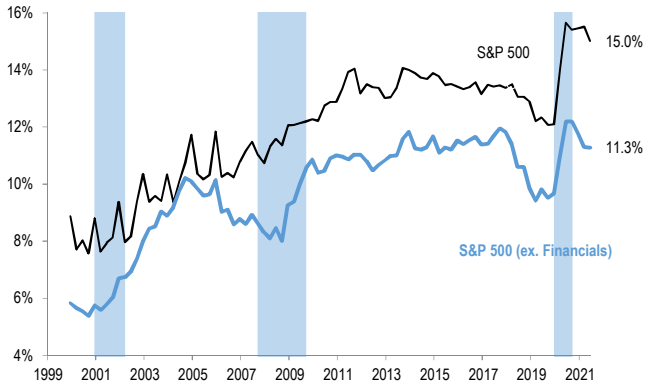
S&P 500 dividend fundamentals are strong: 1) US corporate balance sheets appear healthy with cash balances near record highs (Figure 90), suggesting corporates have plenty of cash to return to shareholders, and interest cost on debt is low given moderate overall debt levels and record low interest rates; 2) analysts' bottom-up estimates have been rising for most of this year (Figure 89) and we believe will continue to be revised higher as earnings come in ahead of expectations (e.g., our Equity Strategists' 2022 S&P 500 EPS forecast of $240 is ~$20 above consensus bottom-up expectations); 3) most companies have been raising their dividends during the pandemic, and most of those that cut or suspended their dividends during the COVID lockdowns early last year have since boosted or resumed their payouts (see here).

Figure 89: S&P 500 dividend bottom-up estimates have risen for the past ~6M and likely will continue to be revised higher as earnings come in ahead of expectations



Source: J.P. Morgan Equity Derivatives Strategy

Figure 90: Cash balances are near record highs



Source: J.P. Morgan Equity Strategy

S&P 500 realized dividends in 2021 are tracking slightly below our bottom-up and top-down estimates published a year ago (see p.43 of our 2021 Outlook). Dividends are on pace to record an increase of 4% y/y vs. +6% expected as corporates were somewhat restrained in delivering increases given lingering uncertainties around the pandemic, despite the strong rebound in growth and corporate profits.

S&P 500 implied dividends rallied significantly this year, and current bottom-up estimates imply only moderate upside remaining of ~3-4% annualized for the 2022-2024 contracts. Although at face value this suggests limited risk premium remaining to capture, we believe bottom-up estimates are lagging the macro recovery, dividend estimates will continue to be revised higher, and we see catalysts for further upside that mean near-term dividends remain compelling.

First, our top-down model points to considerably more upside than bottom-up estimates for the next two years (Table 5). Corporate dividend policy is driven in part by a combination of earnings (as some companies target a payout ratio) and stock price (as some target a dividend yield), so we run a top-down model based on the historical relationship between earnings growth, market return, and dividend growth. Corporate earnings are on track to post their strongest annual growth in over a decade this year (+50% y/y) and the market is up ~20% YTD, but bottom-up estimates are only looking for 9% growth in dividends next year—not much above the long-term average annual increase we've seen historically of 7% during non-recession years. Based on estimated 2021 earnings and our strategists' 2022 forecasts for the S&P 500 level (5050) and EPS ($240, +14% y/y), our top-down model forecasts ~14% dividend growth next year (~9% upside from 2022 dividend futures levels) and ~7% growth in 2023 (~11% upside for 2023 dividend futures).

Table 5: Short-dated S&P 500 dividend futures vs. estimates

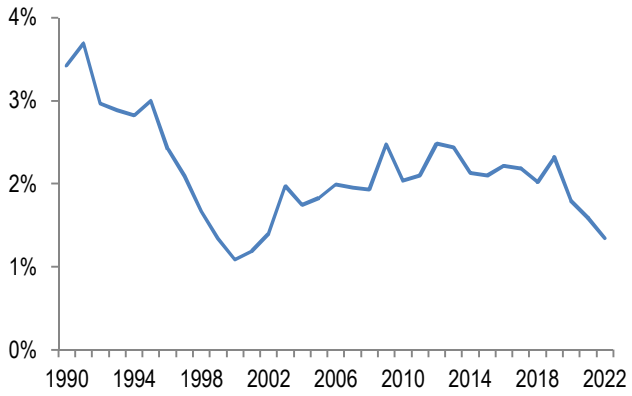
	2021	2022	2023	2024
Dividend Future	60.00	62.90	65.75	66.1
Bottom-up Estimate		65.4	69.9	74.5
Upside/(Downside)		3.7%	6.3%	12.7%
Top-down Estimate*		68.6	73.1	
Upside/(Downside)		9.1%	11.2%	

Source: J.P. Morgan Equity Derivatives Strategy. As of 3-Dec-2021

* Top-down estimate based on regression vs. S&P 500 return and EPS growth, assuming S&P 500 is flat into 2021 year-end, and 2022 performance based on our Equity Strategists' 2022 YE price target of 5050 and EPS estimate of 240

Figure 91: S&P 500 annual dividend yield

Annual dividends divided by start of year spot level



Source: J.P. Morgan Equity Derivatives Strategy. 2022 point is implied for next year based on bottom-up dividend estimates and current spot

Second, companies may be inclined to raise payouts by more than analysts expect. The S&P 500 is expected to deliver its lowest dividend yield since the dotcom bubble and close to a record low (Figure 91). Companies were likely cautious in committing to dividend increases the past couple of years given risks around the pandemic and the possibility they would need cash buffers to weather new lockdowns or disruptions. As we exit the pandemic next year and supply chains heal, corporates will likely step up shareholder returns of their record profits and cash balances.

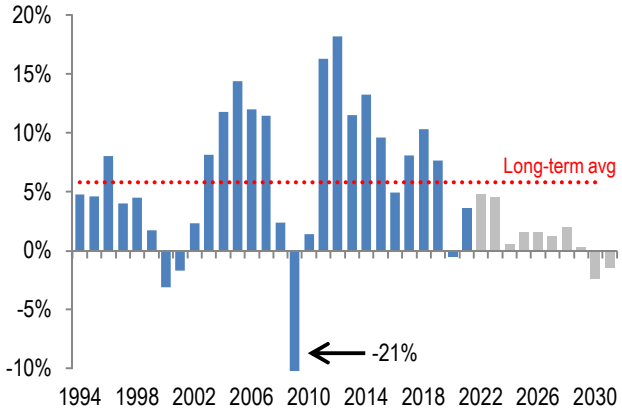
Additionally, dividend futures offer optionality around changes to the tax/regulatory landscape. One of the proposed funding sources for Democrats' social infrastructure plan is to implement a 1% tax on stock buybacks. If this provision makes it into the final bill, we are likely to see companies incrementally shift their shareholder remuneration plans from buybacks to dividends, providing a further boost to dividends. However, a 1% tax is likely low enough to not induce a wholesale corporate policy shift (though once this tax is established, the rate could rise in future, particularly if it doesn't prompt a change in corporate behavior). Additionally, if companies shift part of their capital returns from buybacks to dividends, they would likely favor special dividends over ordinary cash dividends as they are seen as a more flexible form of shareholder remuneration—i.e., like buybacks, special dividends can be freely adjusted downward as cash needs change, while ordinary dividends tend to be sticky and companies are reluctant to cut except in dire situations. But such a shift would likely also result in a boost to ordinary cash dividends, and if companies establish a track record of regularly paying special dividends, the dividend index begins to include them.

Given the fundamental drivers discussed above, we **recommend staying long the 2022 and 2023 dividend contracts** (see our previous recommendation here and the Trade Ideas section for more details) to position for further upside in both implied dividend levels and bottom-up estimates as these contracts are pulled to realized next year.

The dividend curve is quite flat beyond 2023, also leaving **long-dated dividends** fundamentally attractive. Long-term S&P 500 dividend growth has averaged ~6% per annum (even factoring in the zero/negative growth years during recessions), but the dividend curve is implying just ~1% annual growth in 2024-2031 (Figure 92). On a hold-to-maturity basis, we find the long-dated dividends attractive as they are likely to be profitable at expiry, even if we have a typical recession at some point during the life of the contracts. However, investors may need to hold these positions for a long period of time to realize gains. Additionally, the growing S&P 500-linked structured product market and shrinking demand for long-dated puts from variable annuities has resulted in increased supply and reduced demand for both long-dated volatility and dividends (discussed in the Volatility Supply and Demand section). These shifting structural supply/demand drivers have resulted in downward pressure on long-dated dividends (flatter term structure) in recent years, and these trends appear unlikely to abate near term.

Figure 92: S&P 500 dividend curve prices in roughly average growth rates the next 2 years, despite this year's earnings surge, and limited growth beyond 2023

S&P 500 realized (blue) and implied (grey) annual dividend growth rates



Source: J.P. Morgan Equity Derivatives Strategy.

Nikkei 225 Dividends

Nikkei 225 dividends delivered strong performance this year. At the time of writing, dividends across tenors delivered gains north of +10% and materially outperformed Nikkei spot (MNDZ1 +10.6%, MNDZ2 +22.0%, MNDZ3 +24.0% versus NKY +4.8%). Positive revisions in corporate guidance and analyst forecasts were the main drivers for the strength in dividends.

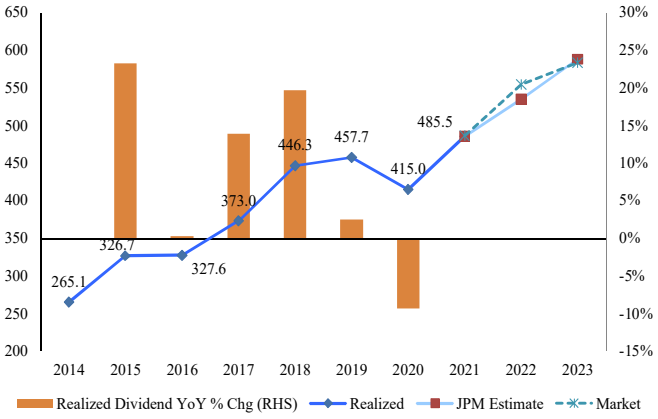
Recently, we witnessed another leg of rally. In our view, key factors behind the recent move include 1) more constructive fundamental outlook on the back of strong FY 2Q earnings, 2) structural economic growth tailwind stemming from the Kishida fiscal stimulus, and 3) expectations of further improvements in corporate governance and shareholder return to be catalyzed by the Tokyo Stock Exchange (TSE) reclassification next year. We expect these developments to have long-lasting impact on Japanese dividends. Based on our top-down model, we see meaningful upside potential on longer tenor Nikkei dividends (i.e., 2023 and onward). **Thus we believe Nikkei dividends should likely continue to deliver robust performance next year.**

Figure 93: Nikkei 225 dividend overview

Calendar Year	2022	2023	2024
Ticker	MNDZ2	MNDZ3	MNDZ4
Current Price	561.0	589.0	604.1
JPM Bottom-up Estimate	535.1	590.9	646.8
Implied Upside	-5%	0%	7%
JPM Top-down Estimate	568.0	632.0	-
Implied Upside	1%	7%	-
% of Estimate Confirmed/Guided	40%	0%	0%
1Y High	554.8	587.4	606.5
1Y Low	426.0	434.0	443.6
Turnover (3M Avg, USD Mn)	6.2	1.6	0.4
Open Interest (3M Avg, USD Mn)	141.9	80.1	49.5

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Note: 2024 estimate assumes a dividend growth rate same as 2023/2022.

Figure 94: Nikkei 225 implied and realized dividend history



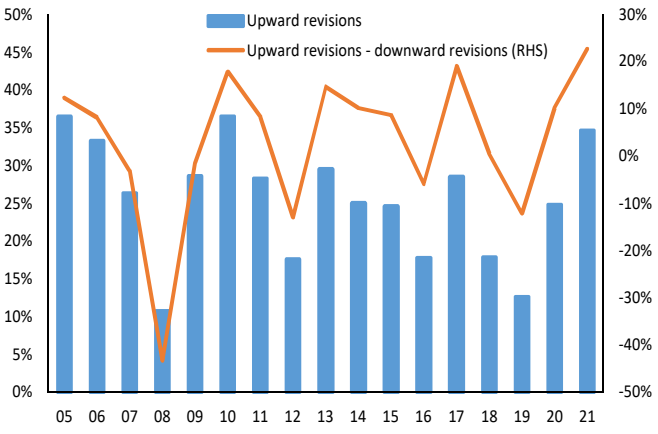
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Better than expected results lead to more constructive dividend outlook

Japanese corporates reported **strong FY 2Q21 results** overall, with recurring profit growing +48% YoY and 60% of companies beating projections. Of note, 35% of the companies raised earnings guidance versus 12% that revised lower. The differential is at highs for Interim reporting seasons since FY 2005 (Figure 95, see here). Looking ahead, our strategist believes earnings will likely remain resilient next year and earnings positive surprise ratio to further improve. This is driven by **continued recovery of the domestic economy,** which will likely result in earnings recovery of sectors dependent on domestic demand (Figure 4).

On the back of the underlying earnings strength and positive outlook, our Nikkei bottom-up dividend estimates are revised higher, mainly led by IT and Communications (Figure 96). The upward revision is more noticeable on the CY 2023 tenor as compared with the CY 2022 tenor. We expect further dividend revisions as the current estimate is likely still underestimating the strong underlying earnings trend.

Figure 95: Percentage of upward revisions to company guidance in FY 2Q earnings report versus downward revisions



Source: J.P. Morgan Equity Derivatives Strategy, QUICK, based on TOPIX constituents; see more details here

Figure 96: Nikkei 225 bottom-up dividend estimate revisions from end of 3Q21 to current

	CY22			CY23		
Sector	End 3Q	Current	Revision	End 3Q	Current	Revision
IT	114.81	123.75	8%	121.99	133.83	10%
Industrials	103.82	102.37	-1%	116.11	116.11	0%
Discretionary	90.51	86.80	-4%	104.48	103.22	-1%
Communications	51.27	55.05	7%	55.75	59.47	7%
Health Care	52.02	52.24	0%	57.77	56.79	-2%
Materials	43.75	42.02	-4%	46.31	44.00	-5%
Staples	35.03	34.84	-1%	38.30	37.56	-2%
Financials	23.99	23.19	-3%	25.46	24.42	-4%
Real Estate	10.85	10.63	-2%	11.50	11.27	-2%
Energy	3.10	3.03	-2%	3.10	3.03	-2%
Utilities	1.19	1.20	0%	1.20	1.19	-1%
Total	530.33	535.11	1%	581.96	590.89	2%

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

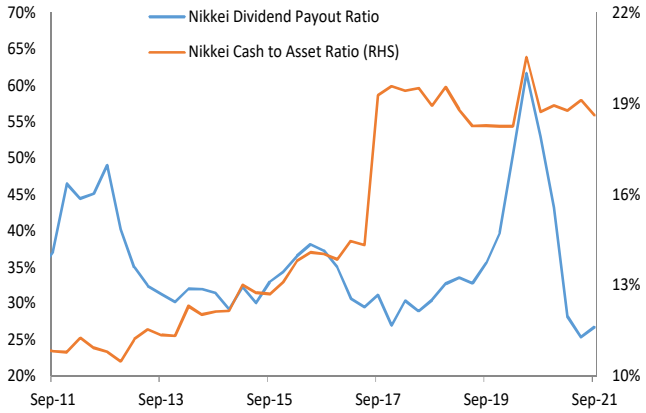
Japan fiscal stimulus boosts confidence in economic growth

Recently, the Kishida administration announced **a greater than expected stimulus package** of JPY 55.7tn in order to restore economic growth in Japan. We note that a main part of the stimulus is compensation equivalent to 100,000 yen for

children 18 and under. The "cash handouts" and other subsidies are aimed to provide a boost in the consumer space, although the degree of economic impact will depend on how much money is allocated toward retail spending.

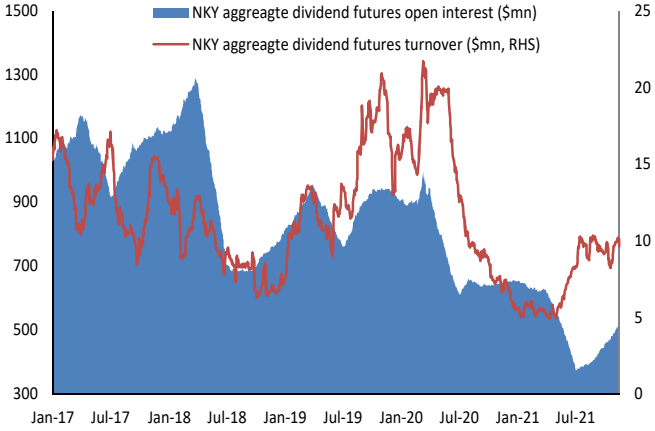
PM Kishida expects the package would lead to **GDP growth of 5.6%** (see here). In case of material ramp-up of retail spending and domestic economic recovery, we could see substantial dividend upside potential from 2023 onward as it takes time for the positive impact of stimulus to play out. In anticipation of the stimulus measures, we think investors have likely added long dividend positions.

Figure 97: Nikkei dividend payout ratio and cash to equity ratio history



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 98: Liquidity of Nikkei 225 dividend futures has materially improved



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Tokyo Stock Exchange reclassification could lead to improvement in corporate governance

In April 2022, the Tokyo Stock Exchange (TSE) will implement the new Market Structure: current market segments (TSE1, TSE2, TSE Mothers, and JASDAQ) will be **reclassified into three new market segments:** Prime, Standard, and Growth (see here). Importantly, the new Prime segment requires companies to maintain certain standards of corporate governance in order to ensure effective foundation for constructive dialogue between listed companies and institutional investors.

We think the TSE reforms will likely lead to **further progress in corporate governance and improvement in shareholder returns.** A number of small-cap firms raised dividend payout ratios this year with an aim to attract new investors and boost their share prices so that they can meet the listing requirement for the new Prime segment (see here). Over time, this will help to raise the awareness of good governance among Japan corporates.

This should bode well for the Nikkei dividend outlook in the long term from a fundamental perspective. At the same time, **it remains to be seen if the push for a more shareholder-friendly culture would be endorsed by Nikkei 225's index provider** in a form of including ESG-related criteria when selecting constituents. We concede this is a remote event, but it could meaningfully accelerate the trend of being more shareholder friendly among Nikkei 225 companies.

Figure 99: Simulation of Nikkei 2022 dividends (YoY % growth vs 2021 realized) based on Japan nominal GDP and pay-out ratio scenarios

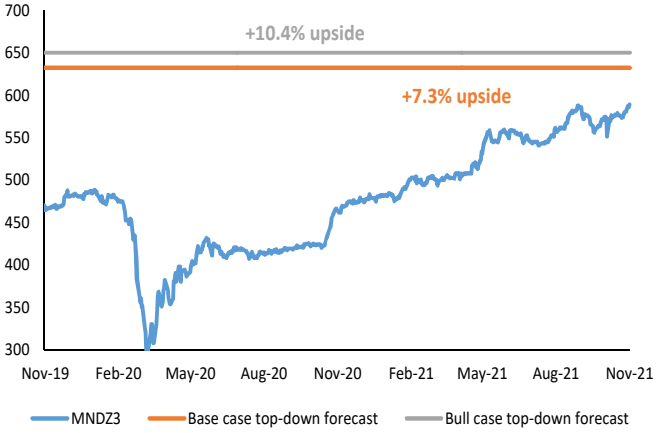
Payout\GDP		→ 2.7%	→ 3.2%	22E 3.7%	→ 4.2%	→ 4.7%
10Y Low	26%	483 (-1%)	487 (0%)	492 (1%)	496 (2%)	500 (3%)
↓	28%	520 (7%)	525 (8%)	529 (9%)	534 (10%)	539 (11%)
22E	30%	557 (14%)	562 (15%)	567 (16%)	572 (17%)	577 (18%)
↓	32%	595 (22%)	600 (23%)	605 (24%)	610 (25%)	616 (26%)
↓	34%	632 (30%)	637 (31%)	643 (32%)	649 (33%)	654 (34%)

Japan Nominal GDP YoY % Chg

Nikkei Dividend Payout Ratio

Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Please refer to JPM GDP estimate here.

Figure 100: Base-case and bull-case Nikkei 2023 dividends based on Japan nominal GDP scenarios and 30% pay-out ratio



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Top-down model suggests meaningful upside for Nikkei 2023 dividend futures

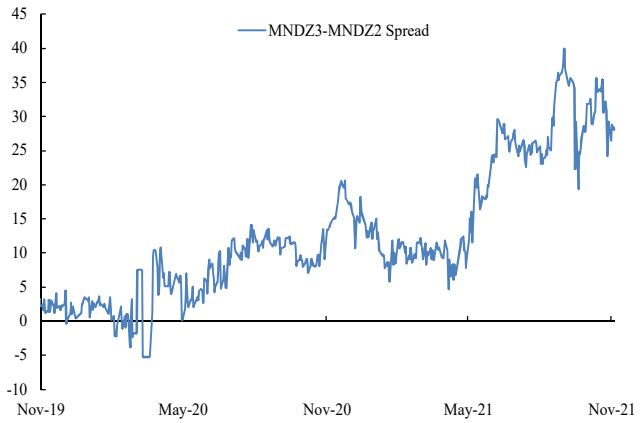
Despite the recent revisions, we believe the improvement in fundamental outlook is not fully reflected in the dividend estimate due to conservative company guidance / analyst dividend revisions. Consequently, current bottom-up aggregate estimates suggest there is 5% downside for the Nikkei CY 2022 dividend contract and flat growth potential for the CY 2023 contract (Figure 93 and Figure 94).

With the bottom-up estimates lagging the fundamental outlook, we resort to a top-down approach to forecast Nikkei dividends. Specifically, we derive a regression relationship between Japan nominal GDP growth versus Nikkei DPS growth based on the past 10-year history and apply the model to forecast dividends for the next couple of years. We estimate Nikkei CY22 dividends should grow +16% yoy to **567 index points** (versus current MNDZ2 561 index points, Figure 99).

For dividend futures further out, we expect more meaningful upside:

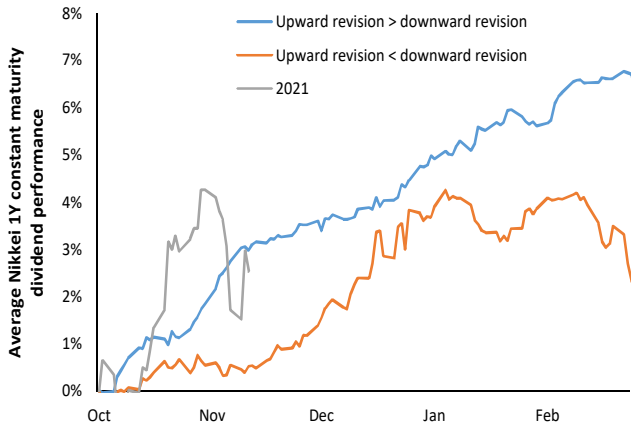
- **Base case estimate:** Based on a modest CY23 GDP growth estimate, we expect Nikkei CY23 dividends to expand +11% to **632 index points.** This suggests meaningful upside potential of **~7.3% for the MNDZ3,** based on current pricing (Figure 93).
- **Bull case estimate:** With a more aggressive GPD growth forecast (i.e., half of what Kishida government expected), we expect Nikkei CY 2023 dividends to **rise to 650 index points,** which translates to ~**10.4% upside** for the Nikkei CY 2023 dividends (Figure 100).

Figure 101: Nikkei CY 2023 – 2022 dividend futures spread history



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 102: Nikkei 1Y constant maturity dividend performance in years where upward guidance revision > downward revision and when upward revision < downward revision in FY 2Q earnings



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P., QUICK * revisions based on TOPXI constituents, data since 2010

Prefer longer-dated Nikkei dividend futures

Since August, our preference on Nikkei dividends has shifted to longer tenors (see here). Recent developments such as strong interim earnings and bigger than expected stimulus package affirms our positive view on the Nikkei longer tenor dividends. Based on current pricing, we see 1.2% upside potential on the MNDZ2 contract and 7.3% upside potential on the MNDZ3 versus our top-down model estimates. Structural drivers such as fiscal stimulus and corporate governance reforms could lead to upside risks in Nikkei longer dated dividends. However, we prefer the 2023 tenor (versus 2024 tenor) on liquidity considerations.

From a pricing perspective, the Nikkei CY23-CY22 dividend term structure materially flattened recently to near lows in 2H21 (Figure 101), which makes the **current entry point relatively attractive** for the long MNDZ3 trade.

In the near term, **we expect the strength in Nikkei dividends to further extend.** Our analysis suggests that in years where upgrades to guidance outpace downgrades at the interim results, Nikkei dividend futures typically continue to post strong performance into the year-end and at the start of the subsequent year. Based on average performance in years where upward guidance revision > downward guidance revision at interim results season, we could see another +3.5% gain in Nikkei 1Y constant maturity dividends (Figure 102) by end of next February. This suggests we could continue to see further gains in Nikkei dividends in the next few months.

Delta 1 Funding

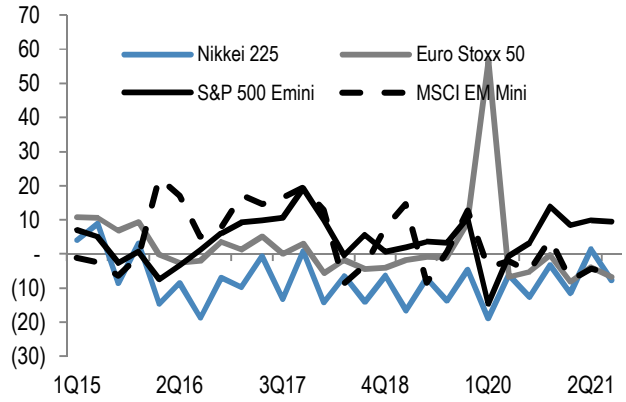
Short-dated funding spreads for developed European and Asian indices stayed cheap in 2021 given the lack of stress in the funding market. As highlighted by our US colleagues, S&P short-dated financing rates are currently trading very rich, reflecting concerns around G-SIB dynamics (Figure 103).

Longer-dated equity funding spreads generally narrowed for Euro STOXX 50 and Nikkei but remained rich for SPX and FTSE100, reflecting market-specific supply-and-demand dynamics linked among other things to the structured product issuance and re-hedging (Figure 104).

Looking into 2022, we expect demand for short-dated funding to increase moderately for Equity indices, most likely driven by increasing demand for equities exposure from investors.

Figure 103: Equity funding spreads on average decreased over the year

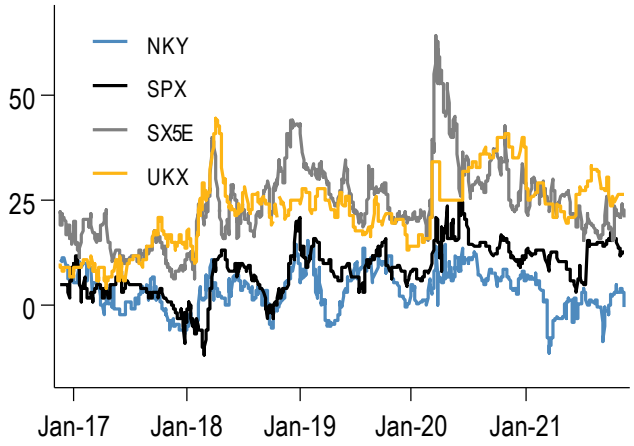
Average futures roll cost (bp, over 12M rolling period, annualized)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 104: The S&P 500 and FTSE100 long-dated implied funding levels remained elevated in 2021

1Y implied funding rates (bp)



Source: J.P. Morgan Equity Derivatives Strategy

US: Equity financing rates continued to rebound from their plunge in March 2020 and generally rose throughout this year as the market rallied and investor positioning stayed long. The funding curve shifted upward nearly in parallel this year, with longer-term funding rates rising as much as shorter-term ones (Figure 105).

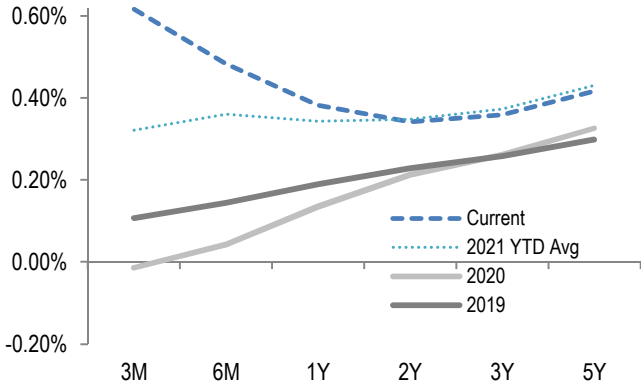
As we've discussed in past Outlooks, changes to the regulatory environment/capital requirements in recent years continue to pressure banks' balance sheets, limiting supply to equity financing markets. In particular, equity financing rates exhibit strong seasonality around year-end due to GSIB dynamics (e.g., discussed here). Equity financing rates over year-end are currently trading very rich, reflecting concerns around these G-SIB dynamics (Figure 106).

Another important regulatory development for delta-1 markets is the continued phase in of un-cleared margin rules (UMR). As UMR phases in and brings more counterparties in scope (with the final stage set for Sep 1, 2022, that will subject an estimated total of ~1,000 institutions to the rules), we see two major implications for equity financing markets. First, exchange-cleared futures contracts may increasingly supplant total return swaps as the funding instrument of choice for in-scope institutional clients as the regulations can make swaps more expensive to trade. Secondly, UMR is likely to drive a structural increase in equity financing rates across the curve due to increased costs for dealers that will need to be passed on as dealers will either need to commit more balance sheet to funding markets (raising their GSIB scores and capital surcharges) or pay higher rates to offload positions via GC swap markets (see the Special Topic section here for more details).

We expect funding costs to decline early in the New Year as the year-end seasonal premium is priced out but for financing spreads to generally remain elevated next year given our positive outlook for equity markets that could drive high demand for levered equity exposure, as well as due to UMR as discussed above.

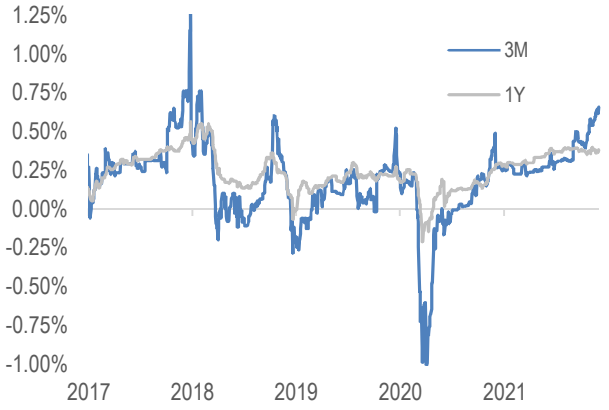
As noted in the Volatility Supply and Demand section, Russell 2000 financing rates were boosted by hedging demand from structured products, causing the Russell's financing spread discount vs. other US indices to narrow significantly in the past few years and remain narrow this year (Figure 17). Russell 2000 financing should again trade at a historically narrow spread vs. the S&P 500 next year given this driver and given likely stronger demand for long Russell 2000 exposure as investors continue to rotate into Value and Cyclicals as we discussed in the Outlook for Markets and Volatility section.

Figure 105: S&P 500 implied funding curve (vs. LIBOR)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 106: Equity financing rates generally rose this year alongside the market

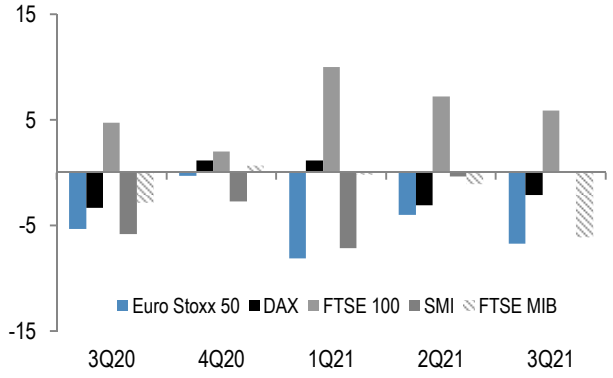


Source: J.P. Morgan Equity Derivatives Strategy.

Europe: Short-dated implied funding remained cheap across the main European futures during 2021 (Figure 107) on the back of a moderate level of investor demand for synthetic equity exposure products. We expect demand for European equity exposure via futures and TRSs to increase going into 2022, and therefore a potential richening of short-dated funding spreads, on average.

Long-dated funding was under pressure for Euro STOXX 50 in 2021. Structured product related dynamics explain part of this impact, specifically subdued issuance of long-dated autocallables and the strong spot performance, which led to a reduced implied funding exposure for exotic trading desks that had issued these products. Carry trades based on the equity funding curves such as TRF/TRS flatteners (e.g., SX5E 5Y vs 1Y) stayed in place and compounded the trend.

Figure 107: European short-dated implied funding stayed cheap during 2019
Futures roll cost (VWAP over roll period, non-annualized) (bp)



Source: J.P. Morgan Equity Derivatives Strategy.

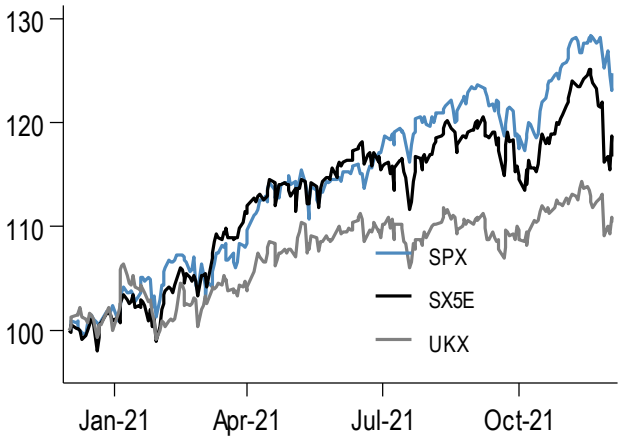
Figure 108: The rally in the Euro STOXX 50 spot since March led to flattening of the term structure for implied funding
Euro STOXX 50 5Y -1Y funding (bp)

Source: J.P. Morgan Equity Derivatives Strategy.

The FTSE 100 index has been one of the worst-performing global indices since the start of the year and also over the longer term (Figure 109). The poor performance of the index affected the risk originating from FTSE 100 single-index and worst-of autocallable products as the index's underperformance relative to global indices shifted most of the risk originating from worst-of (WoF) index autocallables structures to the FTSE 100 index.

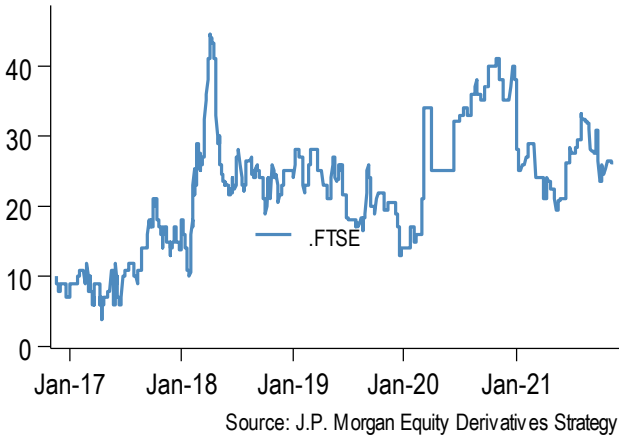
Figure 110 shows the FTSE100 long-dated funding curve remain very steep compared to Euro STOXX 50 (Figure 108).

Figure 109: The FTSE 100 index severely underperformed the other indices used most commonly used in WoF baskets products
Performance since the start of the year (%)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 110: FTSE100 long-dated funding curve remain very steep compared to Euro STOXX 50
FTSE 100 5Y -1Y funding (bp)



Source: J.P. Morgan Equity Derivatives Strategy.

Going forward, we see two factors potentially leading to a further decline in long-dated funding. First, issuance of new structured products continues to be very slow, limiting the demand for long-dated funding. Second, a continued market rally will progressively reduce the exotic desk long-dated funding demand.

Asia: China onshore implied funding was a major focal point this year as overseas investors take advantage of high borrow cost for long outperformance opportunities. Average implied funding for CSI 500 decreased to -11.2% in 10M21 versus an average of -10.6% in 2020 and -9.5% in 2019 (Figure 111). A similar trend can be observed in CSI 300. In the absence of an efficient stock borrowing and lending market, hedging demand via shorting futures has been among the major drivers of

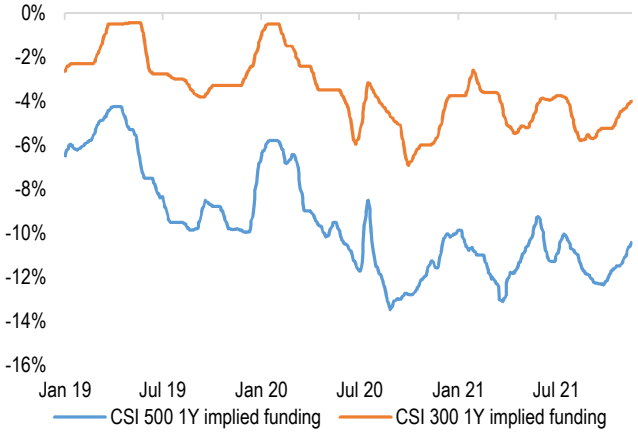
implied funding. In recent years, following significant growth in assets managed by onshore hedge funds, we observe rising influence of market-neutral quantitative strategies (e.g., long stock, short index) on implied funding and more so in small- and mid-cap segments as captured by the CSI 500 index. The popularity of CSI 500 stocks in market-neutral strategies can be explained by more alpha generation opportunities (due to low stock correlations) and availability of listed futures products (which makes it easier to manage market beta exposure). The combination of low stock correlation and high market turnover this year provides fertile grounds for market-neutral strategies to proliferate (Figure 112). The rising popularity of these strategies is expected to push stock correlation lower and market turnover higher. This phenomenon is most notable between June and October 2021. At the time, the rise in implied borrow coincided with a rise in market turnover and a decline in stock correlations.

We expect China onshore implied funding to remain in deeply discounted territory but likely to increase from the 2021 average. We expect low stock correlation to remain in place as China is transitioning to a new economic model that is less reliant on real estate. Dispersion in stock returns bodes well for market-neutral strategies as well as demand for shorting futures as a beta hedge. However, the growth in quant funds will likely be slower as a number of top players suspended fundraising activities following tighter scrutiny from the regulators (see here).

Japan: Nikkei 225 implied funding curve is pushed to positive territory this year with the short-dated having outperformed the long-dated. Short-dated implied funding made the most notable up-move in March 2021 as synthetic long demand increased following strong performance in Nikkei 225 earlier in the year. The up-moves also occurred more recently in September 2021 as investors speculated on more market-friendly policies from Japan's new prime minister into the General Election. Long-dated implied funding continued to be driven by structured product related flows. We find re-hedging flows had a more pronounced impact on the term structure of implied funding while relatively low issuance volume limits the impact of new deals. We estimate a meaningful amount of structured product triggered the early redemption conditions in March and September 2021, causing dealers to unwind their longs in long-dated funding and subsequently leading to a flatter term structure in implied funding.

Going into 2022, we expect implied funding to stay supported, but longer-dated implied funding is likely to outperform short-dated. As discussed in the Volatility Supply and Demand section, we expect structured product issuance to gradually recover next year. Hence, we expect better demand for long dated funding. Re-hedging flows around major knock-out barriers (e.g., 30,000 to 31,000 based on our latest estimates) will continue to drive the relative moves in short-dated and long-dated implied funding. However, we expect any flattening or inversion in the implied funding term structure to be mild considering a relatively low notional outstanding versus history.

Figure 111: Calendar year average of China CSI 300 and CSI 500 implied funding cheapened in 2021 from already discounted levels



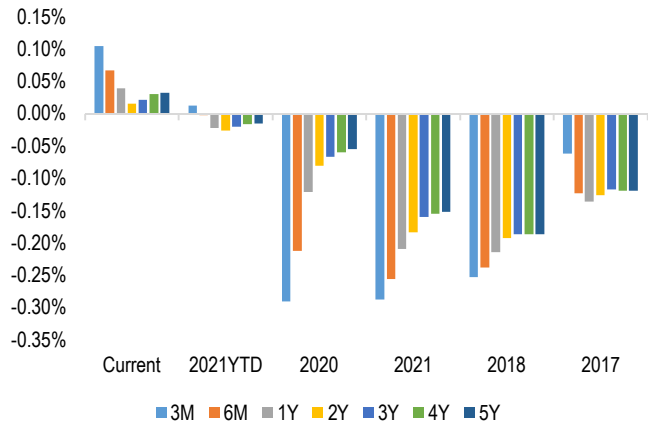
Source: J.P. Morgan Equity Derivatives Strategy.

Figure 112:Low stock correlation and high market turnover provide fertile grounds for market-neutral strategies to proliferate

Source: J.P. Morgan Equity Derivatives Strategy

Figure 113: Nikkei 225 implied funding spread curve

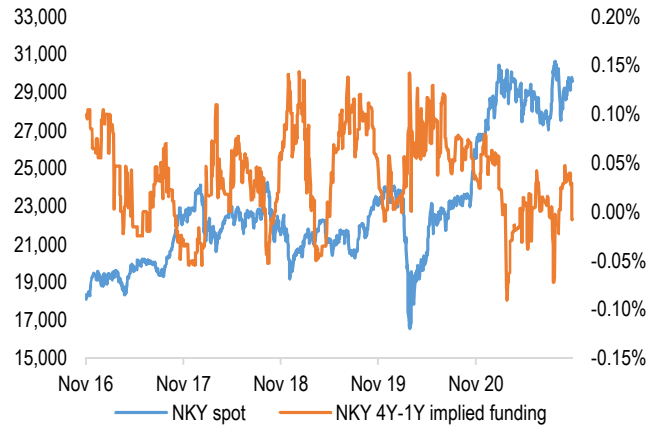
Implied funding spread (%)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 114: Nikkei 225 implied funding spread term-structure vs spot

Index level Rate spread (%)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Derivatives Trades for 2022

Macro/Directional Trades

Position for EM outperformance

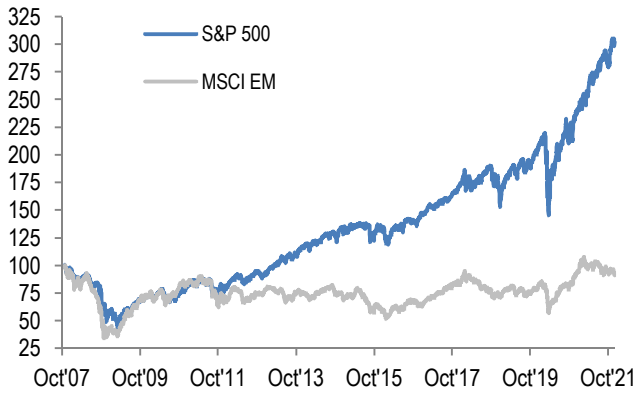
Trade EM outperformance via call switches vs. SPX

EM had a tough year in 2021, driven by the slowdown in China, policy tightening, inflation overhang, EM FX weakness, and Delta variant headwind. While some of these negatives will not disappear, much is already in the price, and we look for better EM vs. DM trading in 2022 since (1) EM valuations are cheap and trade at a wider than historical discount to DM following another year of strong underperformance in 2021; (2) we expect the phase-out of US exceptionalism and convergence of the EM growth, valuation multiple, and reopening differentials vs. DM; (3) we are constructive on China equities on robust earnings growth, reopening, and potential for easing trade barriers; (4) EM remains under-owned by global investors, and allocation to EM equities is still at an early stage; and (5) EM equities should be a regional beneficiary of investors' rotation into Cyclical and Value assets. Our strategists' base case price target for MSCI EM is 1,500 for 2022 year-end (+22%), and in a bull case they see it reaching 1,650 (+34%)—see here. There also remains a stark performance gap between EM and US equities—MSCI EM is back to trading below its previous cycle high in Jan'18 and is *down* ~10% since Oct 2007, while the S&P 500 is near record highs and up ~200% over that period—a ~210% relative underperformance (Figure 115). Meanwhile, EEM volatility appears relatively cheap vs. the S&P 500, with the 6M ATM vol spread in its ~20th %ile relative to the past five years of history (Figure 116).

As such, we recommend positioning for the outperformance of EM equities into 2022 via

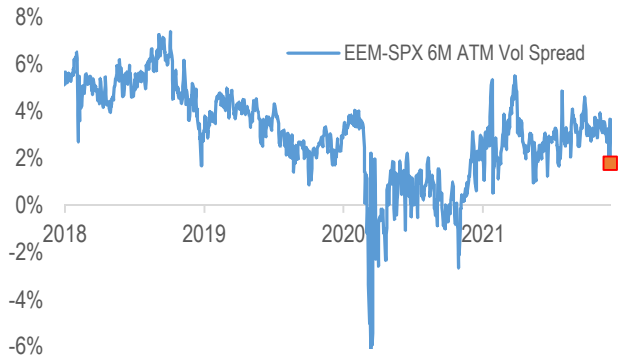
- **6M ATM call switches (long EEM, short SPX calls) for zero cost**, or
- **6M 102.5% call on the outperformance of EEM over S&P 500, contingent on S&P 500 finishing higher, for 1.6%** of notional indicatively.

Figure 115: EM equities strongly underperformed over the last cycle
Price performance (rebased to 100 in Oct'07)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 116: EEM less SPX volatility spread is low



Source: J.P. Morgan Equity Derivatives Strategy.

Additionally, within EM our Equity Strategists are OW China and Brazil, and we highlight recommended structures to position for upside in these markets below:

Short HSCEI call ratio and roll 6 months ahead of expiry for like large returns

Similar to 2018, the large fall in in MSCI China YTD was triggered by a worse than expected U.S.-China relationship and tighter liquidity/regulations onshore (see here). In 2018 and 2021, these factors slashed MSCI China's 12-month forward P/E by around three standard deviations (SD) from peak to trough. Looking ahead, our equity strategists are constructive on MSCI China. They expect China's credit impulse to turn less negative in 1Q22 and slightly positive in 2Q22 but also note that regulations in 2021 are more structural than in 2018. The third factor, the U.S.-China relationship, could lift MSCI China's P/E by 1- 1.5SD if things improve, but it could also trim MSCI China's P/E on flare-ups. For end-2022, our China

equity strategist's MSCI China bear/base/bull-case target is 98/116/123, implying 11%/32%/40% upside potential (MSCI China spot reference 88, see here).

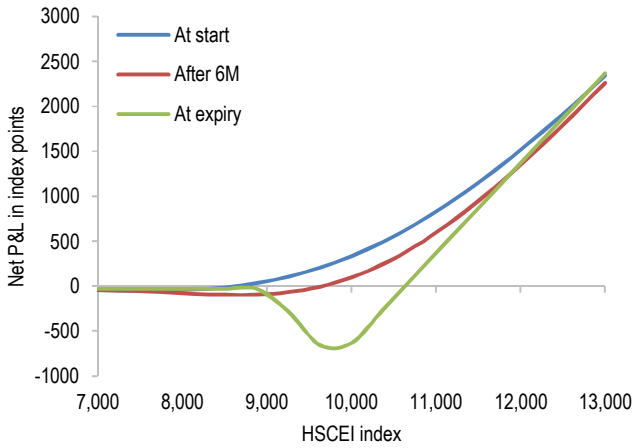
Amid the weakness in offshore Chinese equities, realized correlation between MSCI China and H-shares increased (6M realized correlation at 96%) and H-shares upside skews steepened, making short call ratio (e.g., buying multiple higher strike calls financed by selling one lower strike call) on H-shares attractive to play a major rebound in offshore Chinese equities next year.

While H-shares exhibit flat or even inverted upside skews historically, and, most recently in 1H21, a lack of interest for upside participation since end-June 2021 has been among the factors that keep H-shares upside skew trading on the steep side of history. Current volatility spread of +0.45 vol pt in H-shares 1Y 40-delta over 25-delta call options corresponds to 80th 5Y percentile level despite some normalization from more extreme levels. Should the index move sharply higher as forecasted by our China equity strategists, investors' demand for H-shares call options, due to the need to close their China underweight positions or chase upside momentum, could lead to a substantial rise in upside volatility, especially in more OTM strikes because of their higher leverage.

The short call ratio strategy benefits from a sharp move higher in the underlying price or a sharp move higher in implied volatility during the life of the options (Figure 117). Generally speaking, impact of time decay on the strategy is mildly negative assuming a moderate rise in spot levels, but it will accelerate six to seven months into the trade. To maintain a more stable risk profile, we recommend investors roll the strategy six months ahead of expiry. An alternative to express an extremely bullish view without exposure to downside risk is buying far OTM call options outright.

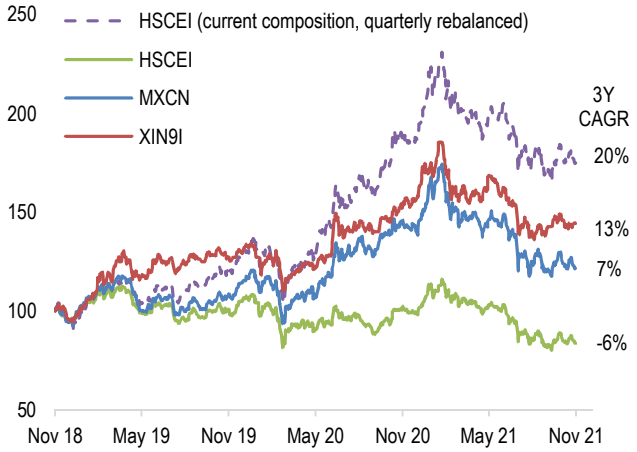
- **Buy 2x HCZ2 16Dec22 9,800 call vs sell 1x HCZ2 16Dec22 9,000 call:** offer HKD 30 (0.34% of notional, 20.5%/20.6% volatility, 10% delta, spot reference 8,390)
- **Buy HCZ2 16Dec22 10,500 call:** offer HKD 130 (1.53% of notional, 20.9% volatility, 15% delta, spot reference 8,390)

Figure 117: Simulated P&L for HSCEI options on futures Dec22 call ratio (-1x 9000 call + 2x 9800 call) at start, after 6m, and at expiry



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 118: The gradual changes in index compositions contributed to H-shares' underperformance in recent years



Source: J.P. Morgan Equity Derivatives Strategy

From a back-testing perspective, the dramatic changes to H-shares index methodology as well as a boom of HK IPOs over the last few years makes it critical to simulate the price history based on the current index composition for a fairer representation of the index's risk characteristics. Revisions to H-shares index methodology that run from March 2018 to December 2019 (see here and here) and inclusion of new listings caused the index to have higher weights in Discretionary, Communications, and Technology and lower weights in Financials. The gradual changes in index compositions contributed to H-shares' underperformance during the tech-led rally coming out of the COVID shock (due to relatively low exposure to tech-related sectors) and during the tech-led sell-off this year (due to relatively high exposure to tech-related sectors). In

simulating the price performance of the index, we backfill stock price with insufficient history with ADR price if available. Otherwise, weight of stocks with missing price history is re-distributed across index members proportional to the current weight. We estimate ~6% of the index weight (largely from newly listed names) is redistributed three years ago. After the adjustment, we find H-shares could have been the best performer over the last three years if the current composition were effective three years ago (Figure 118). This supports the view that H-shares could be the best performer if issues clouding the outlook of offshore-listed Chinese equites were to ease.

Long CSI 500 and CSI 1000 total return swaps

The possibility of easing US-China tariffs is a non-consensus tailwind for US and China equities, especially cyclicals and small caps (see here). After signing the initial trade deal in Jan 2020, the onset of the pandemic completely de-prioritized trade and left $350-370B of Phase I-III tariffs in place. While most investors remain negative on US-China trade, we see a potentially compelling case for easing tariffs. In fact, heading into 2022 US midterms, easing tariffs could align with Biden's campaign commitment, support the party's election strategy, and address business concerns. Lower tariffs could also provide some consumer relief at a time when government benefits are rolling off and consumer inflation is elevated. We recommend investors buying the CSI 500 and CSI 1000 total return swap to express this view and earn outperformance versus cash equivalent.

The sizable outperformance opportunities arise from net long total return swaps CSI 500 and CSI 1000 and come from a lack of efficient stock-lending facilities in China's A-shares market (see Delta 1 funding section). In recent years, following significant growth in assets managed by onshore hedge funds, we observe rising influence of market-neutral quantitative strategies (e.g., long stock short index) on implied funding and more so in small- and mid-cap segments as captured by the CSI 500 index. The popularity of CSI 500 stocks in market-neutral strategies can be explained by more alpha generation opportunities (due to low stock correlations) and availability of listed futures products (which makes it easier to manage market beta exposure). The combination of low stock correlation and high market turnover this year provide fertile grounds for market-neutral strategies to proliferate. As a result, implied funding for China small-cap indices were trading at more discounted levels on average this year. The supply-demand dynamics on CSI 1000 is more imbalanced, so is a higher discount in implied funding rates.

Figure 119: Major China indexes overview

Index	FTSE China A50	MSCI China A50	CSI 300	CSI 500	CSI 1000	MSCI China	H-shares
Ticker	XIN9I Index	MXCNA50C Index	SHSZ300 Index	SH000905 Index	CSI1000 Index	MXCN Index	HSCEI Index
Currency	CNY	CNH	CNY	CNY	CNY	HKD	HKD
Number of Stocks	50	52	300	500	1000	753	50
YTD Price Return	-12.9%	-5.0%	-6.9%	13.5%	20.3%	-19.6%	-21.0%
3M Realized Volatility	16.0%	14.3%	12.5%	16.2%	20.2%	20.2%	22.5%
Weight of Top 10 Stocks	53%	48%	23%	9%	6%	40%	55%
By Exchange of Listing							
Shanghai	70%	59%	62%	48%	38%	9%	0%
Shenzhen	30%	41%	38%	52%	62%	6%	0%
Hong Kong	0%	0%	0%	0%	0%	68%	100%
US	0%	0%	0%	0%	0%	17%	0%
By Market Cap							
Large (>$10bn)	100%	100%	89%	13%	2%	76%	99%
SMid (<=$10bn)	0%	0%	11%	87%	98%	24%	1%
By Sector Weight							
Communication Services	0%	1%	2%	3%	2%	16%	15%
Consumer Discretionary	10%	6%	9%	8%	8%	24%	32%
Consumer Staples	28%	16%	16%	7%	5%	5%	5%
Energy	2%	2%	1%	3%	1%	1%	3%
Financials	37%	18%	23%	5%	1%	14%	26%
Health Care	6%	10%	9%	8%	11%	7%	2%
Industrials	5%	16%	12%	21%	23%	5%	2%
Information Technology	5%	15%	16%	17%	24%	6%	8%
Materials	5%	10%	8%	22%	21%	3%	0%
Real Estate	2%	2%	2%	3%	2%	4%	6%
Utilities	1%	2%	2%	3%	2%	2%	2%

Source: J.P. Morgan Equity Derivatives Strategy. Note: data as of Nov 30, 2021

Investors can take advantage of these flow dynamics by entering long CSI 500 and CSI 1000 net total return swaps to lock in the large discount in implied funding. We expect China onshore implied funding to remain in deeply discounted territory but likely to increase from the 2021 average. We expect low stock correlation to remain in place as China is transitioning to a new economic model that is less reliant on real estate. Dispersion in stock returns bodes well for market-neutral strategies as well as demand for shorting futures as a beta hedge. However, the growth in quant funds will likely be slower as a number of top players suspended fundraising activities following tighter scrutiny from the regulators (see here).

Brazil: Buy call spreads funded by selling puts on EWZ as risk is asymmetrically priced with Brazil equities at 20Y low valuations

Our Equity Strategists are Overweight Brazil as risk is asymmetrically priced, with valuations at 20-year lows. Brazil is also the highest beta market in LatAm and likely to benefit from a pro-risk stance in global markets. Other regions are likely going to lead vis-à-vis growth, with most countries in LatAm expected to post a significant decline in economic activity, as disposable income gets compromised by higher inflation and higher interest rates (almost 10% higher in Brazil). Still, we sense that all the downside is already known in the region and thus very well priced. This is especially the case for Brazilian elections, which has a lot of market attention. Brazil today is trading over 2 SD below average, something that we have never witnessed. While we deem that part of this is justified by higher inflation and a deterioration of the fiscal discourse, Brazil has been in worse situations before with valuations better than current levels. Our strategists thus see significant upside for Brazilian equities with a YE22 price target for the Ibovespa of 134,200 (~30% upside from current levels). Meanwhile, implied volatility on EWZ appears slightly rich (e.g., 6M ATM implied is ~70th %ile over the past 3Y and trades ~6 points above 2M realized), and near-the-money and upside skew are flat (e.g., 6M ATM-110% skew is in its 1st %ile over the past 3Y), but the downside tail is relatively more expensive. We thus recommend buying call spreads funded by selling puts to position for upside, for example:

- **Buy EWZ 6M 105-120% call spreads vs. selling 74% puts for zero cost**, indicatively. This structure is net short vega and sells the 120% strike calls at nearly the same implied vol level as the 105% calls, while the 74% strike puts trade ~8 vol points higher. Even in case of further downside on Brazilian equities, we see the short put as an attractive target buy, with investors buying shares of the ETF near the COVID-19 pandemic lows seen in Mar'20.

Figure 120: EWZ upside skew is flat, but downside tail is still relatively steep

Source: J.P. Morgan Equity Derivatives Strategy.

DM equity upside trades

Trade outperformance of small caps via RTY over NDX outperformance options or call switches

Small-cap US stocks rallied around the start of 2021 on optimism around vaccination and reopening but were range-bound for the rest of the year (apart from a brief breakout in early November that subsequently reverted) and significantly underperformed large caps as virus fears continued to vex markets. We retain a pro-cyclical tilt and preference for reflation- and reopening-sensitive segments, particularly in light of their recent pullback, which includes a preference for small caps. The end to the global pandemic and broader reopening/cyclical expansion of economies next year should favor small caps and see Tech and momentum stocks that benefitted from lockdowns/social distancing measures (and speculative investor positioning) underperform as these measures end. Small caps should also benefit from their cheap valuations and higher beta exposure. Seasonality could also provide a boost to small caps early next year given the well-documented "January effect." Meanwhile, the Russell 2000 has underperformed the S&P 500 by ~50% and the Nasdaq 100 by ~90% over the past ~3.5 years. We thus recommend positioning for its outperformance via (limited-loss) outperformance options on the Russell 2000 vs. the Nasdaq 100.

Correlation between the Russell 2000 and Nasdaq 100 weakened during the pandemic due to factor/cyclical rotation trading, but it remains elevated and still offers a decent discount for outperformance options, allowing investors to position relatively cheaply for small caps' outperformance through these defined loss structures. For example:

- **Buy 6M 102.5% call on the outperformance of Russell 2000 over Nasdaq 100, contingent on the Nasdaq being up at expiry, for ~1.75% of notional,** indicatively. This represents a saving of ~73% vs. a vanilla RTY call.
- Alternatively, investors who are willing to risk uncapped losses in case the Nasdaq outperforms can consider call switches, buying a **6M 102.5% call on Russell vs. selling a call on Nasdaq for 0.3% of notional,** indicatively.

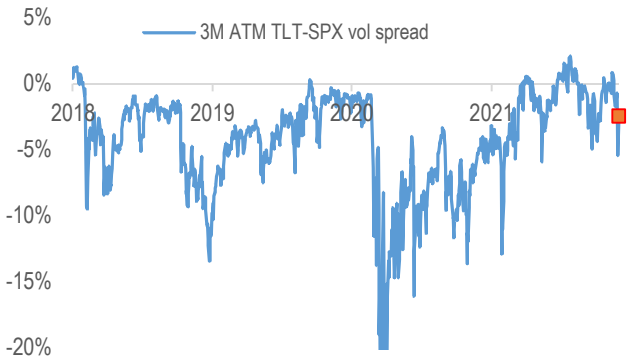
Treasuries are rich and volatility is elevated—sell TLT calls to fund equity upside

Treasuries remain rich, implying significantly worse growth outcomes than our economists' forecasts based on our rates strategists' fair value framework, and even more acutely so after rallying on the Omicron variant scare. The US economy is expected to deliver firmly above-trend growth in 2022, with broad support from consumers, businesses, and government. Thus, the pre-conditions for FAIT should be met: our economists project the Fed will raise rates in September and December and at a quarterly pace thereafter—while markets are pricing this in for next year, they imply a slow tightening pace and low terminal rate thereafter, leaving room for catch-up at the long end. We think this hiking cycle is likely to be different than the last as the economy can handle more tightening. Additionally, as the Fed tapers, a large source of demand disappears. We project LDI and foreign demand to accelerate in 2022, but bank demand should moderate after a record in 2021, requiring higher yields to entice demand. This should result in yields rising next year, with our rates strategists projecting 10-year yields rising to 2% by 2Q22 and 2.25% by year-end (see here).

On the equity side, we remain constructive as discussed above and expect cyclical segments to outperform on above-trend growth and recovery from the pandemic, better than expected earnings, easing supply shocks, still accommodative policy, an improving China/EM backdrop, and normalizing consumer spending habits. We also see the potential for the Omicron variant ultimately to prove to be a positive for risk markets, in the sense that it could accelerate the end of the pandemic by crowding out more severe variants, and thus lead to higher yields and steeper curves, while benefitting cyclical/reopening-linked assets (see here). Meanwhile, the recent volatility in rates kept TLT implied volatility elevated, though its premium vs. equity volatility eroded somewhat on the Omicron variant scare when equity volatility outperformed (Figure 121). As such, we continue to recommend selling TLT calls to fund equity upside (as previously recommended here), particularly in reflation/reopening-linked segments with inexpensive volatility relative to TLT. For example investors can indicatively:

- **Sell 3M ATM TLT calls vs. buying 3M ATM calls on SPX / RTY / EEM / XLE / XLF** for 1.15% / 2.7% / 0.8% / 3.3% / 1.9% of notional.

Figure 121: TLT vs. SPX 3M ATM volatility spread



Source: J.P. Morgan Equity Derivatives Strategy.

Eurozone upside trades

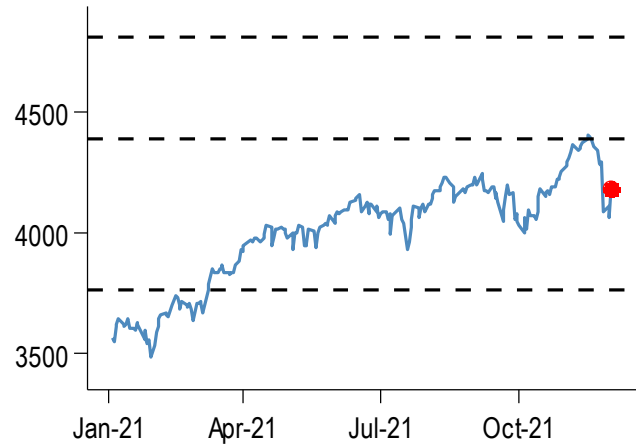
J.P. Morgan strategists Dubravko Lakos-Bujas and Mislav Matejka continue to be bullish equities into 2022 and see European equities outperforming within DM. The further rally in equities will likely be driven by continued easing of supply chain bottlenecks, improving China backdrop, and central bank policy remaining broadly accommodative.

Directional vanilla option trade

Euro STOXX 50 implied volatility spiked recently on the back of Omicron-related concerns (Figure 122), while skew steepened further. For investors who agree with our strategists' views we recommend an upside structure that is short volatility and skew to play further upside of European stocks into 2022:

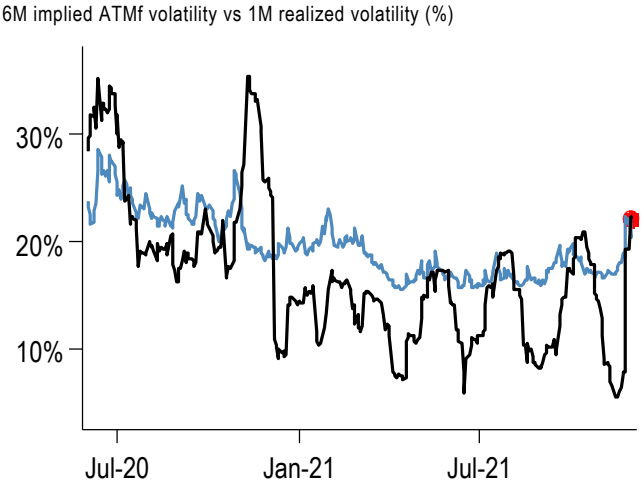
- **Buying 1.78x SX5E Jun-22 105%-115% call spread and selling 1x SX5E Jun-22 90% put, indicatively flat (ref. 4,108)**

Figure 122: Euro STOXX 50 index spot level and strikes of the proposed call spread vs. put option structure



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 123: Euro STOXX 50 6M ATMf implied volatility vs 1M realized volatility



Source: J.P. Morgan Equity Derivatives Strategy.

Derivative considerations

- **Volatility:** With the latest market correction (Figure 122) we find current SX5E implied volatility expensive versus recent realized (Figure 123).

- **May Expiry:** We favor the June expiry as it screens relatively high in the ATMF volatility curve (Figure 125). The expiry choice is also in line with our equity strategist's view that most of the equity upside should be realized between now and 1H22.
- **Skew:** SX5E skew remains elevated relative to pre-COVID-19 crisis levels (Figure 124) and has room to normalize more.

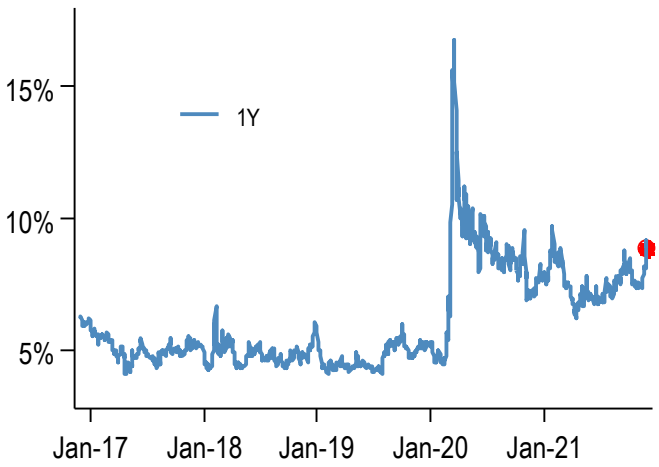
  Alternatively, we recommend long-dated risk reversals as an alternative to delta one holding, to take advantage of steep long-dated skew (Figure 124):

  - **Buy SX5E Dec-22 105% call funded by selling Dec-22 90% put with knock-in barrier at 67% (~2,752, continuously monitored), for zero cost (SX5E ref. 4,108).**

  As explained in our previous publication, these trades should eventually benefit from skew flattening early next year if we are right in our view, although admittedly long-dated skew could remain steep until year-end.

Figure 124: SX5E skew remains well above pre-Covid19 levels and has further room to normalize

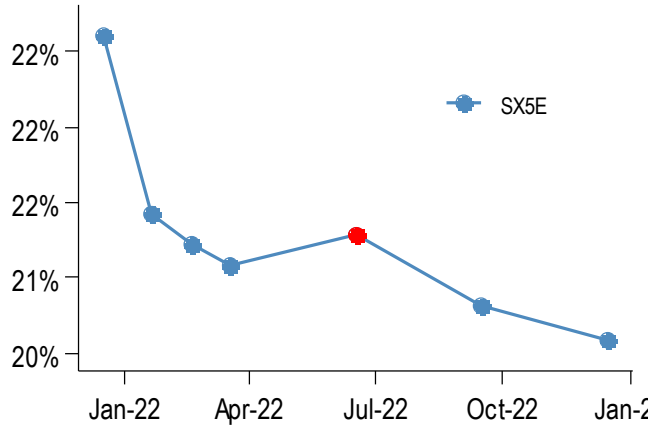
1Y 25D skew (%)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 125: Euro STOXX 50 Jun22 expiry screens relatively high in the ATMF volatility curve

SX5E ATMF volatility term structure (%)



Source: J.P. Morgan Equity Derivatives Strategy.

Upgrading UK to OW: long FTSE 100

Our equity strategy team recently upgraded to Overweight UK equities after being negative on the UK for six years and moving it to Neutral after dividend cancellations had been priced in July 2020. Since the Brexit referendum in June 2016 UK equities underperformed European equities by around 30% and US equities by more than 90%. As earnings growth held up comparatively well, a significant valuation gap has emerged, making UK equities attractive to own. As a traditionally high-yielding market and against the backdrop of our expectation of rising rates, it is important to point out that we no longer observe the clear inverse correlation between bond yields and the price of UK equities. On the flipside the UK continues to trade at a low beta to PMIs and has historically exhibited a negative correlation to the performance of Cyclicals. We expect earnings in the UK to be supported by weakening sterling, which our FX colleagues expect in the months to come. We do not consider the start of a hiking cycle by the BoE a major threat to our Overweight call and, instead, believe current concerns over labor supply shortages and power prices could be easing.

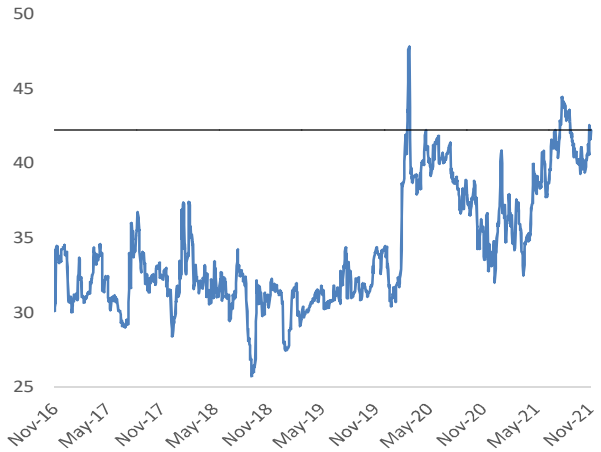
The volatility surface of FTSE 100 shows the same hallmarks of other major indices in the region at the moment, following the Omicron induced correction at the time of writing. Volatility has increased substantially with 3m ATMF up around 6pt to almost 19% and 6m ATMF up by around 3pt to 18.5%, while the index is realizing around 15% over one month. Relative to other indices, FTSE100 vol trades cheap, opening possibilities of RV trades. Especially vs SPX, EEM, and SX5E, FTSE vol screens cheap, trading close to five-year relative lows (1st, 8th, and 14th percentile, respectively). FTSE100 term-structure inverted, and skew has steepened close to multi-year highs. As such, the most efficient way to be long is via short-

skew structures, a feature that runs like a red thread through most of our directional trades. Either investors sell short vega via call spread collars or use risk reversals. Selling down-&-in puts instead of vanilla puts will help to provide additional cushion on the downside—for those investors that can use light exotics, we would recommend to use these and reach out to enquire. We will provide here the vanilla expression in form of a call spread collar even if we recognize that upside skew is steep, with the short call trading 2pts below the long call. Investors can indicatively:

- **Buy UKX Jun-22 7375-7850 Call Spread vs 6150 Put at a small credit** (ref 7169, 103%/110% CS vs 85%P, 16.8/14.7/24.7 mid vols, 41 delta)

Figure 126: Similar to other major indices, FTSE 100 skew trades close to all-time highs and lends itself to short for long directional trades as we are proposing

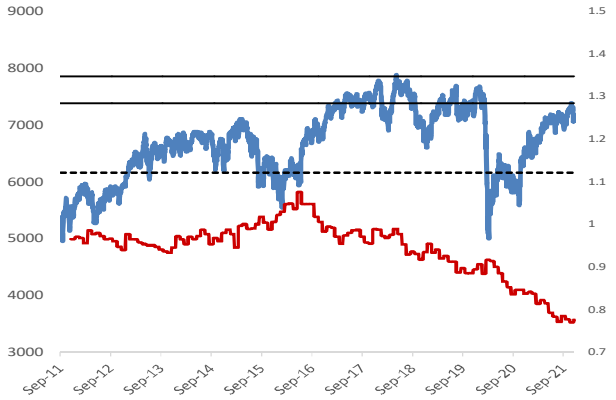
FTSE 100 6M 25D Skew



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 127: FTSE 100 trades cheap relative to European equities after 5 years of strong underperformance. Proposed zero-cost structure allows investors to gain upside exposure vs short downside close to March 2020 lows

FTSE100 spot (blue, lhs), proposed strikes of CS (black) v P (dashed) ; and relative 1yr frwd P/E of FTSE100 /SXXP (red, rhs)



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg.

SX5E hybrid dual digitals

Going into 2022, the J.P. Morgan Fixed Income strategist team expects yields to re-steepen into 1H2022. In Europe, our strategists are calling for the ECB to deliver purchases beyond PEPP at the December meeting, implicitly pushing back any rate liftoff in 2022. Our chief strategist, Marko Kolanovic, recently published a report highlighting that the re-steepening of global yield curves should support our thesis of internal rotation toward Cyclicals and Value. He recommends investors position for further upside in cyclical assets into 2022.

For investors who are bullish in equities in the medium term and agree with our strategist's view we recommend the following structure:

- **Buying Mar-22 dual digitals contingent on SX5E > 106% and EUSA2 < ATMF-20bps, for approximately 9%,** barrier observed only at expiry (~70% discount versus the vanilla SX5E 106% Mar22 digital call). (Ref: SX5E: 4,121, EUSA2 Mar22 fwd –0.28%)

We have chosen the barrier level for EUSA2 to be relatively close to the current spot level as we don't expect rates to revert to the lows we have seen in 2021.

The structure takes advantage of:

- Attractive implied correlation between SX5E and Euro rates (0% imp corr) versus recent negative realized correlation (Figure 131)
- Elevated steepness in the front end of EUR swap curve
- Low SX5E forward

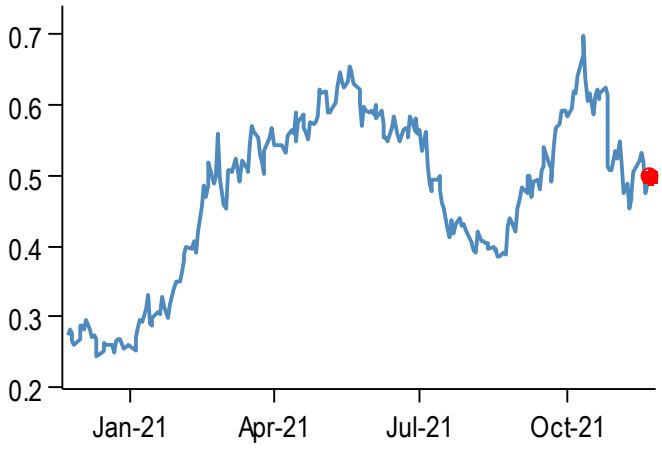
Figure 128: The EUR and USD swap rates moved sharply higher after the summer

EUR swap rates (%, Blue) USD swap rates (%, Black)

Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg Finance L.P.

Figure 129: EUR swap rates curve flattened considerably

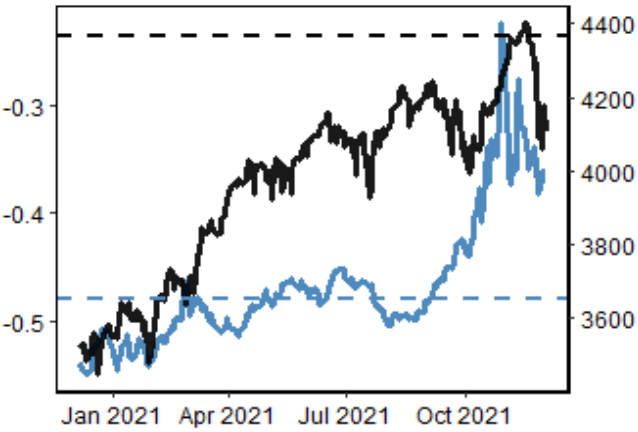
EUR rates 10Y-2Y (%)



Source: J.P. Morgan Quantitative and Derivatives Strategy, Bloomberg Finance L.P.

Figure 130: SX5E spot and strike levels of our proposed hybrid structure

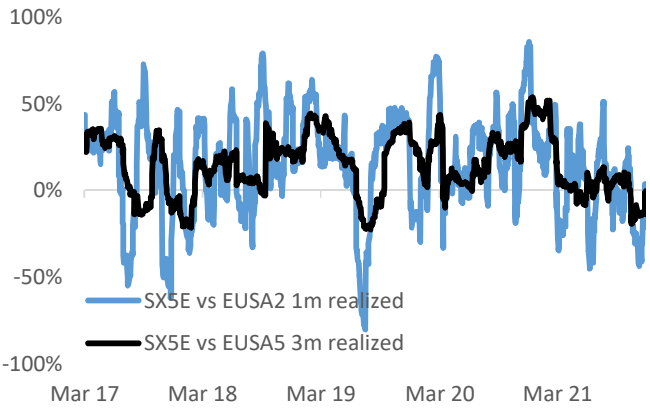
EUR swap rates (Blue, %) SX5E spot (Black)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 131: 1M and 3M realized correlation between SX5E and EUSA2

Correlation computed with daily returns (%)

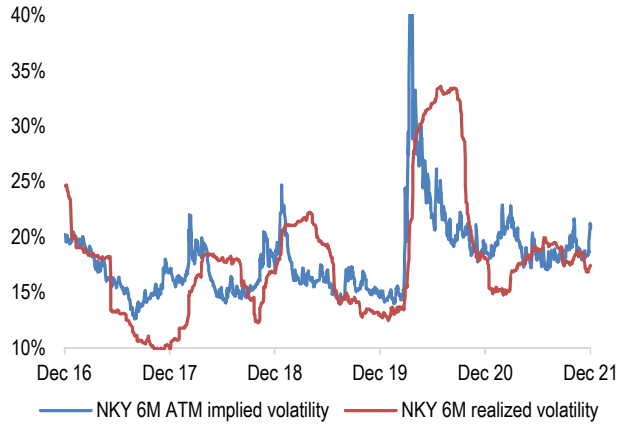


Source: J.P. Morgan Equity Derivatives Strategy.

Buy Nikkei call ratios to express a moderate bullish view on Japan equities

Our Japan equity strategists believe Japanese stocks have moderate upside in 2022 and expect a trading range between 28,000 and 32000 in Nikkei (see here). They expect corporate earnings to continue to improve against a backdrop of ongoing global economic recovery and the reopening of the domestic economy. However, they think it is highly likely that valuations will fall slightly from current levels as tapering in the US and a lack of additional easing measures from the BoJ may cause a slowdown in global liquidity growth.

Figure 132: The high absolute levels in implied volatility suggest meaningful selling pressure on volatility when market stabilizes



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 133: We recommend buying Nikkei 10Jun22 29,500 31,500 2x3 call ratios to implement a moderate bullish view on Japan equities

Source: J.P. Morgan Equity Derivatives Strategy.

As discussed in the Outlook for Markets and Volatility section, we expect VNKY to average 19-20 next year mainly driven by declining volatility risk premia in 1H22. We think a lack of factor leadership sets the stage for declining volatility risk premia. As highlighted in the Japan Year Ahead 2022 (see here), growth and quality outperformed value factors in 2020 in a bifurcated market, followed by a reversal in 2021 as value factors turned positive and 12-month momentum factors were sharply negative. After movements over the past two years, differentials both in valuations and performance between value/growth are close to trend lines, and we think it is hard for either to establish a clear, unilateral direction under these conditions. As measured by the average distance of individual factor returns to TOPIX returns, lower factor return dispersions are consistent with lower realized volatility levels. The historical relationship suggests that if factor return dispersion were to fall to bottom quartile levels of ~2% from the current level of ~4% (70th percentile in five years), there could be a 2-3 vol pt decline in realized volatility.

We recommend **buying Nikkei 10 Jun 2022 29,500 31,500 2x3 call ratios** to implement a moderate bullish view on Japan equities. Looking at the market pricing, Nikkei volatility term structure is currently inverted. The high absolute levels in Nikkei implied volatility suggest meaningful selling pressure on volatility when the market stabilizes (Figure 132). This favors buying light vega structures, such as long call ratios. From a market-to-market perspective, long call ratios benefit from a slow rally up to the upper call strike or a decline in implied volatility during the life of the options.

- **Buy NKY 10 Jun 2022 29,500 31,500 2x3 call ratio:** offer 340 yen (1.22% of notional, spot reference 27,635, implied volatility 19.6%/18.2%, delta 9%)

Trade cyclical sector outperformance

We maintain our pro-risk stance with a strong cyclical tilt as the re-opening trend continues. Specifically, we recommend and reiterate long-delta structures into 2022 in Energy, Financials, and Autos in Europe, long Energy and Financials in the US, and long Financials and Autos in Japan. Our economists expect global growth of 4.6%, 2% above estimated potential next year, as they write in their Outlook 2022. The cyclical recovery will be driven by an easing of supply shocks, pent-up consumer demand, reduction of saving rates, an increase in capex, and a replenishment of inventories. The healthy backdrop of excess savings among households and corporates in combination with what remain for now easy financial conditions underpins our constructive fundamental outlook and our trade recommendations.

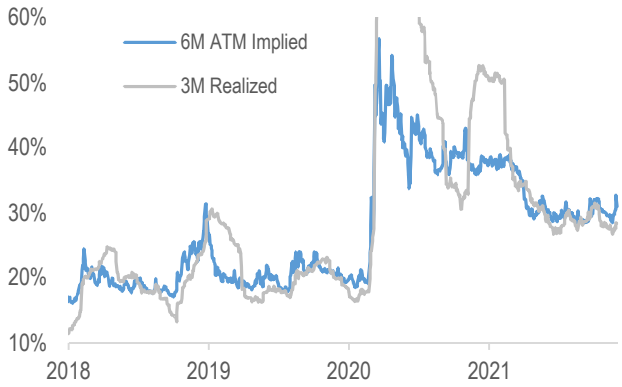
Energy upside ideas

Crude oil rallied to multi-year highs in 2021, thanks to strong demand as the economy reopens and mobility recovers, and limited supply with OPEC+ appearing to gain comfort with higher prices and US shale growth restrained. Despite the rise this year, oil remains very cheap compared to other assets (see here). As we discussed here and here, we believe we've entered a new commodity super cycle, with structurally higher energy prices caused by a confluence of several factors. These factors include the surge in demand as we recover from the pandemic, loose monetary and fiscal policies, and a chronic underinvestment in supply driven by 1) industry capex cuts because of the prolonged period of lower energy prices since 2014, 2) a societal push toward investment in renewables rather than traditional energy sources to achieve climate goals, and 3) geopolitical headwinds. Additionally, with places to go and money to spend, oil is set to remain a major beneficiary of the reopening next year. Our commodity strategists expect an overall balanced market in 2022, with crude inventories below average, resulting in Brent oil prices averaging $88/bbl for the year and breaching $90/bbl in 3Q22. However, our oil & gas analysts see even further upside risk to crude as they estimate "true" OPEC spare capacity is well below consensus estimates, and the group will struggle to deliver the needed output growth to balance the market. They therefore expect oil to overshoot to $125/bbl in 2022 and $150/bbl in 2023, led by a spare capacity shock (see here). Given our bullish crude oil view and energy companies' strong fundamentals, the energy sector is one of our highest conviction overweights given improving fundamentals, increasing capital return, low valuation relative to the market and relative to its credit, light positioning, and high short interest (see here and here).

US: Buy calls/call spreads on the energy sector given upside risks for oil and strong fundamentals: Despite the strong positive re-rating of markets, expected further upside in oil prices, and the fact that energy companies have become far more efficient (e.g., much lower crude breakeven prices) in recent years, many oil majors and the sector as a whole are trading well below their levels when crude was last trading at similar prices roughly seven years ago (as we noted in October). For example, XLE is *down* ~30% since Oct'14, vs. the S&P 500 +140% over this period. Meanwhile, volatility on XLE appears relatively inexpensive (even if somewhat richer than in October), trading slightly cheap vs. other sector ETFs and only slightly above recent realized volatility, and its call wing skew is relatively flat (e.g., 6M 105-120% skew is in its 30th %ile over the past 3Y). As such, we recommend:

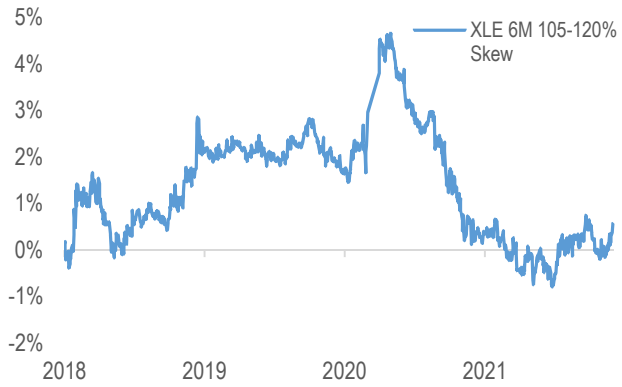
- **Buy calls or call spreads on XLE to position for upside in the energy sector—**for example, 6M 105% calls on XLE cost 6.35% of notional, or investors can cover ~30% of the premium by selling 125% strike calls (i.e., the call spread's net cost is 4.55%, offering a ~4.4:1 max payout to cost ratio). Additionally, we continue to favor buying calls on underperforming energy names with cheap volatility (see our October note and/or reach out for an updated screen).

Figure 134: XLE 6M implied vs. 3M realized



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Figure 135: XLE 6M 105-120% skew



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Europe: Buy SXEP call spread collars or appearing call spreads: YTD the SXEP sector performance remained behind our expectations despite ~60% higher relative earnings upgrades for FY21 and +79% earnings upgrades in absolute terms (20% and 29%, respectively, for FY22), driven in part by a rally in the underlying commodity (here). As a result of this, as per Figure 136 SXEP is screening historically cheap in terms of relative valuations despite the rally we have seen this year. Admittedly, this comparison through time does not reflect the headwinds from ESG-related portfolio flows the sector is facing.

With the recent correction, SXEP vol spiked to elevated levels we have seen pre-pandemic, albeit of course far below last year's extreme levels. Term-structure has inverted, making near-dated options particularly expensive. Figure 137 shows that upside skew steepened in the correction even if it continues to trade flat. We think this is another flare-up of the type of risk that the market has ultimately seen through repeatedly over the last two years.

We recommend long exposure to the sector via either low-vega call flies or, specifically, here via a Jun-22 call spread that benefits from the flat upside skew and mitigates somewhat the recent spike in vol, still achieving interesting leverage at an opportune moment to enter the sector after the recent correction:

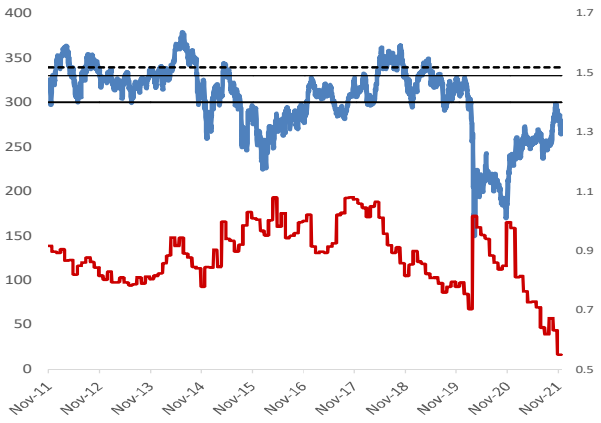
- **Buy SXEP Jun-22 300-330 Call-Spread at EUR 4.65 - spot ref. 271- (~110%-121%, mid vol 22.8/22.9, delta 15),** for a max payout to premium ratio of 6.4x

Alternatively, investors can buy an appearing call spread where the short call (120% of spot) is activated if the barrier (130% of spot) is breached at any point during the lifetime of the option, leaving the investor with the pay-off profile of a regular call spread (110-120% of spot). The additional, potential max profit of up to 10% costs 19bps more than a vanilla call spread.

- **Buy SXEP Jun-22 110 Call vs 120C Knock-In at 130% (continuous observation) at 1.89%, compared to the equivalent vanilla 110-120% Call Spread at 1.7%.**

Figure 136: Despite significant upgrades in earnings, performance of SXEP remained behind expectations leaving relative valuations of the sector at multi-year lows

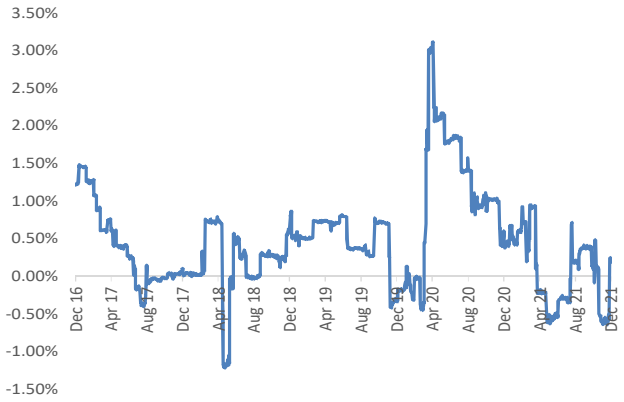
SXEP spot (blue, lhs), proposed strikes of CS (black), KI barrier (dashed) and 1yr frwd P/E SXEP/SXXP (red, rhs)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 137: SXEP upside skew steepened from multi-year lows but continues to trade flat - Jun

SXEP 6m 110-120 F Vol



Source: J.P. Morgan Equity Derivatives Strategy.

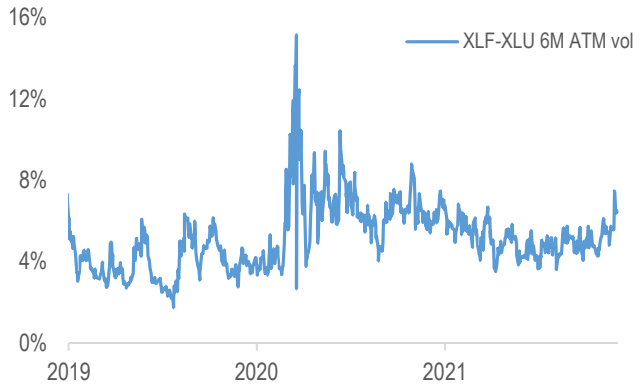
Financials upside ideas

Along with our view of continued strong momentum in 2022 with persistent but declining inflationary pressures, our FI strategists expect in their Outlook 2022 different reaction functions and policy paths for different central banks with focus residing on labor markets and wage pressures. Our colleagues expect the Fed to start hiking in September, the BoE to continue hiking after a 15bps hike this December, and the ECB to push back any liftoff in 2022. This outlook sets the backdrop for higher rates across the board with the team expecting the biggest and earliest increases in the US with 10Y treasury yields expected to be up from currently ~1.4% to 2% by 2Q22 (10Y gilts from ~0.8% to 1.15% by 2Q22 and 10y Bunds to remain range-bound between -0.3% to -0.1% in early 2022 but go up to +10bps toward the end of the year). Commensurate with the fundamental outlook, the team expects yield curves to steepen. This expectation of higher rates and steeper yield curves is the central macro driver behind our call to be long Banks in the US, Europe, and Japan into 2022.

US: Fund upside on Financials with Utilities: Our call to be long financials is based on the expectation to see next year a strong consumer credit environment, and continued elevated IB activity, in addition to the view of higher rates next year, which should benefit Financials via higher NIMs. Conversely, higher rates should weigh on bond proxy sectors such as Utilities. For example, based on a historical regression between the relative outperformance of XLF vs. XLU against changes in the US 10Y yield, should our Rates strategists' call for a ~55bps increase in the 10Y yield in 1H22 materialize (i.e., 2% target), we would expect to see XLF outperform XLU by ~11%.

- **Buy 6M ATMF calls on XLF vs. selling calls on XLU** for 1.95% net (over 70% of the XLF premium is covered by selling XLU calls), indicatively. Volatility on XLF appears relatively cheap vs. other sector ETFs, and around fair vs. XLU (Utilities), providing an attractive funding source for upside in Financials under the scenario of rising rates and cyclical recovery we highlighted above.

Figure 138: XLF-XLU 6M ATM volatility spread



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Europe: Buy SX7E call spread collars: As mentioned before, the expectation of higher rates and steeper yield curves is the central macro driver behind our call to be long Banks into 2022. In Figure 139 we show the sensitivity of European sectors to US rates with Banks showing by far the highest sensitivity. Fundamentally, our sector analysts maintain their positive stance on European Banks and our Equity strategists their OW rating on higher rates, improving earnings and valuation.

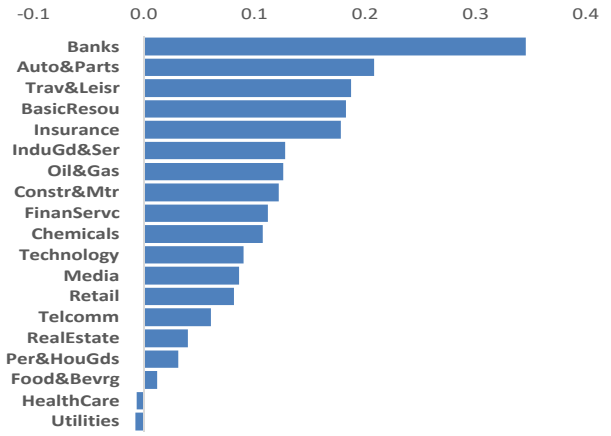
With the vol surface of the SX7E showing very similar properties to the SXAP, volatility has recently spiked to pre-pandemic peak levels. Skew, too, has steepened over recent months and is currently trading at the 92nd percentile. Thus congruent to Autos, we see call-spread collars as the most efficient way to gain exposure to European banks over the next few months, net selling vega and skew. Indicatively, investors can:

- **Buy SX7E Jun-22 €102.5-117.5 Call-Spread and sell Jun-22 €77.5 Puts at zero** (ref. 96, ~106%/122% CS vs 81%P, 27.2/25.5/34 mid Vols, 40 delta), or alternatively,

- **Buy SX7E Jun-22 105%-117% Call-Spread fully funded by selling the equivalent 95% Put with KI barrier at 55.5% (continuously observed)—**note the barrier is only a touch higher than March 2020 lows.

Figure 139: European Banks show by far the highest sensitivity to US rates

Sector beta to UST 10Y rate, adjusted for equity market returns



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 140: European Bank and Auto skew trades close to extreme levels over recent past

European sector skew across the term-structure: normalized 25D skew

2Y %ile	3m	6m	9m	12m	24m
Auto&Parts	94%	97%	97%	98%	91%
InduGd&Ser	96%	96%	95%	95%	96%
Banks	91%	86%	92%	91%	83%
Utilities	73%	73%	73%	76%	56%
Insurance	59%	71%	65%	70%	59%
Telcomm	48%	64%	68%	76%	100%
Oil&Gas	42%	33%	33%	38%	44%
BasicResou	24%	33%	31%	29%	33%
HealthCare	35%	24%	19%	17%	16%
Technology	3%	4%	12%	23%	61%

Source: J.P. Morgan Equity Derivatives Strategy.

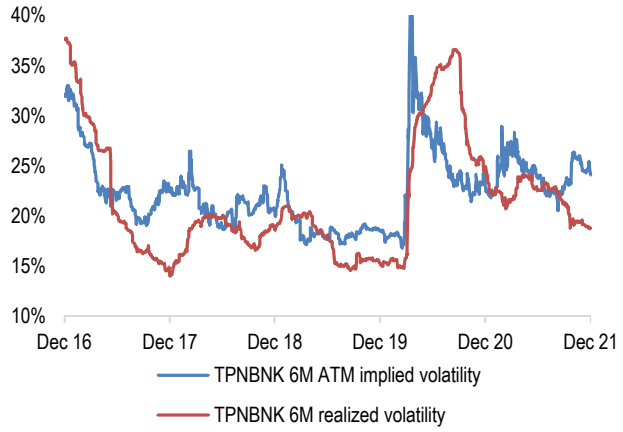
Japan: Buy TOPIX Banks (TPNBNK) call spread collar

Our Japan banks analysts are bullish on the sector over the medium term (see here). The global upturn in interest rates and increasingly clear signs of a structural bottoming out in Japanese banks' core profits are among the factors that will catalyze a full-scale catch-up in bank stocks' laggard performance. Among major banks including MUFG, SMFG, and Mizuho, share buybacks suspended after the spread of COVID-19 infections have either resumed starting from November 2021 or are expected to resume soon (see here, here, here). Investors will react positively to resumption of share buyback activities as disappointment in shareholder return policies was among the factors holding back the index from moving higher in 2H21.

Implied and realized volatility in TOPIX banks has been on diverging paths with the implied appearing resilient and realized trending down (Figure 141). Current 6M ATM implied volatility of 23% is higher than 6M realized volatility for more than 70% of the time in the last five years. To implement our medium-term bullish view on the sector, we recommend investors buy TOPIX banks call spread collars for light vega exposure. Please find indicative pricing below:

- **Buy TPNBNK 10 Jun 2022 105% 115% call spread vs sell 10 Jun 2022 88.5% put** for zero cost (implied volatility 23.0%/21.0%/25.7%, delta 40%)

Figure 141: Implied and realized volatility in TOPIX banks has been on diverging paths with the implied appearing resilient and realized trending down



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 142: We expect the global upturn in interest rates and a structural bottoming out in Japanese banks' core profits to catalyze a full-scale catch-up in Japan bank stocks' laggard performance

Source: J.P. Morgan Equity Derivatives Strategy.

Autos Upside Ideas

Europe: Buy SXAP call spread collars

We believe the Auto sector is poised to benefit in the most direct way from our economists' anticipation of easing supply shocks, pent-up demand, and the cyclical recovery more generally. This is the thesis that JPM sector analyst Jose Asumendi puts forth in his note The last cut of the year? Time to overweight conviction calls. As Jose puts it, ***"we are talking about when to buy, not if."***

After anticipating and reflecting in his forecasts a series of production cuts throughout the year, Jose thinks that we are close to the trough and that focus is shifting to a much more positive outlook in 2022 with a supportive supply / demand picture emerging:

- **strong volume growth** expected: order backlogs prevail as dealers are unable to fulfill orders from customers
- **pricing power** of OEMs is the highest in many years;
- **supply chain bottlenecks to ease in 2Q22:** the market will be pricing in quickly any early signs of normalization;
- **normalization of COVID-19 restrictions** to further strengthen demand and growth outlook
- **strong free cash flow backdrop** of OEMs via declining investments into ICE technology (internal combustion engine);
- **any improvement of Chinese consumer a bonus** on sentiment from currently depressed levels. Despite an otherwise subdued outlook on Chinese growth as a result of a policy shift away from the hitherto applicable growth model, our China economist, Haibin Zhu, expects consumer spending to recover over the next few months.

Investors can indicatively,

- **Buy SXAP Jun-22 690-770 Call-Spread and sell Jun-22 540 Puts at €0.10 credit (ref 656, ~105/117% CS vs 82%P, 23.8/22.4/30.4 mid Vols, 42 delta)**

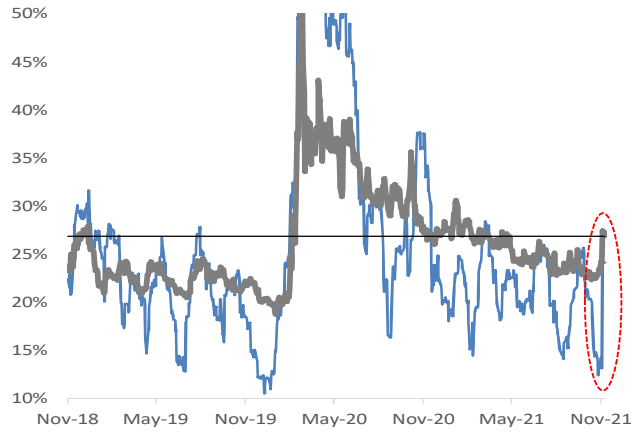
or alternatively,

- **Buy SXAP Jun-22 105%-115% Call-Spread fully funded by selling the equivalent 95% Put with KI barrier at 56% (continuously observed)—**note the barrier is close to March 2020 lows.

The proposed structures provide long exposure to the pro-cyclical Autos sector into 1H22 while selling rich vol and steep skew. Absolute vol levels on SXAP normalized before spiking recently to pre-pandemic highs in the midst of the Omicron-correction. Generally, options on the sector have been trading very rich. We believe the short downside exposure in either structure is at conservative levels at ~82% and 56% of spot, respectively. The SXAP is currently trading close to the cheapest levels in a decade relative to the Stoxx 600 as shown in Figure 144. The maturity is sufficiently long-dated so as to capture first signs of a pickup in production volumes if our fundamental thesis is correct.

Figure 143: SXAP vol normalized before spiking recently to pre-pandemic highs, while skew steepened to 2-year highs. Options on the sector have generally been trading very rich relative to realized vol.

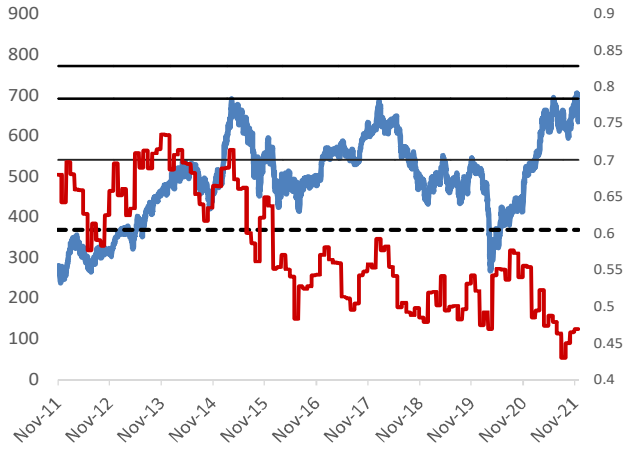
SXAP 6M ATMF (grey) and 1m realized volatility (blue) (%)



Source: J.P. Morgan Quantitative and Derivatives Strategy

Figure 144: The proposed structures fund undemanding upside by taking downside risk at conservative levels (KI barrier close to Mar20 lows), esp. given the sector's attractive relative valuation to Stoxx600

SXAP spot (blue, lhs), proposed strikes of CS v P (black), KI barrier (dashed) vs relative 1yr frwd P/E SXAP/SXXP (red, rhs)



Source: J.P. Morgan Quantitative and Derivatives Strategy; Bloomberg.

Japan: Buy TOPIX Transportation Equipment (TPTRAN) call ratio

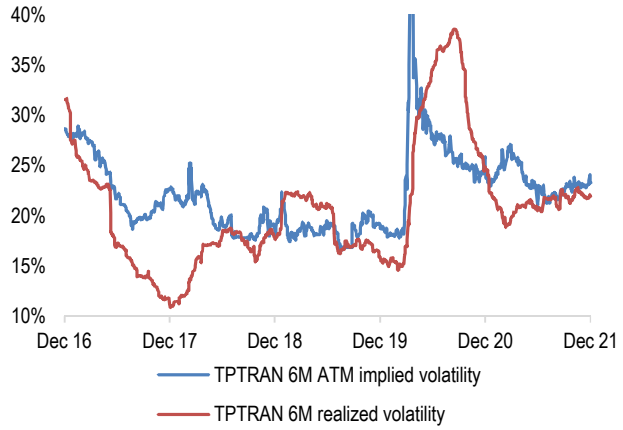
Our Japan equity strategists are bullish on the automotive industry from a sector allocation perspective, driven by recovering earnings outlook and ease of supply chain problems (see here). Production of Japanese autos is poised to rebound off a bottom, and our Japan auto analyst expects a shift to pricing in a return to normal market conditions in FY2022 (see here). They forecast a sharp recovery in aggregate global production of Japanese autos, from 22.7 million vehicles (+4.1% YoY) in FY2021 to 26.5 million vehicles (+16.9%) in FY2022, reflecting a significant amount of catch-up production through FY2022. At a macro level, a weaker yen outlook should also be positive for the industry (JPM forecast of USDJPY 117 by Jun-22 and 116 by Dec-22).

The TOPIX Transportation Equipment Index is a capitalization-weighted index that tracks the performance of the transportation equipment sector of the TOPIX Index. By GICS industry group, the index provides exposure to Automobiles and Components (89%), Consumer Durables (6%), and Capital Goods (5%). Year to date, The TOPIX Transportation Equipment Index delivered a price return of 21.5%, outperforming TOPIX by ~15%. Most of the outperformance came from 1H21. The sector grinded higher in 2H21 in part due to below expectation 2Q (July- September) results.

We recommend investors buying TPTRAN Jun22 105% 115% 2x3 call ratio to implement the view. Implied volatility of the index appears expensive relative to the realized (Figure 145). For a more carry-friendly profile, we prefer selling higher strike calls (e.g., 115%) rather than puts to finance the purchase of lower strike calls (e.g., 105%). With the spot level of the index trading at the upper limit of the five-year range (Figure 146), current risk premium embedded in the puts may not be high enough to offset an adverse mark-to-market impact if a correction occurs.

- **Buy TPTRAN 10 Jun 22 105% 115% 2x3 call ratio: offer 2.15%** (implied volatility 23.9%/21.8%, delta 13%)

Figure 145: Implied volatility of the TOPIX Transportation Equipment index appears expensive relative to the realized



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 146: The TOPIX Transportation Equipment Index price history versus option strike levels

Source: J.P. Morgan Equity Derivatives Strategy.

Thematic trades

Japan QUEST thematic index

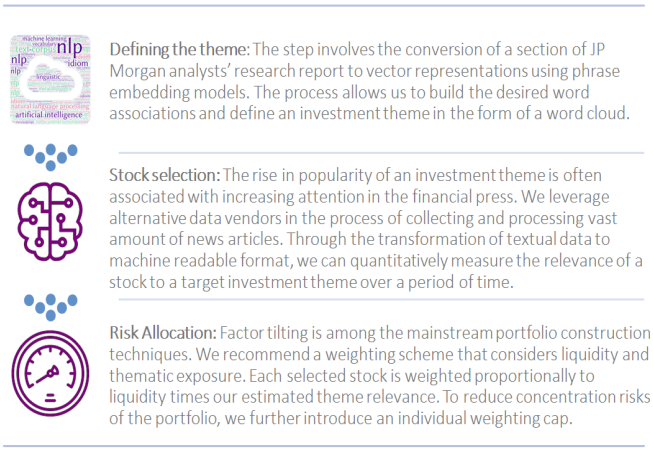
We apply the QUEST framework to construct thematic portfolios. Natural Language Processing (NLP) and Machine Learning techniques applied to big data can be of great help in identifying themes and thematic stock selection. In our report AI and Big Data Approach to Thematic Investing, we demonstrate that analyzing a large volume of text is an effective way to design and rebalance thematic exposure. We believe the big data and machine learning approach can capture thematic exposure more accurately, be more timely (i.e., early on), and allow for far greater scaling compared to qualitative stock screens. Here is a list of Japan themes we covered this year.

Japan stimulus: We revisit Japan stimulus plays following headlines on the government's fiscal spending plans in November 2021. As captured by the news co-mention analysis that drives the selection of our stimulus plays, we recognize there has been a meaningful amount of talk that links stimulus to a number of long-term growth themes in the media. However, actual spending plans for growth promotion measures appear light relative to other areas being covered by Japan's fiscal expenditure as well as relative to similar cases in the US. From a long-term perspective, digital transformation and de-carbonization policies as the core of the Kishida administration's growth strategy is unlikely to change. We recommend investors add long exposure to the stimulus hypothetical basket on potential weakness in the near term.

Japan renewable energy: Japanese firms have curtailed energy consumption, but not by enough to achieve the greenhouse gas emissions reduction target by 2030 and decarbonization by 2050, and the government is promoting a Green Growth Strategy. Combined with the government efforts, we expect massive investment in changing the energy mix, firms' proactive green capex, and housing investment. Our calculation of the value of capex and housing investment for decarbonization totals ¥55 trillion for the three years from FY2021 to FY2023 (3.2% of GDP) and rises further to around ¥216 trillion (3.9% of GDP) by FY2030. We recommend investors to build long exposure renewable energy beneficiaries.

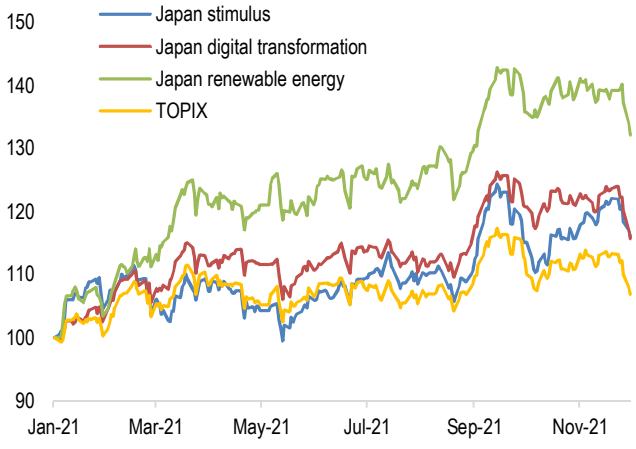
Japan digital transformation: The Japanese government formed the Digital Agency to help to execute the government's broader digital transformation (DX) strategies. Driven by rapid digitization of work, life, and leisure during the pandemic, the ability to capture new business opportunities and improve productivity via the transformation of business processes has been increasingly important to the financial success of Japanese companies as well as to the competitive advantage of the Japanese economy. To position for the structural changes DX is bringing to Japan, investors can consider buying baskets of stocks with high theme relevance scores with respect to digital transformation.

Figure 147: QUEST stock selection process overview



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 148: Year-to-date simulated performance of Japan stimulus, digital transformation, renewable energy stocks vs TOPIX



Source: J.P. Morgan Equity Derivatives Strategy.

European Re-opening Basket

In its Outlook 2022 our equity strategy team is highlighting the following themes to be of particular relevance for markets next year: a) the easing of supply chain distortions—a key consideration for our recommendation to be long SXAP; b) EM

exposure basket, which we play via our China dispersion trade; c) rising bond yields, which we express via our long in SX7E; d) de-carbonization of European industry and infrastructure; and e) the re-opening of economies and progressive decline of Covid-related restrictions, a trade we are highlighting here. The emergence of the Omicron variant and the recent flare-up of Covid-related market jitters offer excellent entry levels into this theme as related names sold off particularly strongly.

We express access to this theme via worst-of-calls on a selection of names geared towards Covid-related restrictions and the respective easing of the same on the upside, which is our base case for 2022. Aside from questions on Omicron around transmission, vaccine escape, and health impact that keep markets in thrall at the moment, it is our belief that Omicron will ultimately prove to be another episode toward normalization as the medical technology to produce and distribute effective vaccines has been proven. Specifically, we recommend investors

- **Buy Mar-110% worst-of-call on {SAF FP; HEIA NA; LI FP} at 0.99%, indicatively (spot ref: SAF FP €103.1, HEIA NA €87.4, LI FP €18.96). The proposed worst-of-call can be bought at a** ~55% cost saving to the cheapest individual call**.**

The names on the proposed WoC basket are chosen from the following two baskets our analysts and equity strategists have identified as being particularly sensitive to this theme, JPDEUVAC and JPDUKVAC <Index>). From these stocks we aimed to select a basket of stocks that provide sufficient liquidity in derivatives, showed strong sensitivity to the theme, feature relatively low levels of vol, provide low pairwise correlations to achieve a significant correlation discount via the WoC structure, and are fundamentally attractive.

Sensitivity to Covid/Omicron concerns: we considered names that have been down by more than 7% since news on Omicron broke. On average the three names are down 10% the discovery of Omicron emerged (Figure 150).

Volatility: we excluded all names that showed 3m vol above 65th percentile to exclude particularly expensive names relative to their own histories.

Correlation: we picked stocks from three different sectors and selected on the grounds of low pairwise correlation of the most promising set of three stocks (Figure 149)

Fundamentals: we have screened for names that are Neutral or Overweight rated by J.P. Morgan analysts (see the most recent reports on Safran OW, Heineken OW, Klepierre upgraded to N).

Figure 149: Pre-selected names on basis of liquidity, sensitivity to theme, vol levels, fundamentals and, as per below, low pairwise correlation

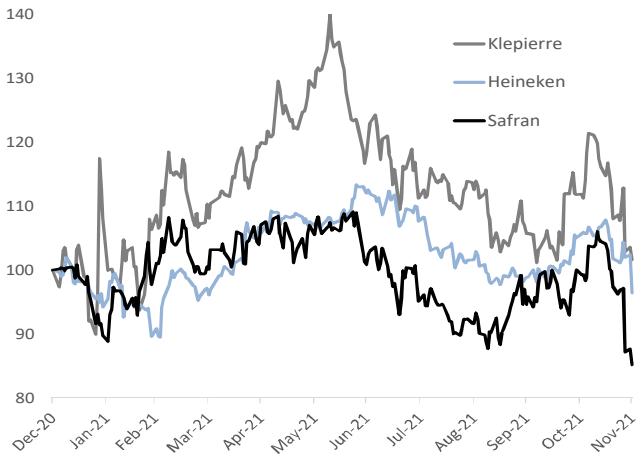
Weekly correlation matrix of selected stocks

	AMS	CARLB	HEIA	FRA	ITX	LI	RR/	RNO	RYA	AIR	SAF	EZJ
AMS	1.00	0.54	0.62	0.77	0.74	0.49	0.57	0.69	0.83	0.78	0.74	0.77
CARLB	0.54	1.00	0.75	0.57	0.53	0.30	0.25	0.47	0.47	0.45	0.44	0.41
HEIA	0.62	0.75	1.00	0.63	0.70	0.51	0.40	0.53	0.55	0.57	0.54	0.54
FRA	0.77	0.57	0.63	1.00	0.75	0.70	0.49	0.74	0.73	0.69	0.65	0.77
ITX	0.74	0.53	0.70	0.75	1.00	0.61	0.39	0.66	0.63	0.70	0.70	0.70
LI	0.49	0.30	0.51	0.70	0.61	1.00	0.43	0.69	0.38	0.63	0.47	0.60
RR/	0.57	0.25	0.40	0.49	0.39	0.43	1.00	0.53	0.57	0.56	0.55	0.59
RNO	0.69	0.47	0.53	0.74	0.66	0.69	0.53	1.00	0.60	0.79	0.74	0.72
RYA	0.83	0.47	0.55	0.73	0.63	0.38	0.57	0.60	1.00	0.77	0.70	0.80
AIR	0.78	0.45	0.57	0.69	0.70	0.63	0.56	0.79	0.77	1.00	0.84	0.81
SAF	0.74	0.44	0.54	0.65	0.70	0.47	0.55	0.74	0.70	0.84	1.00	0.73
EZJ	0.77	0.41	0.54	0.77	0.70	0.60	0.59	0.72	0.80	0.81	0.73	1.00

Source: Bloomberg Finance L.P, J.P. Morgan Equity Derivatives Strategy.

Figure 150: Klepierre, Heineken & Safran sold off hard since the emergence of the Omicron variant shook markets

Prices, indexed at 100 YTD



Source: Bloomberg Finance L.P., J.P. Morgan Equity Derivatives Strategy.

Global Investment Themes

We recommend trading baskets (either delta-1 or via options) to position in themes expected to benefit from major macro undercurrents that we believe will drive markets next year, including a resumption of the reopening/reflation trade (i.e., outperformance of cyclical and value assets such as commodities, cyclical and value stocks, and increasing rates) that underperformed significantly in the Delta wave and Omicron scare but should outperform next year as we likely emerge from the pandemic, and easing of supply chain pressures and trade barriers. See p.17-28 of the 2022 Global Equity Outlook for more details, including basket compositions, and please reach out for pricing on option structures on these baskets:

Long Ideas

1. **Global Beneficiaries of Easing Supply Chain Pressures** (JPGBESCP <Index>) includes stocks that were facing significant supply chain bottlenecks and could outperform as these bottlenecks ease next year
2. **Global Reopening Beneficiaries in Services** (JPGREBES <Index>) comprises names in services, particularly focused around travel, leisure, gaming, and experiences, that stand to benefit from a broader reopening and easing of travel restrictions
3. **Global Beneficiaries of Rising Oil Price** (JPGBOROP <Index>) is made up of stocks with high/positive excess return correlations with oil
4. **US Infrastructure Spending Beneficiaries** (JPAMBINF <Index>) captures names that would likely benefit from physical infrastructure spending such as roads, bridges, airports, and public transit, and mostly comprises stocks in the Industrials and Materials sectors
5. **Tariff Reduction Beneficiaries** (US names: JPAMUSIM <Index>, China names: JPHCHTRB <Index>) includes companies that were adversely affected by the US/China trade restrictions, and we would expect to benefit if trade relations improve
6. **China Small Cap Recovery** (JPCNSCRB <Index>) consists of OW-rated stock picks by JPM analysts with <$5Bn market capitalization, and with revenue share from mainland China >50%
7. **Europe Retooling/De-Carbonization Beneficiaries** (JPDEURTL <Index>) is made up of stocks that are positioned to facilitate the retooling/greening of European industry and reduction in carbon footprint
8. **SE Asia Trade Regionalization Beneficiaries** (JPSEATRB <Index>) includes OW-rated names expected to benefit from connecting supply chains and lowering trade barriers within SE Asia, particularly focused on banks with high exposure to trade, local hardware/industrial goods producers, and industrial real estate and logistic services providers

Short Ideas

1. **DM Labor Intensive with Weak Pricing Power** (JPDLIWPP <Index>) includes names sensitive to rising wage pressures with low ability to pass increased costs to their customers due to lower pricing power, lower sales/employee, and weaker margins
2. **Global Higher Oil and Rates Laggards** (JPGHORLD <Index>) comprises stocks with high negative excess return correlation to US 10Y yields and oil prices

Volatility/Risk Premia Trades

Monetize steep index skew and rich convexity

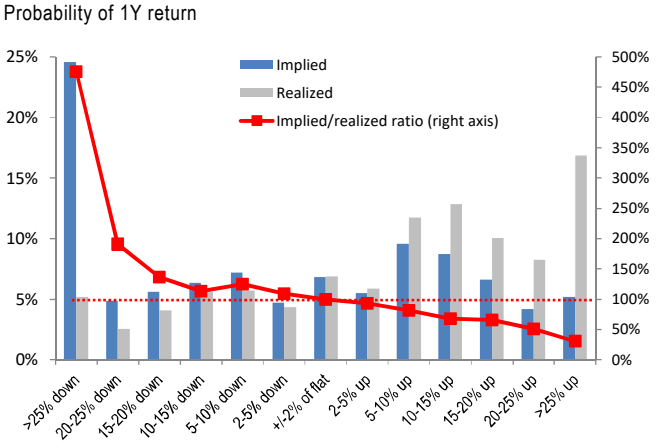
S&P 500 knock-in risk reversals for asymmetric market exposure while monetizing the steep skew

As discussed in the Skew section, the S&P 500's skew is historically steep, and the index retains the steepest skew among major global indices, supported by protection demand, supply from yield-seeking strategies, more limited structured product supply, and dealer capital constraints. Figure 151 below illustrates the resulting dislocation between the implied return probability distribution derived from S&P 500 options across the skew and the probability of similar size moves historically. We note from this figure that option markets are overestimating the chance of large downside moves and underestimating the chance of large upside moves relative to history.

We recommend monetizing the steep skew, for example via the following structures:

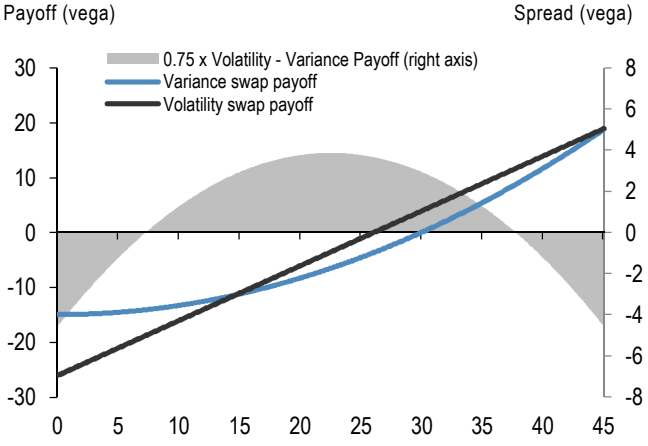
- Add asymmetric delta exposure while monetizing this rich skew premium by **buying an SPX 1Y 107% call funded by selling a 90% put that knocks in at 64%** (daily barrier observation) for zero cost, indicatively—this structure is only exposed to losses if the index trades down more than 36% (~2900 spot level)
- Alternatively, for those expecting more limited upside in equities next year, **the same knock-in put can fund 2x levered 105-110% strike call spreads** for zero cost. The maximum upside on this structure is 10% of notional in case the S&P 500 finishes above ~4960 (vs. our strategists' year-end target of 5050, based on 4513 ref price)

Figure 151: S&P 500 skew overprices downside and underprices upside probabilities relative to historical returns



Source: J.P. Morgan Equity Derivatives Strategy

Figure 152: S&P 500 ratio vol vs. var swap payoff



Source: J.P. Morgan Equity Derivatives Strategy

Sell S&P 500 convexity

Additionally, **convexity on the S&P 500 is still trading at distressed levels, and we continue to recommend monetizing it** (e.g., see here). The implied convexity risk premium, for example measured by the spread between variance swaps and ATMF volatility, has been little changed over the past ~18 months and continues to trade around twice its pre-pandemic levels, and US indices exhibit the highest convexity among global regions (Figure 49). As discussed in the Volatility Supply/Demand section, the convexity richness is sustained by strong tail hedging demand and a dearth of vol risk premium sellers. We expect these risk premia strategies to gradually ramp back up, in time pressuring convexity levels; however, even if implied convexity levels remain elevated, selling this risk premium makes for an attractive carry trade to play the implied to realized spread. The continued large convexity risk premium also contrasts against other risk premia that normalized to a much greater extent since they spiked in 1Q20, such as spot, volatility, implied dividends, funding, and credit spreads.

Therefore, we recommend monetizing the rich convexity, for example via the following structures:

- **Sell 1x Dec'22 variance swaps vs. buying 0.75x the vega notional in Dec'22 vol swaps on the S&P 500.** The terminal payout (if held to maturity) is linked solely to the underlying index's realized volatility over the life of the trade, and rich convexity levels allow investors to obtain a wide breakeven range and elevated maximum payout. We ratio the two legs in order to skew the breakeven range lower and add a short volatility tilt. The variance-vol swap spread is currently indicatively bid at 3.9 points; this structure allows investors to collect a maximum 3.9 times the vega notional if the index realizes near 22.5% and returns a positive P/L if realized volatility over the next year falls between 7% and 38% (Figure 152). The structure returns >2 vega profit if realized falls between 12% and 33%. Investors can **also consider similar structures on the Russell 2000 and Nasdaq 100,** where convexity is similarly rich.

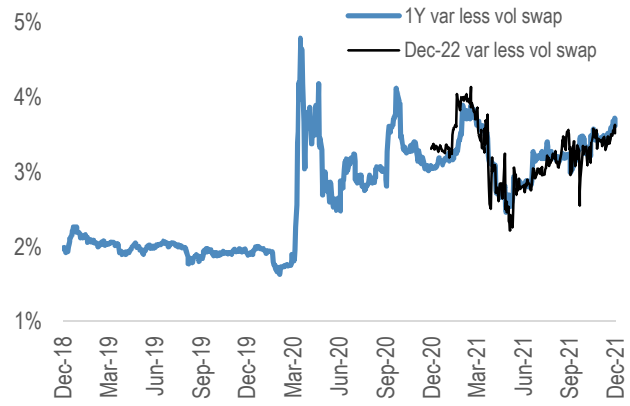
- **Buy Dec'22 65% up-variance vs. selling vanilla variance on the S&P 500.** In this structure, an investor indicatively collects 3.5 vega of annualized carry as long as the S&P 500 trades above 65% of its starting level (i.e., above a spot price of ~2930). If the S&P 500 dips below this barrier, the investor is naked short variance at a strike of 30, only for the period the index trades below this level.

Euro STOXX 50 Dec-22 variance vs. volatility swap spread

Euro STOXX 50 volatility convexity as priced in by variance versus volatility swaps has experienced a much smaller degree of normalization compared to other equity derivatives risk metrics such as volatility (Figure 153). Furthermore, volatility convexity increased further on the back of the recent market weakness.

Figure 153: Euro STOXX 50 variance swap convexity remains elevated

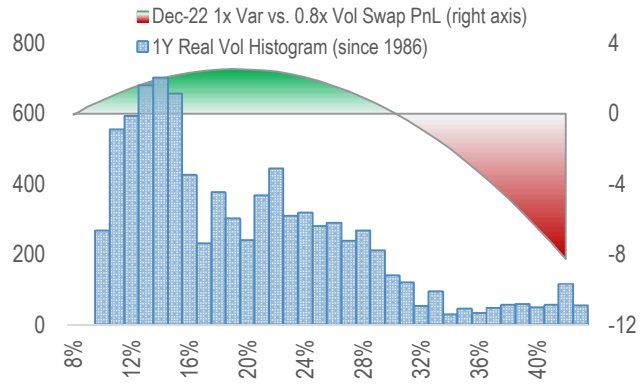
SX5E 1Y and Dec-22 variance less volatility swap spread



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Figure 154: Payout for the proposed structure overlaid to the historical distribution on 1Y 3M realized volatility

SX5E realized vol histogram (since 1989) Trade PnL (vol points)



Source: J.P. Morgan Quantitative and Derivatives Strategy.

Shorting Euro STOXX 50 volatility convexity via variance swap vs. volatility swaps spreads remains attractive, in our view. These trades have a good entry level and at expiry have a payoff that is exclusively dictated by realized volatility, without any path sensitivity.

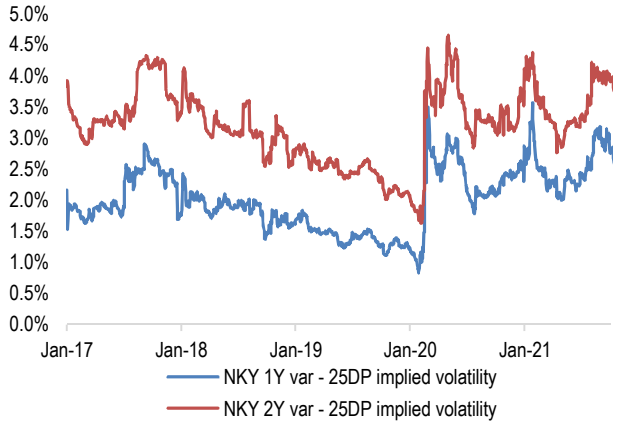
- We recommend **selling 1x Euro STOXX 50 Dec-22 var swaps and buying 0.8x Euro STOXX 50 Dec-22 vol swaps** at an indicative spread of 3.1 (var ref. 27.8). The trade sells a higher notional in variance and by doing so shifts the breakeven level lower.

We expect this trade **to make between 2 and 2.5 vol points profit at expiry, in our central scenario for volatility.** The lower breakeven at 9.4% is safe even if the Euro STOXX 50 should we revert to a low vol regime, while the upper breakeven of ~35.4% vol points protects from all instances expect for dramatic markets crashes such as the Great Financial Crisis (Figure 154).

NKY forward convexity trades

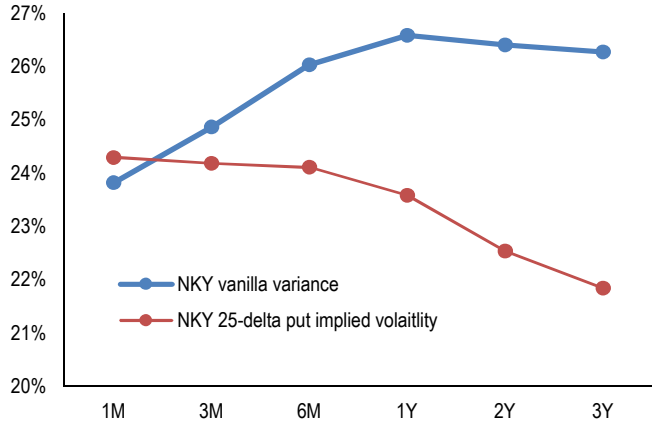
As highlighted in the Skew section, Nikkei 225 variance and convexity continue to trade at historically elevated levels. Looking ahead, we expect a recovery of structured product activity next year, which will exert selling pressure on longer dated variance and convexity (see Volatility Supply and Demand section). This makes us favor forward volatility and convexity premia extraction trades. Other than selling Nikkei forward variance outright, we also like pairing the short forward variance against forward up-variance or forward volatility agreement (FVA).

Figure 155: Nikkei longer dated convexity remains close to 5y high levels



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 156: Nikkei vanilla variance and 25D put implied volatility term structure

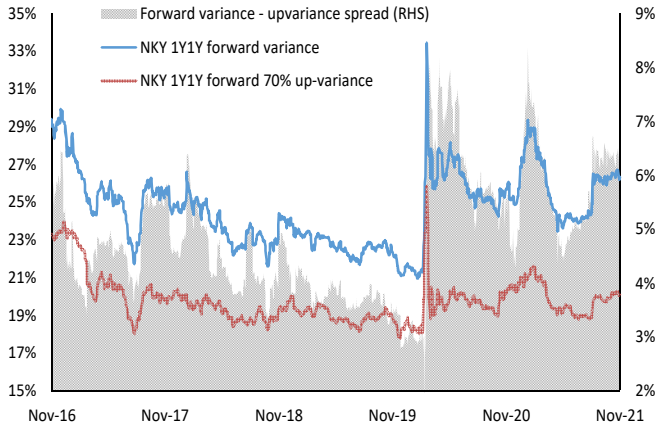


Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Short forward variance versus long forward up variance: Nikkei longer dated convexity currently ranks as the most distressed among that of major global and Asian indices (see Skew section). To extract the rich forward convexity risk premium, investors can consider long Nikkei forward vanilla variance versus short forward up-variance. The structure is attractively priced due to comparatively low downside volatility versus variance. Nikkei 2Y variance – 25d put volatility spread currently is sitting at the ~84%tile over the past five years (Figure 155). The attractive relative pricing is most notable in the longer dated bucket, whereby Nikkei downside volatility exhibits significantly more downward sloping term structure versus vanilla variance (Figure 156). Please refer to below indicative pricing:

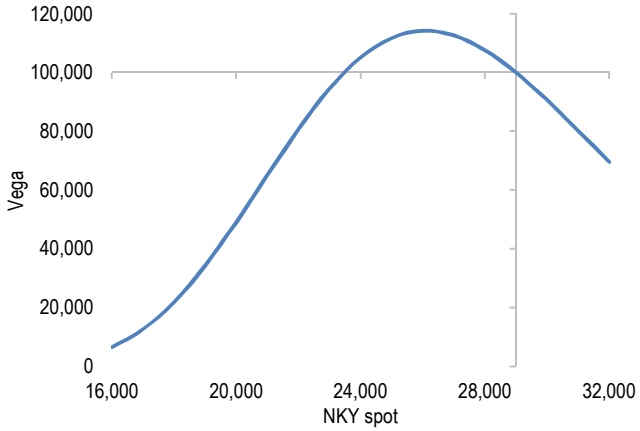
- **Sell NKY 09Dec22 – 08 Dec 23 forward variance** at 25.65 vol
- **Buy NKY 09Dec22 – 08 Dec 23 forward 70% up-variance** at 20.36 vol
- **Vol spread:** 5.3 vol

Figure 157: Nikkei 1Y1Y forward vanilla variance and 1Y1Y 70% forward up-variance spread history



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 158: Black-Scholes Vega of Nikkei Dec22-Dec23 25,000 fixed strike FVA in Dec22 (spot reference 29,000, 100K Vega notional)



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Short forward variance versus long FVA: An alternative way to extract the forward convexity risk premium is to sell forward variance versus fixed strike FVA. The FVA gives exposure to a single point on the volatility surface. Buying fixed strike FVAs avoids the high cost of convexity that is typically priced into variance swaps. Selling the variance vs vanilla volatility spread in forward starting format effectively locks in a volatility spread higher than that of a spot starting equivalent. A major risk to the short forward variance vs FVA trade is that the vega of the fixed strike FVA is spot dependent with a bell-shaped curve (Figure 158). While we acknowledge the vega mismatch is not ideal, our analysis suggests the structure allows investors to earn carry under a wide range of volatility scenarios in a relatively range-bound scenario (see here). Please refer to below indicative pricing:

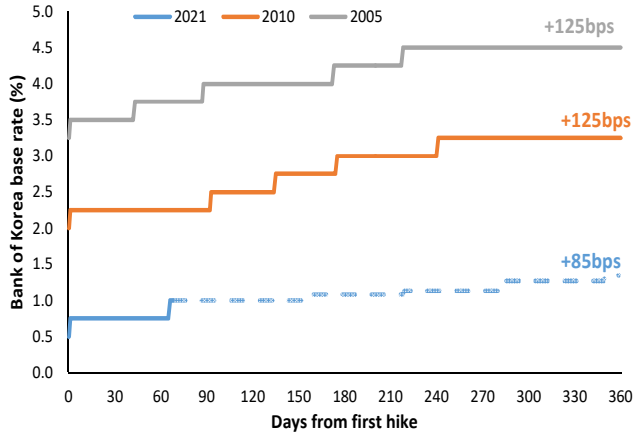
- **Sell NKY 09 Dec 22 - 08Dec23 forward variance** at 25.65 vol
- **Buy NKY 09 Dec 22 - 08Dec23 25,000 fixed strike FVA straddle** at 20.44 vol (spot reference 28,284, Q -2.16%, R 0%)
- **Vol spread:** 5.2 vol

Volatility RV trades

Long KOSPI2 volatility on normalizing central bank policies at home and abroad

We recommend investors own KOSPI 200 – S&P500 synchronous variance spread **as a carry-friendly way to position for an outperformance in Korea equity volatility.** Normalizing central bank policies at home and abroad is among the main considerations behind our expectation of outperformance in Korea equity volatility versus those with a slower policy normalization schedule. **Tighter liquidity conditions that typical follows rate hikes could lead to reduced equity risk appetite and hence more pronounced equity moves**. This was observed in the 2005 and 2010 BoK rate hike cycles (see here). This year, the BoK has raised policy rate twice (from 0.5% to 1.0%) in 2H21, and the market expects further rate hikes in 2022. However, compared to the realized rate hike path in 2005 and 2010, expectation for the pace of further rate hikes still lags (Figure 159). Driven by this observation, we think there remains room for BoK to deliver hawkish surprises, and so this could lead the outperformance in Korean equity volatility to continue.

Figure 159: Forecast of current Bank of Korea policy rate hike cycle versus 2005 and 2010 realized rate hike cycle



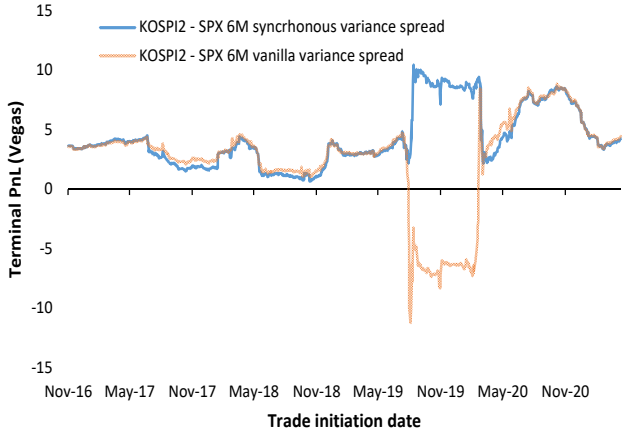
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Dotted blue line indicates expected policy rate path based on Bloomberg average forecast.

Figure 160: 6M variance – 3M realized volatility spread for cross-index pairs among major Global and Asian indices

	SPX	SX5E	NKY	AS51	KOSPI2	HSI
SPX		-5.4%	-9.0%	-9.1%	-10.6%	-12.4%
SX5E	5.4%		-3.6%	-3.8%	-5.2%	-7.0%
NKY	9.0%	3.6%		-0.1%	-1.6%	-3.3%
AS51	9.1%	3.8%	0.1%		-1.4%	-3.2%
KOSPI2	**10.6%**	5.2%	1.6%	1.4%		-1.8%
HSI	12.4%	7.0%	3.3%	3.2%	1.8%	

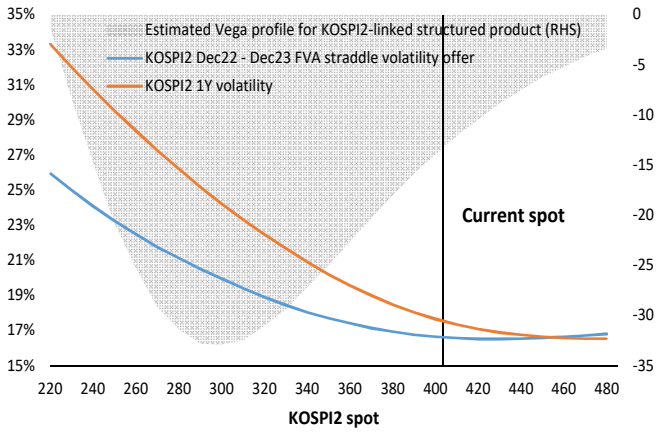
Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * The table reads as row - column

Figure 161: Terminal PnL of KOSPI2 - SPX 6M synchronous and vanilla variance spread



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * Backtest assumes the trade is entered at 4.5v.

Figure 162: KOSPI2 Dec22 – Dec23 FVA volatility versus 1Y1Y volatility curve



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

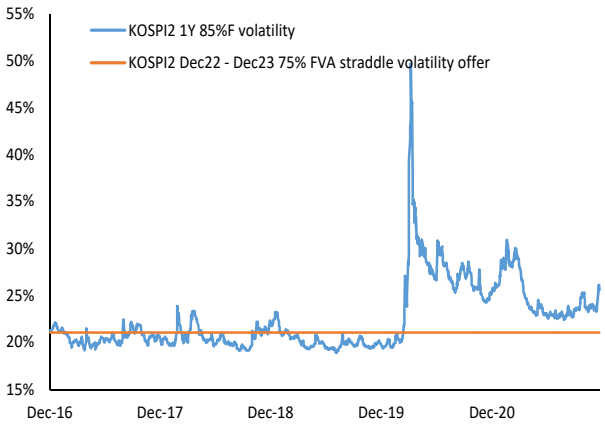
Entry point for the KOSPI 200 - S&P500 variance spread trade is attractive compared to history and relative to other major variance pairs. For example, **6M KOSPI2 - SPX variance spread is sitting at the 4%tile in the past five years**. The index

pair would yield **+10.6% carry** versus 3M realized volatility spread based on current pricing, which ranks among the highest of cross-index variance pairs (Figure 160).

Synchronous variance spread is our preferred way to express the view. The novel implementation, where the variance sampling is done in Asia hours for both legs, has minimal pricing differential versus the vanilla version. However, it will help mitigate downside risks induced by overshooting of US volatility, similar to what we saw during the COVID sell-off. While the KOSPI2 – SPX vanilla variance spread would have experienced -11.2v drawdown in Mar20, the synchronous version would record the highest terminal PnL at that time at ~10.5v. This is due to comparatively lower realized volatility of the S&P500 futures during Asia hours compared to that on Asia indices such as the KOSPI2. At current pricing, **the KOSPI 200 – S&P500 synchronous variance spread would have registered positive PnL 100% of the time in the past five years, with average PnL of +4.3v** (Figure 161). We like the tenor due to 1) highest potential carry and 2) our expectation of relatively lower volatility in 1H22 versus 2H22 in the US. Please refer to below indicative pricing:

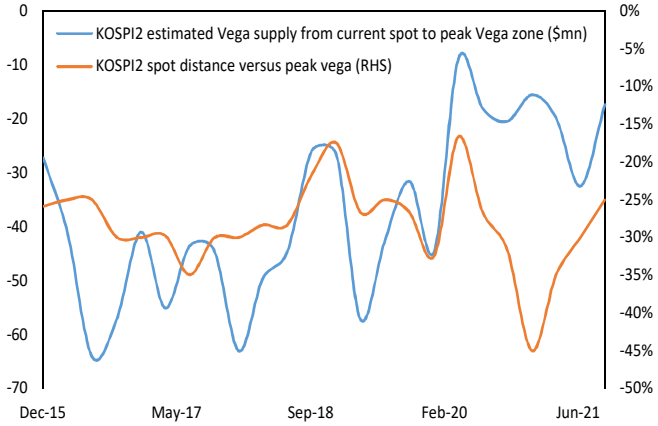
- **Buy KOSPI2 09 Jun 2022 variance** at 23.3 vol
- **Sell SPX 09 Jun 2022 variance** at 27.8 vol (combo synchronous variance spread, variance sampling at Korea close)

Figure 163: KOSPI2 Dec22 – Dec23 75% FVA volatility versus KOSPI2 1Y1Y 75%F volatility



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 164: Estimated KOSPI2 autocallable vega supply toward peak vega zone is low historically, while spot distance to peak vega is still relatively far



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Alternatively, investors can also consider long KOSPI 200 FVA. KOSPI2 volatility term became inverted recently, hence presenting an attractive opportunity to enter the long forward volatility, especially for downside strikes (Figure 162). At current pricing, the 1Y1Y 75% FVA is offered at 4.5v discount versus the 1Y vanilla volatility counterpart (Figure 163). A risk for the trade is moderate sell-off or grind-lower scenarios, whereby autocallable hedging flows will lead to further supply of longer dated downside volatility. However, we note current structured product vega outstanding is historically low and KOSPI2 spot is far away from the peak vega zone (Figure 164). This should allow the market to better absorb the hedging impact, reducing the vega supply impact on longer dated volatility.

Considering current attractive entry level, we think the adverse impact from structure product re-hedging dynamics will likely be cushioned by the material roll-down. We select ~75% strike as it roughly corresponds to the peak vega level of autocallables. In the event of spot moves to the left of the peak vega, product dealers will need to buy back short volatility positions and lead to material gains of the back-end volatility, hence benefitting the long FVA position. Please refer to below indicative pricing:

- **Buy KOSPI2 08 Dec 2022 – 14 Dec 2023 290 fixed strike FVA straddle** at 21.05 vol (spot reference 380, Q -0.74%, R 0.77%)

RTY up-variance versus SPX variance spread

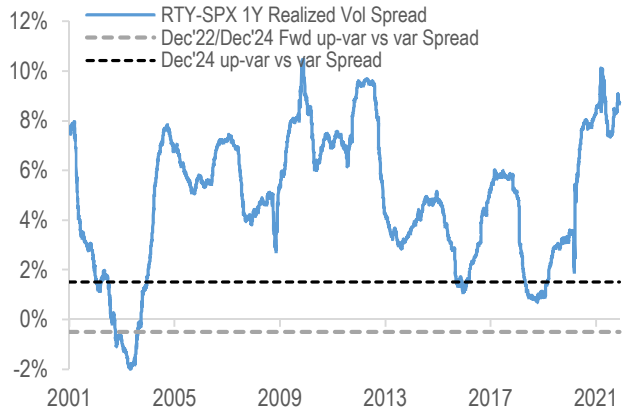
We continue to recommend buying Russell 2000 up-var vs. selling S&P 500 vanilla variance to monetize the larger effects of structured products on the Russell 2000 and rich convexity. As we discussed in the Volatility Supply and Demand and Term Structure sections (and in our 2021 Outlook), Russell 2000-linked structured products dampened the index's long-dated volatility. This, along with higher RTY realized due to style rotation trades, and larger long-term hedging demand on S&P 500, caused the Russell 2000 term structure to diverge from the S&P 500. The Russell 2000 less S&P 500 volatility spread performed well during the pandemic, with the Russell 2000 realizing ~9% points higher volatility over the past year. Investors can enter the RTY-SPX volatility spread at an attractive level to collect strong carry, while monetizing the rich convexity risk premium, term structure dislocation, and impact of structured products through this up-var vs. var structure:

- **Buy Dec'22/Dec'24 forward starting Russell 2000 50% up-var vs. short S&P 500 variance @ -0.5v**, or
- **Buy Dec'24 Russell 2000 50% up-var vs. short S&P 500 variance @ +1.5v**, indicatively

We recommended similar structures in our 2021 Outlook, and they performed very well over the past year, delivering strong carry and rallying away from the up-var strike. On a hold to maturity basis, the main risk for this structure is if the Russell 2000 declines by more than 50% from current levels, in which case the investor is left naked short S&P 500 variance for as long as the Russell 2000 trades below this threshold (though the trade would also likely suffer negative interim mark to market on a large sell-off approaching this threshold). However, the Russell 2000 has only ever seen a 50%+ sell-off during the 2008/9 GFC. Additionally, in exchange for this tail risk, the investor is receiving strong carry, by going long the RTY-SPX vol spread well below where it realized in recent years (Figure 165). Meanwhile, Russell 2000 realized volatility should continue to be supported by cyclical and factor rotation trades next year.

Figure 165: RTY up-var vs. SPX var spread carry is strong

Russell 2000 less S&P 500 volatility spread



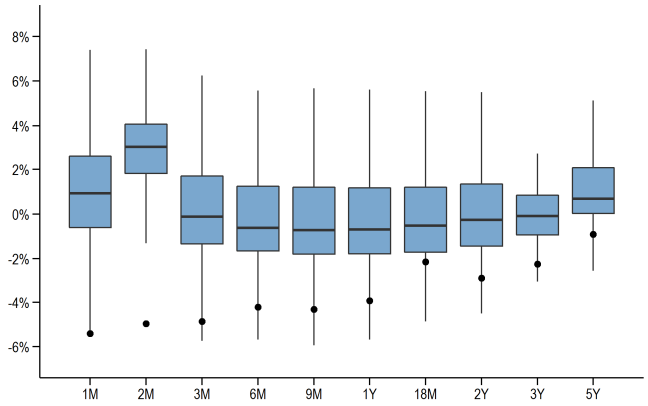
Source: J.P. Morgan Equity Derivatives Strategy

Euro STOXX 50 versus S&P 500 Dec 2022 synchronous variance spread

The Euro STOXX 50 has been realizing higher levels of volatility than the S&P 500 over most of 2021. Our analysis of the drivers of Euro STOXX 50 and S&P 500 realized volatility indicates that the current realized spread will likely persist into 2022. The biggest driver of the S&P 500 volatility outperformance vs. the Euro STOXX 50 during the Covid crisis has been the Tech sector, and the recent contribution of Tech volatility to the two indices appears more balanced (Figure 171) than before (more details in our recent, in-depth report). The entry level of the spread is also reasonably attractive over the long term (Figure 170), despite not being as low as in 2020.

Figure 166: The entry level for 1Y variance spreads is reasonably attractive in historical terms

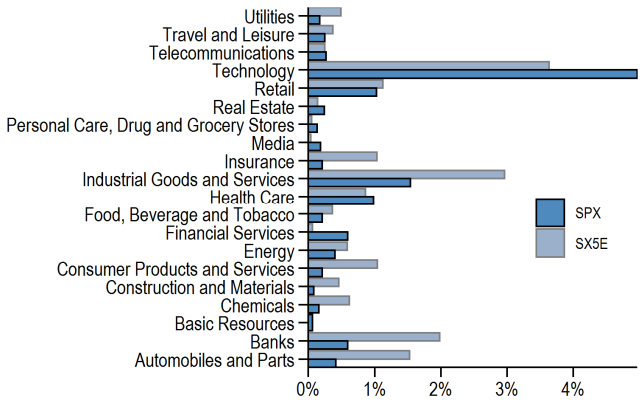
Euro STOXX 50 less S&P 500 var spread 5Y boxplot (black dot for current)



Source: J.P. Morgan Equity Derivatives Strategy

Figure 167: The Tech sector has become an important drivers of Euro STOXX 50 volatility in 2021

Marginal sector contribution to total vol (realized vol since 01-Sep-2021)



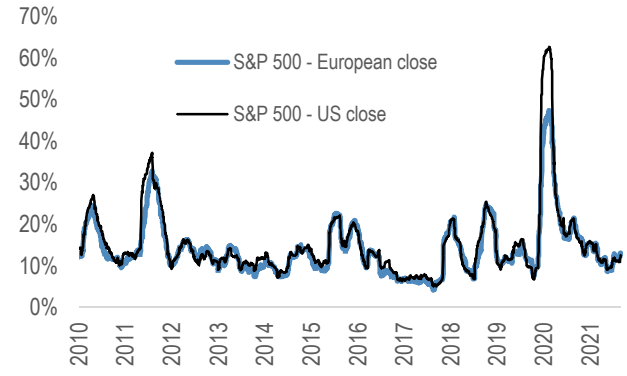
Source: J.P. Morgan Equity Derivatives Strategy

- We recommend entering **synchronous long Euro STOXX 50 less S&P 500 Dec-22 var spreads at -1 vol points**, indicatively.

The synchronous variance spread involves trading a variation on S&P 500 variance swaps that references the **S&P 500 fixing at European closing time.** The synchronous variance spread pricing is slightly worse than that of the regular variance spread, but the spread is less subject to idiosyncratic risk and importantly **less exposed to intraday momentum on the S&P 500.** Intraday momentum for the S&P 500 can lead to heightened realized volatility, especially in times of great stress (Figure 172). Figure 169 shows the back-tested PnL of the synchronous spread and illustrates that the loss in 2020 would have been contained.

Figure 168: The S&P 500 struck at European close experienced more limited volatility spike during the Covid crisis

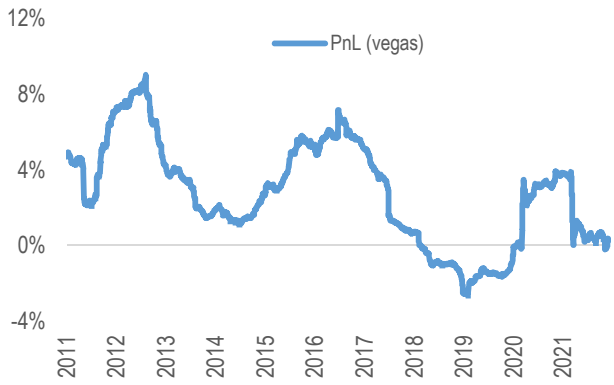
3M realized volatility for US close and European close S&P 500 (%)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 169: The synchronous variance swap spread entered at current level would have had limited losses in 2020

Synchronous Euro STOXX 50 less S&P 500 back-tested PnL (vegas)



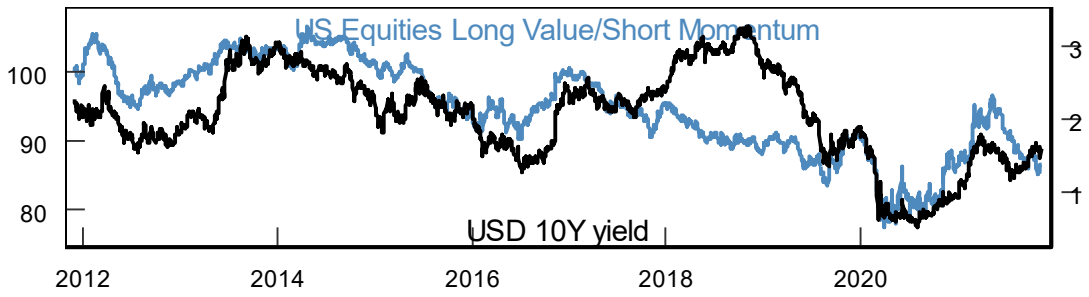
Source: J.P. Morgan Equity Derivatives Strategy.

Dispersion trades

Machine learning based dispersion trades

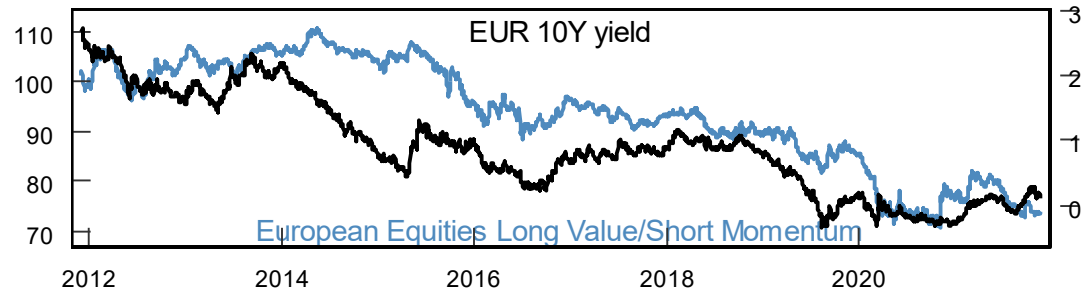
It is our long-held belief that names with extreme factor exposures are likely to experience higher volatility. This is because stock volatility is increasingly attributable to factor rotations, which are in turn driven by macro factors such as bond yields. Moreover, this is a global phenomenon and applies equally to US (Figure 63) and European (Figure 171) asset classes. With the global central banks looking to exit the easing regime and transition into tightening next year, factor-driven equity volatility is likely to be sustained in 2022, in our view.

Figure 170: Historical performance of long US equity Value/short Momentum factors (Indexed to 100 in Dec 2011)



Source: J.P. Morgan

Figure 171: Historical performance of long European equity Value/short Momentum factors (Indexed to 100 in Dec 2011)



Source: J.P. Morgan

In this section, we propose a pair of new dispersion portfolios on S&P 500 and Euro STOXX 50, constructed using our machine learning based methodology.

S&P 500 bespoke dispersion

We select a weighted portfolio of 25 names, as seen in Table 6, based on the volatility and fundamental factor data of our stock universe of the top 100 S&P members with the highest option liquidity. By looking beyond the top 50 names in the SPX for the dispersion trade, we are able to screen for names with more diverse factor exposures and therefore better expected performances. **A 1Y SPX vol swap dispersion against the names below are indicated at 13.3%.**

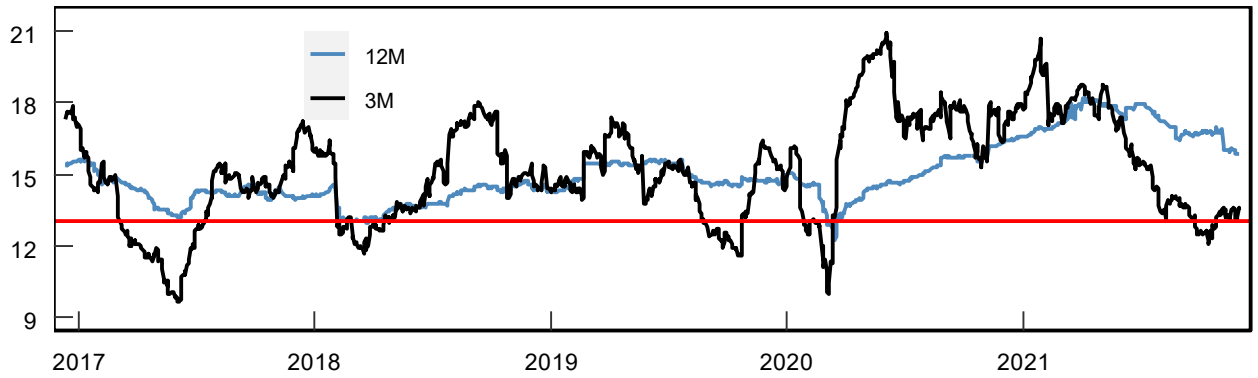
Table 6: Proposed bespoke dispersion portfolio vs. SPX

Ticker	Sector	Weights		Sector	Weights
AAPL	Information Technology	4.1%	CRM	Information Technology	4.1%
FB	Communication Services	4.1%	COST	Consumer Staples	4.1%
INTC	Information Technology	4.1%	GILD	Health Care	4.1%
T	Communication Services	4.1%	LOW	Consumer Discretionary	4.1%
NFLX	Communication Services	4.1%	ORCL	Information Technology	4.1%
TWTR	Communication Services	4.1%	MO	Consumer Staples	4.1%
CCL	Consumer Discretionary	4.1%	DVN	Energy	4.1%
CSCO	Information Technology	4.1%	KHC	Consumer Staples	4.1%
NKE	Consumer Discretionary	4.1%	LRCX	Information Technology	4.1%
KO	Consumer Staples	4.1%	NEM	Materials	4.1%
GS	Financials	4.1%	MU	Information Technology	3.7%
PG	Consumer Staples	4.1%	MSFT	Information Technology	2.7%
AMAT	Information Technology	4.1%			

Source: J.P. Morgan.

The back-test performance and summary statistics are shown in Figure 172 and Table 7 below. The current entry point compares favorably to the historical realized volatility spreads, including the pre-2020 levels.

Figure 172: Current entry point (in red) vs. historical 1Y realized volatility spread
Weighted average single stock



Source: J.P. Morgan

Table 7: Summary statistics of the dispersion trade back-test assuming current entry level

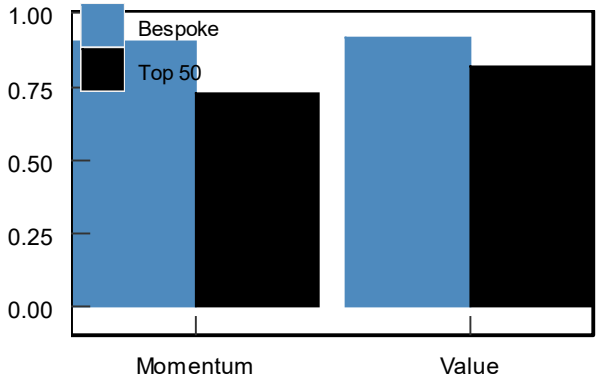
Trade Statistics	PNL (Vega)
Min	-2.2
1st Quartile	0.3
Mean	0.7
3rd Quartile	1.3
Max	5.5
Current	3.1
Current IV as Percentile of RV	16

Source: J.P. Morgan.

Also indicative of future performance, in our view, is the exposure of the portfolio to Value and Momentum factors. As shown in Figure 173, the bespoke portfolio has a higher factor dispersion than the vanilla SPX top 50 dispersion. Further details at the ticker level are displayed in the Value/Momentum factor exposure space, as seen in Figure 175, where we also observe a wide dispersion.

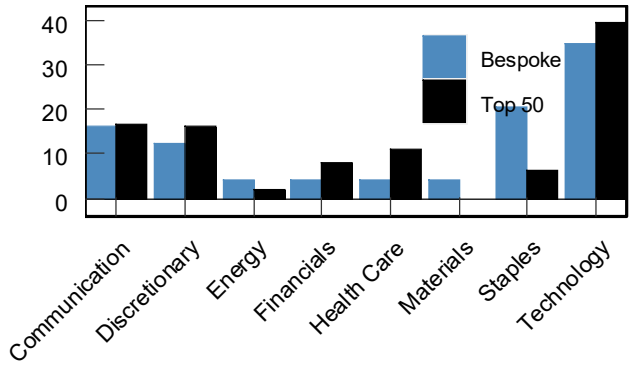
From a sector perspective (Figure 174), the portfolio is overweight Staples and Materials volatility and underweight Discretionary and Healthcare.

Figure 173: Factor volatility of the bespoke vs. SPX top 50 dispersion



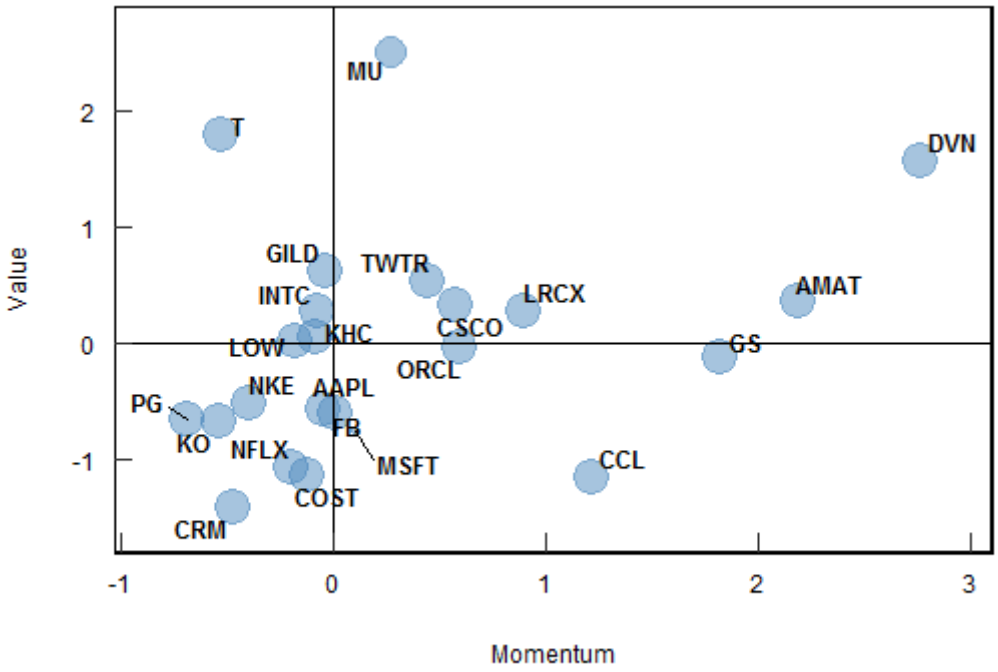
Source: J.P. Morgan

Figure 174: Sector distribution of the bespoke vs. SPX top 50 dispersion



Source: J.P. Morgan

Figure 175: Factor exposure of single names in our bespoke dispersion portfolio



Source: J.P. Morgan

SX5E bespoke dispersion

Based on the volatility and fundamental factor data of our stock universe, a weighted portfolio of 19 names is constructed using our machine learning based methodology, as seen in Table 8. **A 1Y SX5E vol swap dispersion against the names below are indicated at 8.7%.**

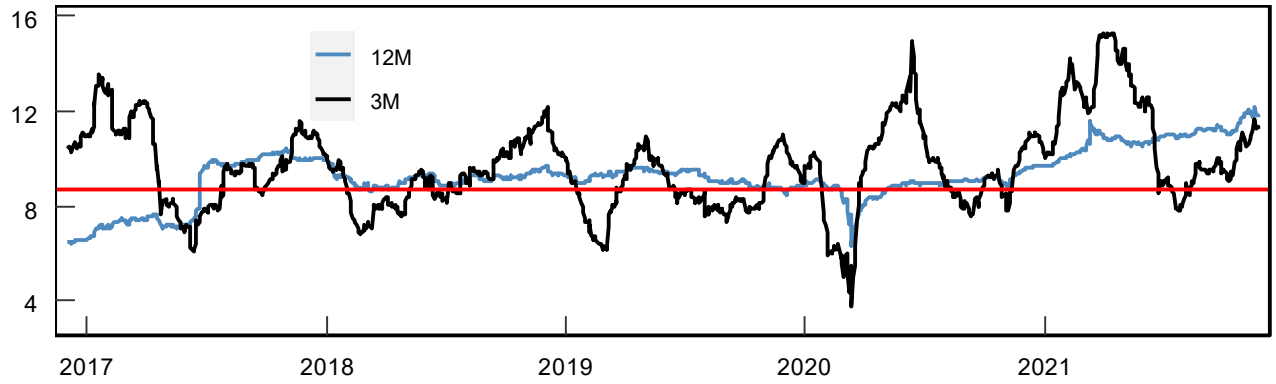
Table 8: Constituents of the bespoke dispersion portfolio

Ticker	Sector	Weights	Ticker	Sector	Weights
BBVA SQ	Banks	11.2%	KER FP	Retail	2.0%
AD NA	Personal Care, Drug and Grocery Stores	11.2%	ABI BB	Food, Beverage and Tobacco	1.9%
OR FP	Consumer Products and Services	11.2%	CS FP	Insurance	1.7%
ADS GY	Consumer Products and Services	10.9%	SU FP	Industrial Goods and Services	1.6%
VOW3 GY	Automobiles and Parts	10.6%	BN FP	Food, Beverage and Tobacco	1.4%
SIE GY	Industrial Goods and Services	10.3%	LIN GY	Chemicals	1.4%
EL FP	Health Care	9.3%	IFX GY	Technology	0.9%
STLA IM	Automobiles and Parts	5.0%	IBE SQ	Utilities	0.8%
TTE FP	Energy	4.1%	MUV2 GY	Insurance	0.7%
MC FP	Consumer Products and Services	3.6%			

Source: J.P. Morgan

The back-test performance and summary statistics are shown in Figure 176 and Table 9 below. The current entry point compares favorably to the historical long-term (1Y) and short-term (3M) realized volatility spreads, including the pre-2020 levels.

Figure 176: Current entry point (in red) vs. historical realized volatility spread
Weighted average single stock



Source: J.P. Morgan

Table 9: Summary statistics of the dispersion trade back-test assuming current entry level

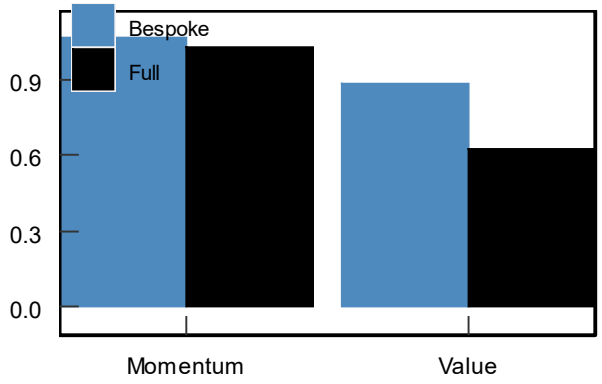
Trade Statistics	PNL (Vega)
Min	-2.2
1st Quartile	0.3
Mean	0.7
3rd Quartile	1.3
Max	5.5
Current	3.1
Current IV as Percentile of RV	16

Source: J.P. Morgan.

Besides the backward-looking back-tests, we show the exposure of the portfolio to Value and Momentum factors as an indication of potential future performance. As shown in Figure 177, the bespoke portfolio has a higher factor dispersion than the vanilla SX5E full dispersion. Further details at the ticker level are displayed in the Value/Momentum factor exposure space, as seen in Figure 179, where we also observe a wide dispersion.

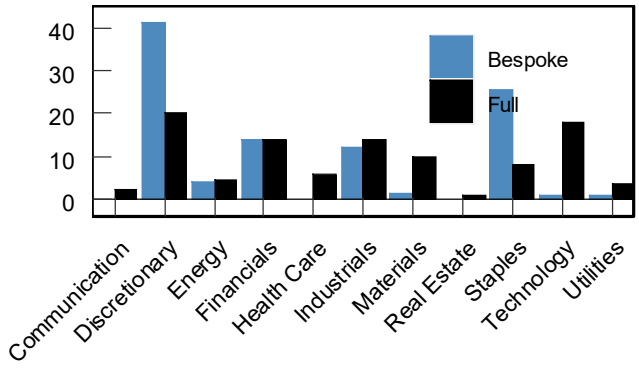
From a sector perspective (Figure 178), the portfolio is overweight Staples and Discretionary volatility and underweight Materials and Technology.

Figure 177: Factor volatility of the bespoke vs. SX5E full dispersion



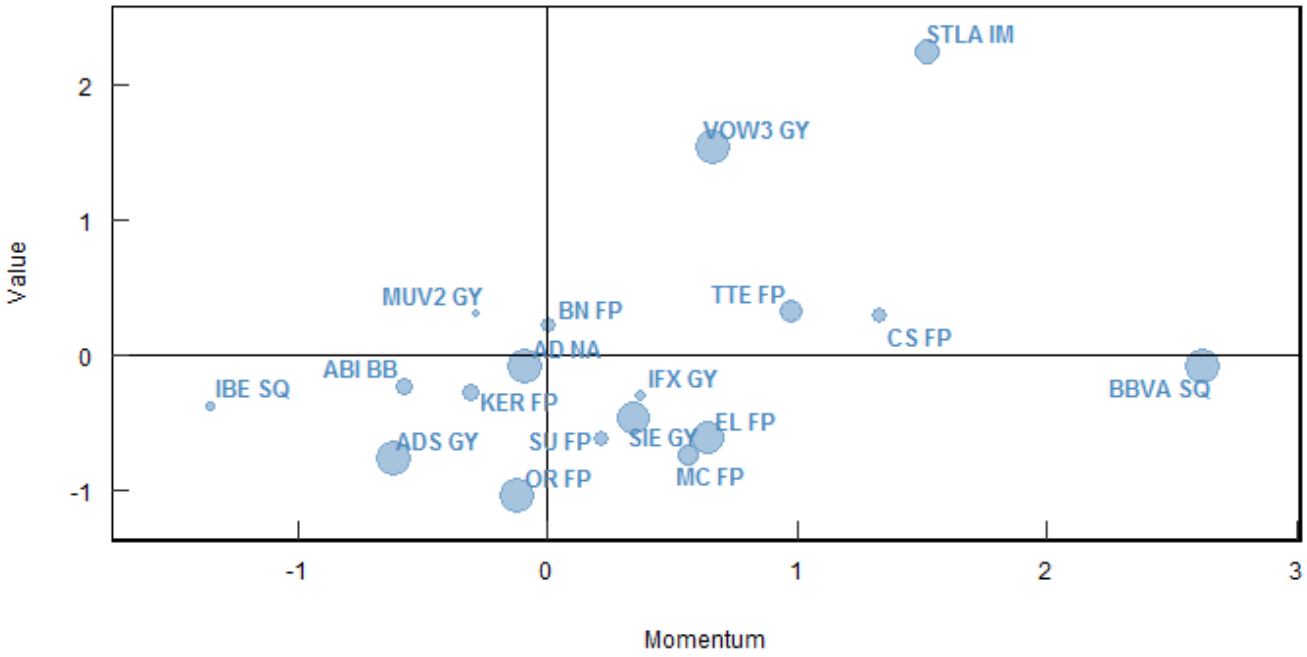
Source: J.P. Morgan

Figure 178: Sector distribution of the bespoke vs. SX5E full dispersion



Source: J.P. Morgan

Figure 179: Factor exposure of single names in our bespoke dispersion portfolio



Source: J.P. Morgan

China-exposed thematic dispersion basket

China has been a source of concern for equity markets in 2021 for a number of reasons: 1) continued defaults of Chinese property developers and structural slowdown of Chinese property market; 2) further tightening of regulation in the Tech sector; 3) slowdown in economic data.

We propose a bespoke dispersion basket consisting of European stocks to play the view that concerns around China will persist into 2022 and continue to drive the volatility of China-exposed stocks.

To create our optimized dispersion basket, we select European names that have high China revenue exposure relative to peers. We then apply a filter to select names that can be liquidly traded in volatility swaps format. The resulting stock population can be found in Table 10.

The basket weights are then constructed by running an optimization problem to maximize the exposure to the z-score of the three metrics described below:

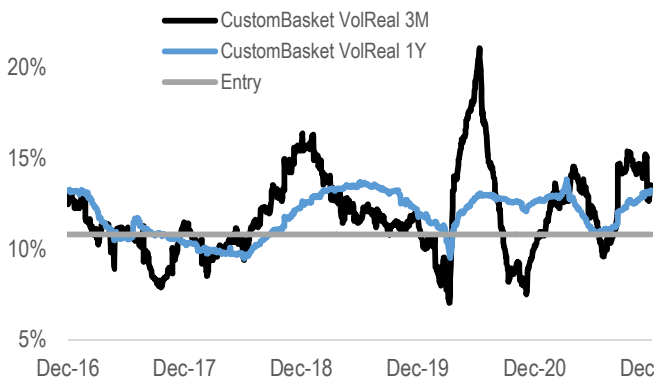
- **Maximize China Exposure:** current 1Y correlation of the stocks versus CSI300.
- **Entry level:** current 5Y percentile of the 1Y ATMF implied vol of the stocks.
- **Carry:** the EWMA volatility of the basket of stocks versus current 1Y ATMF implied vol.

The optimization is run subject to the following constraints:

- **Leverage:** the basket weight sums to 100%.
- **Diversification:** the weight of each individual stock is constrained between 3% and 20%.
- **Volatility:** the optimized basket should not have a higher weighted average implied volatility than an equally weighted basket.

Figure 180: Realized volatility spread and entry level of the proposed China exposed custom dispersion basket

Volatility spread (%)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 181: historical entry level of the proposed custom dispersion basket

Volatility spread (%)

Source: J.P. Morgan Equity Derivatives Strategy.

Table 10 shows the results of our optimization methodology above. Each name in the optimized basket is traded against volatility swaps of its corresponding regional index. UK stock are funded by FTSE100, Swiss stocks by SMI, and European stocks by SX5E.

- **Indicatively, a Dec-22 vol swaps dispersion on the proposed custom basket is offered at 10.8% (x2.5 capped on both sides).** The 3M realized volatility of the basket is 13.5%.

Figure 180 shows the back-test versus the current entry level of the custom basket.

Table 10: China exposed custom dispersion basket

Ticker	Weight
SX5E	-50%
SMI	-34%
UKX	-16%
AAL LN	4%
ABBN SE	3%
ADS GY	3%
AIR FP	3%
AI FP	3%
BAS GY	3%
BHP LN	3%
BMW GY	3%
CFR SE	3%
DAI GY	3%
DSM NA	3%
GLEN LN	3%
HEN3 GY	3%
HOLN SE	8%
HSBA LN	3%
RI FP	3%
KER FP	20%
RIO LN	3%
UHR SE	20%
VOW3 GY	3%

Source: J.P. Morgan Equity Derivatives Strategy.

Dividend futures trades

S&P 500: stay long 2022 and 2023 dividend futures

In the Dividend section above we discussed the rationale for remaining constructive on near-term S&P 500 dividends. Although discounts to bottom-up estimates are relatively narrow after dividend futures' rally this year, we see scope for more material upside given:

1. Bottom-up estimates will likely continue to be revised higher as earnings come in ahead of expectations—our strategists expect S&P 500 EPS for 2022 to realize ~9% above analysts' expectations
2. Our top-down model, based on the historical relationship between earnings growth, market return, and dividend growth, points to ~9% upside (14% y/y dividend growth) for next year given the strong market rally and surge in earnings this year
3. With the S&P 500 expected to deliver its lowest dividend yield in two decades and companies likely cautious in committing to dividend increases the past couple of years given risks around the pandemic, they will likely step up shareholder returns of their record profits and cash balances as we exit the pandemic next year
4. Dividend futures offer optionality around changes to the tax/regulatory landscape. If Democrats' proposed tax on stock buybacks make it into the final social infrastructure bill, it would likely prompt corporates to shift part of their shareholder remuneration from buybacks to dividends

While we're fundamentally positive across the whole dividend curve, we prefer the short end where pull-to-realized exerts greater influence, the holding period to realize gains is smaller, and supply from structured product hedging flows is less impactful. As such, **we recommend staying long the 2022 and 2023 S&P 500 dividend futures** (which we previously recommended going long here). The current upside to top-down estimates stand at ~9% for 2022 and ~11% for 2023 dividend futures (without factoring in any additional boost to dividends from a buyback tax).

Europe dividend trades: FTSE100 2022, Banks 2023, SX5E 2023 and CAC 2023

We believe dividends will continue to deliver positive returns over 2022. Similar to other equity trades, the recent correction allows for slightly more attractive entry levels, which we would recommend taking advantage of. The entire dividend complex delivered very strong returns throughout 2021 as we had anticipated and recommended in this publication last year. Indeed, the returns this year were broadly in line with the pecking order we had recommended: Banks > CAC 40 > FTSE 100 > SX5E. As a rule, dividends far outpaced their underlying spot markets. These strong returns that we have seen in 2021 were driven by a reduction in embedded risk premia still amply prevalent at the start of the year, and very significant upgrades that we have seen throughout the year; even if the pace of the same has slowed, it remains positive. Looking ahead to 2022, though, the positive returns we anticipate will need to rely almost entirely on earnings upgrades. We and our equity strategy team expect companies to deliver and to surprise current analysts' expectations on the upside. One helping hand here will come from inflationary pressures that we are seeing, driving nominal earnings up. Nominal GDP in the Eurozone is expected to grow by 6.5% (with 2.3% inflation). As a rule of thumb, earnings tend to grow around 5-6x faster than GDP, yielding very substantial potential earnings growth for next year. Current forecasts are closer to 16%, as opposed to the 30% this yardstick suggests. Finally, while 2022 is expected to be yet another strong year delivering significant earnings growth, we fully expect companies in Europe to return increasingly cash to shareholders via share buybacks, which will reduce some of the upside potential for dividend investors. Prospects are good, and our pecking order for next year is Banks in 23, FTSE100 in 22, SX5E in 23, and CAC in 23.

Nikkei 225: stay long 2023 dividend futures

Nikkei dividends delivered exceptional performance in 2021, with dividend futures across tenors delivering more than 10% returns. As discussed in the Dividends section, we continue to see upside on Nikkei dividends next year on the back of the below supportive developments:

- **Constructive fundamental outlook:** Japanese corporates reported strong FY 2Q21 results overall, which spurred another leg of dividend rally recently. Our strategist believes **earnings will likely remain resilient next year** driven by continued recovery of the domestic economy. We think dividends estimate have yet to fully reflect the strong earnings trend and will likely continue to see further revisions.

- **Confidence in economic growth driven by stimulus measures:** Recently, the Kishida administration announced a greater than expected stimulus package with size of JPY 55.7tn. PM Kishida expects the package would lead to **real GDP growth of 5.6%.** In case of material ramp-up of retail spending and strong recovery of domestic economy, we could see **substantial dividend upside potential** from 2023 onward.

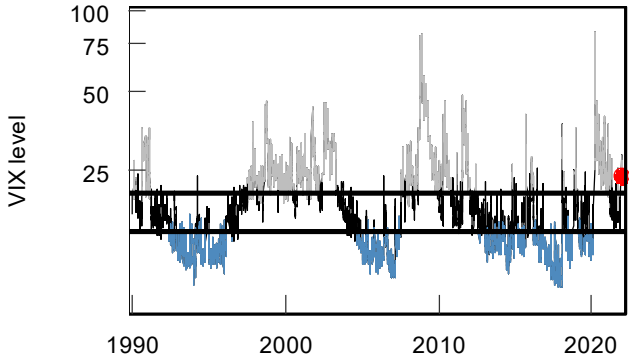
- **Tokyo Stock Exchange reclassification a tailwind:** We think the upcoming TSE reforms will lead to further progress in corporate governance and improvement in shareholder returns. A number of small-cap firms raised dividend payout ratio this year with an aim to attract new investors and boost their share prices so they can meet the listing requirements for the new Prime segment. Over time, this will help raise the awareness of good governance among Japan corporates. This should bode well to Nikkei dividend outlook in the long term from a fundamental perspective.

Based on our top-down model, we see relatively limited return potential on the 2022 tenor (+1.2% implied upside) and more meaningful upside on tenors further out (MNDZ3: +7.3% upside potential in base case, +10.4% upside potential in bull case). Our analysis suggests, in years where upgrades to guidance outpace downgrades at the interim results, Nikkei dividend futures typically continue to post strong performance into the year-end and at the start of the subsequent year. In the near term, **we expect the recent strength in Nikkei dividends to further extend.** We recommend investors to add long exposure to the MNDZ3 contract now.

Earn protected VIX carry in volatile environments

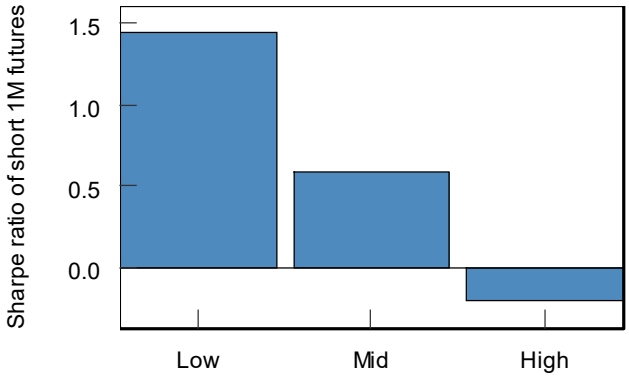
VIX has oscillated between medium- and high-vol regimes, as defined by our machine learning based regime model, for much of the year (Figure 182). As discussed in our previous reports, in such an environment, the performance of naïve VIX term structure carry strategies tend to be modest and face drawdown risk from potential vol spikes. We also note that since Jan 2020, VIX has not spent any time in the low-vol regime, which is the most favorable environment for VIX carry.

Figure 182: VIX regimes as defined by our machine learning model



Source: J.P. Morgan

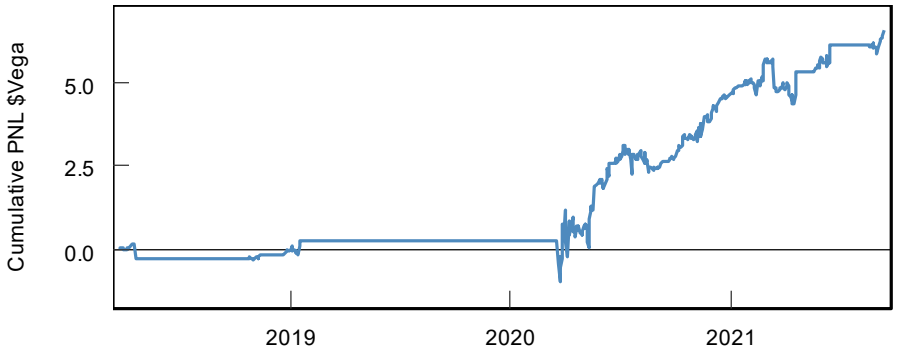
Figure 183: Performance of short VIX strategy conditional on VIX regimes



Source: J.P. Morgan

Under such circumstances, how can investors harvest VIX term structure premium in a protected manner? We propose a VIX calendar strategy that has been shown to deliver alpha systematically. Specifically, **when VIX is above 20, we sell the front-month 20 delta put and buy the second-month 20 delta put, at a 1:1 ratio.** The trade is carried until the expiry of the front-month contract and unwound if VIX is 20 or below, and if VIX is above 20 it is rolled into the same put calendar structure. The back-test P&L (before transaction cost), where trades are entered on monthly VIX expiry dates, is seen in Figure 184 and Table 11.

Figure 184: VIX put calendar performance conditional on VIX is greater than 20 at inception



Source: J.P. Morgan

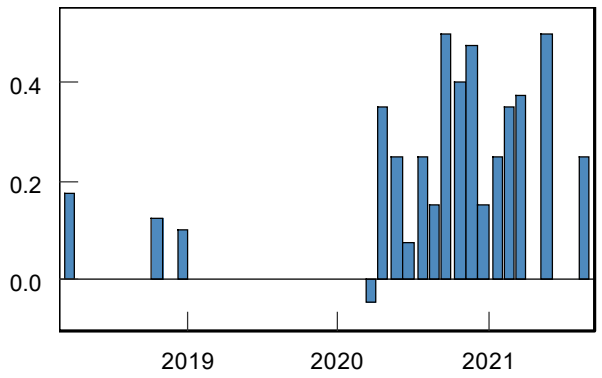
Table 11: Performance of the put calendar (P&L per trade) since Jun 2016

VIX at Inception	Mean P&L per trade (vega)	Standard Deviation	Annualized Sharpe	Trades
<= 20	-0.069	0.425	-0.7	47
> 20	0.364	0.415	1.6	18

Source: J.P. Morgan.

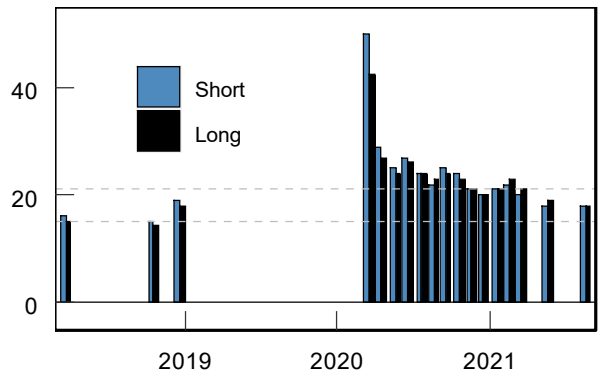
What's the economic rationale behind the profitability of the put calendar? When VIX is > 20, the term structure tends to be flat to upward sloping. Therefore, the put calendar enjoys the positive roll yield of being long the front-month futures delta. In exchange, the structure generally requires a small premium to be paid upfront (Figure 185). In scenarios of sustained high volatility, or temporary vol spikes, the front-month puts are likely to expire worthless and allow the investor to own the second-month put option outright. The strikes of the respective long/short legs can be seen in Figure 186. The premium of the remaining put options should more than offset the initial premium paid at trade inception. The dotted lines are technically important VIX levels of 21 and 15 for reference. The downside scenario for the trade would be if the term structure steepens substantially in the front month. We choose 20 delta puts so that even in this scenario, the front-month options are still likely to expire worthless.

Figure 185: Premium paid at trade inception ($) before transaction cost



Source: J.P. Morgan

Figure 186: Put calendar front month (short) and second month (long) strikes



Source: J.P. Morgan

Hedging Trades

Hedge inflation / hawkish central bank turn

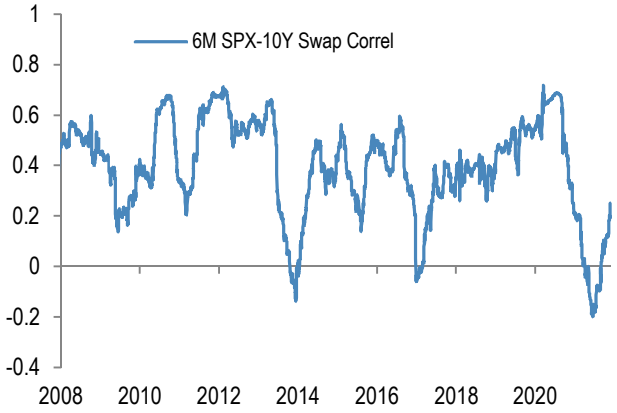
US equity bond hybrid puts

Our equity strategists highlight the key risk to their positive outlook is that persisting high inflation elicits a more aggressive monetary policy response next year, especially if post-pandemic dislocations persist (e.g., supply chain issues, labor shortages, etc.). Investors can take advantage of a favorable correlation structure to hedge this risk efficiently via hybrid puts. For example:

- **Buy an S&P 500 1Y 90% strike put, contingent on 10Y swaps increasing by 50bps**, for ~1.85% of notional (a ~70% discount to vanilla 1Y 90% puts).

Correlation between equities and rates has been positive most of the time over the past couple of decades (or equivalently, equities and bonds were negatively correlated) due to the prevalence of risk on/risk off trading (Figure 187). However, we saw this correlation flip negative earlier this year when markets became concerned about runaway inflation as both equities and bonds sold off in tandem on the prospect of aggressive monetary policy tightening that would arrest the economic recovery. However, as markets got more comfortable that central banks viewed the inflation surge as transitory and policy tightening would remain gradual, this correlation reverted back to positive more recently and is priced positively by hybrid derivatives markets.

Figure 187: S&P 500 / 10Y swap rate correlation was positive most of the past couple of decades but turned negative earlier this year on inflation worries



Source: J.P. Morgan Equity Derivatives Strategy.

Buy MSCI EM Asia put ladder as an inflation hedge

Inflation will remain a recurring theme next year. Since the COVID trough in March 2020, the rise in inflation expectations amid a low bond yield environment has proven supportive for equities. That said, central bank policies are key to equity markets' reaction function to inflation. Our strategists' expectations are that major central banks are unlikely to turn more hawkish relative to market pricing. After all, average inflation targeting framework allows for inflation overshoot, without immediate policy response. Nevertheless, prolonged high inflation could spur accelerated hike rates, which could inflict pain on equity markets.

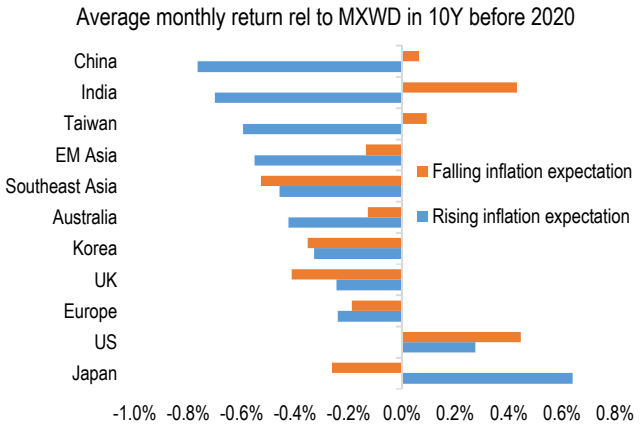
History suggests EM Asia are among the major underperformers when inflation expectation rises. Excluding the post-pandemic history, where major central banks have been curbed in reacting to higher inflation prints, EM Asia markets are bottom ranked by relative performance versus MSCI AC World (MXWD) when inflation expectations rose in the 10 years before 2020 (Figure 188). According to our equity strategists, past weakness of EM markets in a rising inflation environment can be explained by an adverse impact on the valuation of equities relative to bonds, given higher opportunity cost both globally and locally, as well as by the fiscal challenge to manage increased debt levels at costlier rates (see here).

Additionally, tightening monetary policy in the US generally pushes up US yields and may lead to a stronger USD versus EM currencies. This can potentially reverse some of the capital flows into EMs following ultra-loose fiscal and monetary policy introduced by DMs to combat the COVID-19 pandemic. A strong USD is not only a major fundamental headwind to EM from a capital flow perspective but also a pain to USD-funded equity investors from an exchange rate perspective (Figure 189).

Against this backdrop, we suggest investors buying put ladder on M1MS, the net total return version of the MSCI EM Asia index. The M1MS provides exposure to major EM Asia stock markets, including China (42%), Taiwan (20%), South Korea (16%), and India (16%), as well as Asia FX with the index denominated in USD. We expect EM Asia equity and FX to underperform if prolonged high inflation elicits a more hawkish monetary policy response. For this reason, buying protection on M1MS could deliver more hedging benefits than local indices. Driven by our view that prolonged high inflation is a risk more likely to occur in 2H22, we choose Dec 2022 as the options expiry. A put ladder can be seen as an extension of a bear put spread by selling another lower strike put. The strategy is net short vega and long theta. It carries positively as time passes. Recent move higher in implied volatility and skew in M1MS improves the entry level of the strategy.

- **Buy M1MS 16 Dec 2022 95% 85% 75% put ladder (buy 95%, sell 85% and 75%):** offer 1.4% (implied volatility 23.0%/24.2%/27.6%, delta -5%)

Figure 188: Excluding the post-pandemic history, where major central banks have been curbed in reacting to higher inflation prints, EM Asia markets underperform when inflation expectation rises



Source: J.P. Morgan Equity Derivatives Strategy. Note: Country and region market performance are calculated based on MSCI indices. Rising/falling inflation expectation is defined as 5Y5Y USD inflation swap rate above/below 1Y moving average.

Figure 189: A strong USD is not only a major fundamental headwind to EM from a capital flow perspective but also a pain to USD-funded equity investors from an exchange rate perspective

Source: J.P. Morgan Equity Derivatives Strategy.

Hedge potential unwind of crowded retail positioning

Best of puts on NASDAQ, KOSPI 200, and TAIEX

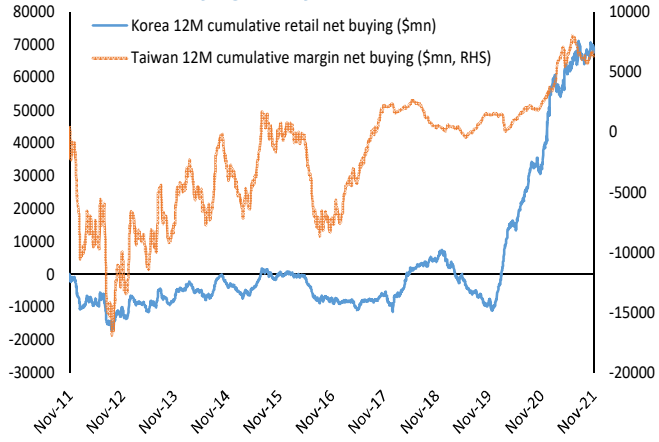
We think crowded retail positioning is among the key risks to watch next year. As highlighted in the Volatility Supply and Demand section, the US Technology space saw outsized retail trading mainly driven by call option buying activity of individual investors via options. Outside of the US, Korea and Taiwan are among the markets that witnessed strong retail participation post-COVID. We estimate retail investors net bought $86.0bn cash equities in Korea and $9.5bn in Taiwan via margin trading alone since the end of Mar 2021 (Figure 190). Retail positioning has reached historically extreme levels following the sharp buying activity.

Incidentally, the three market segments mentioned all exhibit high exposure to Technology and thus are all vulnerable to risk of Technology weakness driven by a potential hawkish shift in CB policy (see here). Should such a risk shock take place, **we could see a potential disorderly unwind by retail investors, which would exacerbate the sell-off.** Historically, US Tech, Korea, and Taiwan (represented by the NASDQA, KOSPI 200, and TAIEX, respectively) tend to tend to sell off in tandem (Figure 191).

To hedge against the risk of retail unwind, we recommend buying best-of puts on a basket of the Nasdaq 100, KOSPI 200, and TWSE. By conditioning the payoff on the best performer of a basket of the three underlyings, best-of puts can help materially reduce upfront cost of protection vs. a vanilla put option. The mark to market of the best-of put structure would benefit from a rise in correlation and volatility during a major risk shock. Please refer to below indicative pricing:

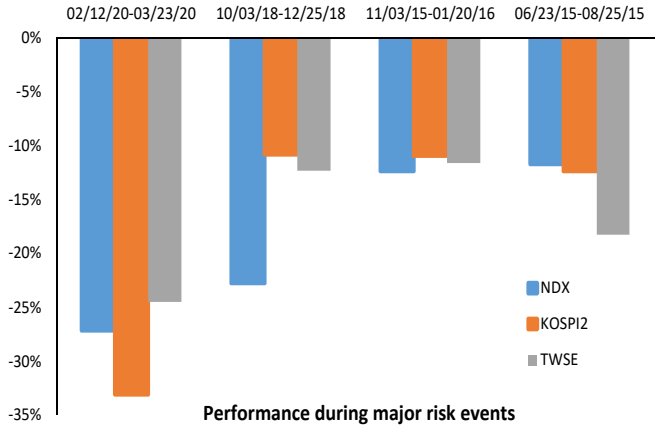
- **Buy 09 Jun 2022 95% best-of puts on {NDX, KOSPI2, TWSE}:** offer 2.54% (45% discount versus the average of the vanilla puts)

Figure 190: Korea and Taiwan are among markets that saw most pronounced retail buying activity post-COVID



Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P.

Figure 191: NASDAQ, KOSPI, and TWSE sold off in tandem during recent major corrections

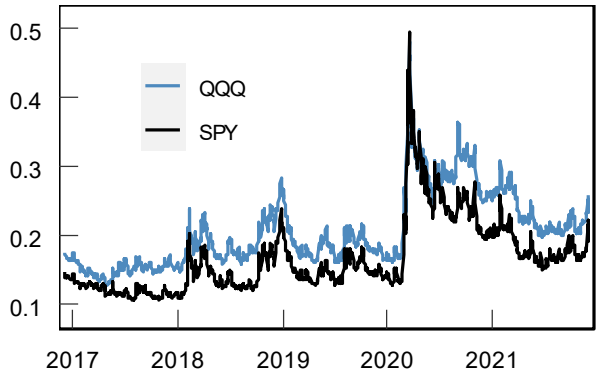


Source: J.P. Morgan Equity Derivatives Strategy, Bloomberg Finance L.P. * We highlight periods when MSCI ACWI recorded <-10% sell-offs since 2015.

Long tail protection on NASDAQ

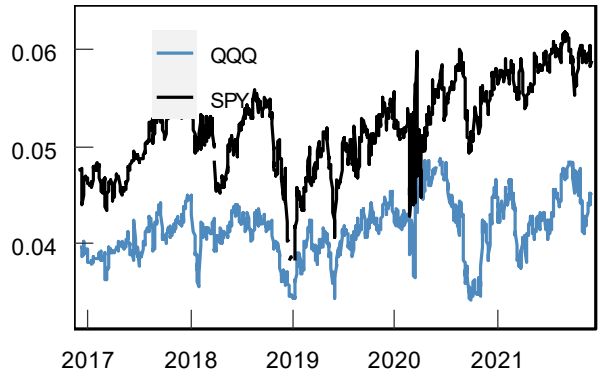
From a macro and fundamental perspective, we recommend reducing portfolio exposure to tech stocks, represented by the NASDAQ 100 index. However, from a volatility perspective, we find outright buying of NASDAQ volatility to be unattractive. The level of its implied volatility is likely to be elevated compared to the S&P 500 (Figure 187). At the same time, the NASDAQ downside skew continues to be flat (Figure 193). Moreover, in terms of the rate of change, NDX skew has recently flattened whereas the SPX skew continues to steepen.

Figure 192: 6M ATM Implied volatility



Source: J.P. Morgan

Figure 193: 6M ATM – 90% skew

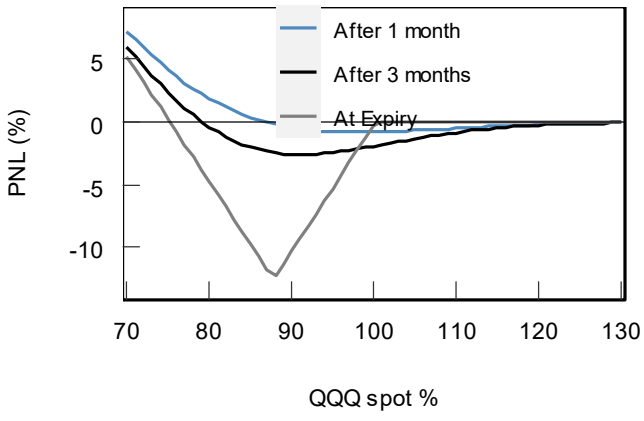


Source: J.P. Morgan

- **We propose a 6M ATM-87.5% 1x2 put ratio on QQQ (selling ATM and buying OTM puts) for approximately zero cost, indicatively.** Given the volatility parameters described above, we find put ratios to be an attractive protection structure. The payoff and hypothetical mark to market of the structure can be seen in Figure 194.

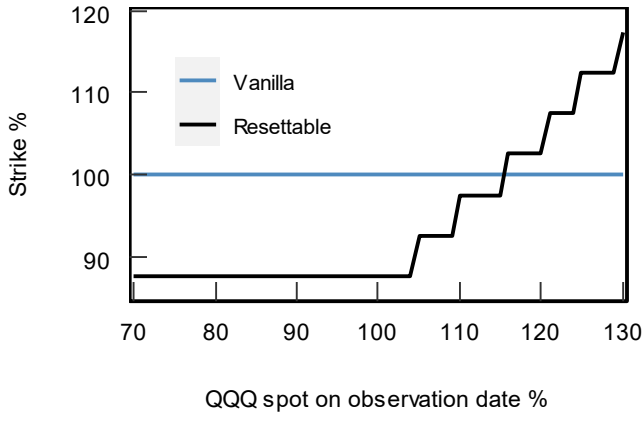
As an alternative exotic option implementation, we propose selling 1x 6M ATM put to buy 1.8x 6M 87.5% resettable puts on QQQ, for zero premium. The resettable puts will reset their strike 5% higher for every 5% higher in spot, observed at monthly frequency, with no cap on resets. The added resettable feature reduces the strike risk. The structure begins its life as a 1-by-1.8x put ratio (long 1.8x OTM puts), and will turn into a 1.8x1 put spread (long 1.8x near the money puts) if the QQQ rallies by more than 15% in six months (Figure 195). Regardless of the spot moves, the structure is net long puts and offers tail risk protection at all times.

Figure 194: Hypothetical P&L of the vanilla put ratio at various stages of the trade



Source: J.P. Morgan

Figure 195: The resettable structure changes from short ATM put ratio to long put spread if QQQ rallies more than 15%

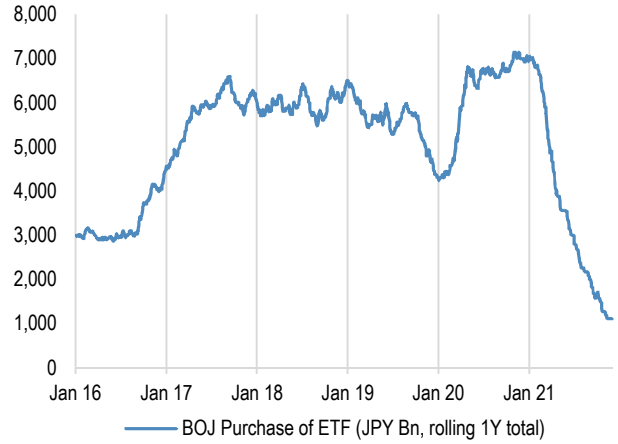


Source: J.P. Morgan

Japan domestic politics hedge

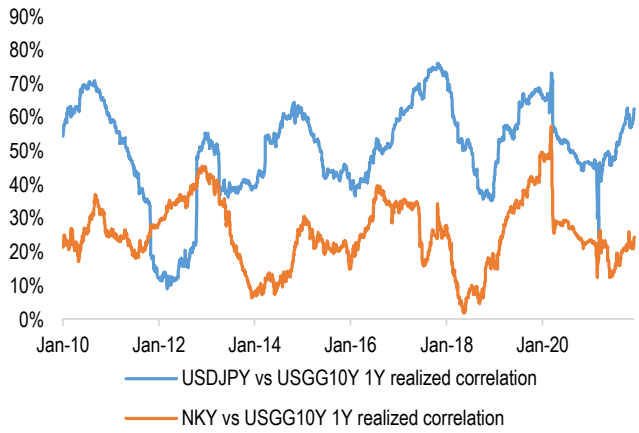
As discussed in the Outlook for Markets and Volatility, we think Japan volatility could be higher in 2H22 depending on the administration's policy directions. A major political event is the Upper House elections in the summer of 2022. A victory for the ruling bloc would raise the prospect for long-term political stability but at the same time could prompt discussions on tax hikes and a greater focus on income redistribution. Toward the end of the year, there will likely be more uncertainties over the sustainability of the BOJ's monetary policy as Governor Kuroda's term in office will end in April 2023. While it is too early to expect a major change in monetary policies, a quiet shift in BOJ's stance, as can been seen in a slowdown in asset purchases this year, is already underway (Figure 196).

Figure 196: While it is too early to expect a major change in monetary policies, a quiet shift in BOJ's stance, as can been seen in a slowdown in asset purchases this year, is already underway



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 197: US treasury yields are more influential on USDJPY but less so on Nikkei



Source: J.P. Morgan Equity Derivatives Strategy. Note: correlation is calculated based on rolling 2-day percent changes for USDJPY and NKY and net changes for USGG10Y.

Our FX strategists caution that the yen remains much more sensitive to yields than equities (see here). A stagflationary environment of lower equities but rising yields still looks consistent with USD/JPY higher. They look for USD/JPY to rise into the high teens (2Q: 117) before leveling off into year-end (116).

Investors can consider buying Nikkei put spreads contingent on USDJPY floored as a low-cost way to hedge against moderate downside in Japan equities. The structure leverages positive correlation between the equity / FX pair and thus provides decent cost savings relative to vanilla equivalents.

- **Buy NKY 08 Dec 2022 95% 85% put spread contingent on USDJPY >100% at expiry (quanto USD):** offer 1.19% (62% cost savings versus vanilla equivalent cost of 3.12%)

Cheap European hedges

For investors who are concerned about the adverse impact of the Omicron variant to our fundamental pro-cyclical outlook for 2022 and are looking to add protection, we recommend cost-effective structures against a potential market correction.

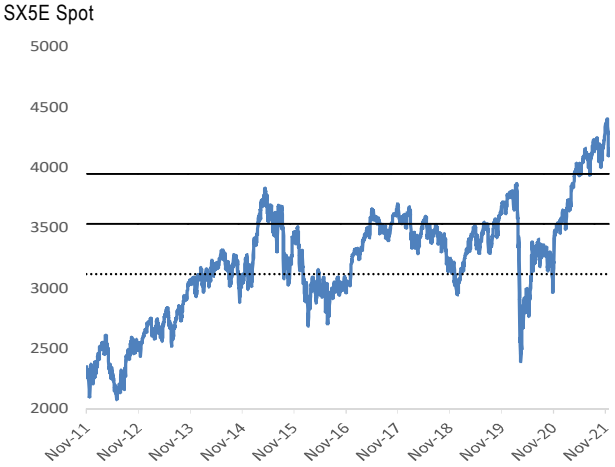
- **Buy SX5E Mar22 95%-85% put spreads where the lower strike put knocks in at 75% (continuously monitored): offer 1.85%**, only ~20bps or 11% more expensive than the vanilla 95% - 85% put spreads (ref 4179)

For the appearing put spread, the investor pays a slightly higher premium than the vanilla put spread for a potentially higher payout if the lower barrier 75% (~3,130) is not triggered (Figure 198). In the event that the lower barrier is triggered, the payout of the appearing put spread is the same as a vanilla 95%-85% put spread.

The premium of the appearing put spread over the vanilla put spread is low due to the steep downside skew (Figure 199).

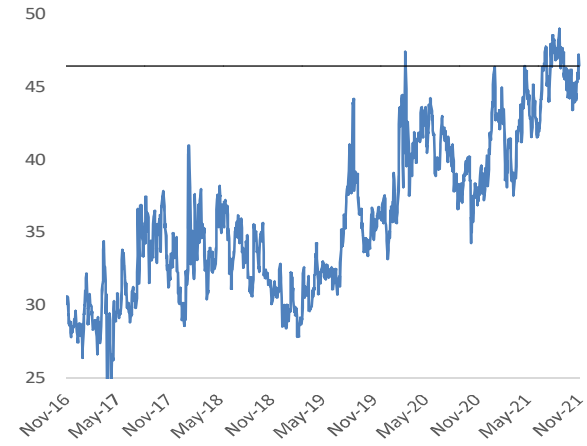
The structure lends itself as a hedging vehicle for a long equity portfolio in that it offers specific protection even if markets were to correct significantly. The following two structures are more efficient ab initio but do not provide this level of protection should we have a large correction—in case of the KO put, the hedge would at some point disappear, and in the case of the put-ratio the structure does not protect against a correction early on in the trade, as well compounding downside exposure should an exceptionally sharp correction occur.

Figure 198: SX5E spot with strikes and KI-barrier (dotted line) of the proposed appearing put spread (and level of the proposed KO-barrier)



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 199: SX5E 4M 25D skew trades close to multi-year highs and significantly above pre-Covid levels



Source: J.P. Morgan Equity Derivatives Strategy.

To cheapen initial premium to get downside exposure while benefitting from steep skew, investors can buy indicatively either in light exotic format:

- **Buy SX5E Mar21 95% Put with knock-out at 75% (continuously monitored): indicatively offered at 0.99%** versus 2.98% for a vanilla 95% Put, or a 67% discount (ref: 4,179)

The payoff of the knock-out put at expiry will be the same as a vanilla 95% put provided that the barrier is not breached from now until option expiry. If the barrier condition is triggered, the put option would cease to exist. We set the knock-out barrier at 75%. Given the current macro backdrop we anticipate, we think the likelihood of it being breached before March 22 is small even if SX5E goes below 95%.

In the vanilla space opportunities for cheap hedges are limited at the moment given the spike in volatility we are experiencing right now. Figure 200 shows the price of a 4m 95/90% Put spread on Euro STOXX 50 over time. Pricing has

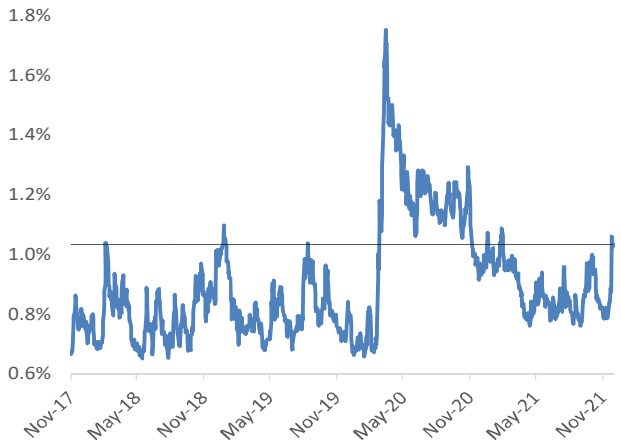
spiked back up to pre-pandemic peak levels, even if the structure is still offering max payout to premium ratio of close to 5x for a 10% drop in the underlier at maturity. Investors can indicatively,

- **Buy SX5E Mar21 95-90% Put-Spread at 1.0 %** (ref: 4,179, 22.7/26.1 mi vols, -11 delta)

Net short vega structures that benefit from high vol and skew, such as put ratios, price very well historically. The **SX5E Mar21 1x2 95-86% Put-Ratio can be entered close to costless** (ref: 4,109, 22.7/28.2 mid vols, flat delta) but the low initial delta makes this structure an ill-suited hedge that will not protect against near-dated drawdowns in an equity portfolio. At maturity, though, it offers significant upside at lower equity levels with additional downside from ~77% of spot, as the P&L graph in Figure 201 shows.

Figure 200: SX5E put spreads do not price very attractive relative to history but are the best available option in the vanilla space

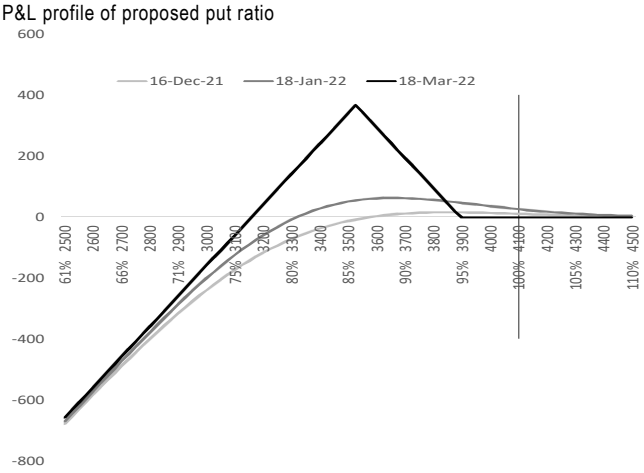
Price SX5E 4m 95/90 put spread



Source: Bloomberg Finance L.P., J.P. Morgan Equity Derivatives Strategy.

Figure 201: Breakeven at expiry of the proposed costless put ratio is ~77% of spot

P&L profile of proposed put ratio



Source: Bloomberg Finance L.P., J.P. Morgan Equity Derivatives Strategy.

Hedging for French elections risks

The first round of the 2022 French presidential election will be held on 10 April 2022. Should no candidate win a majority of the vote in the first round, a runoff will be held between the top two candidates on 24 April 2022. The first round falls between the March and April expiries, while the second round falls between the April and May expiries. This is different from the 2017 French presidential elections, when both dates fell between the April and May expiries.

For investors who would like to play a widening of the event risk premia going into the upcoming French elections we recommend:

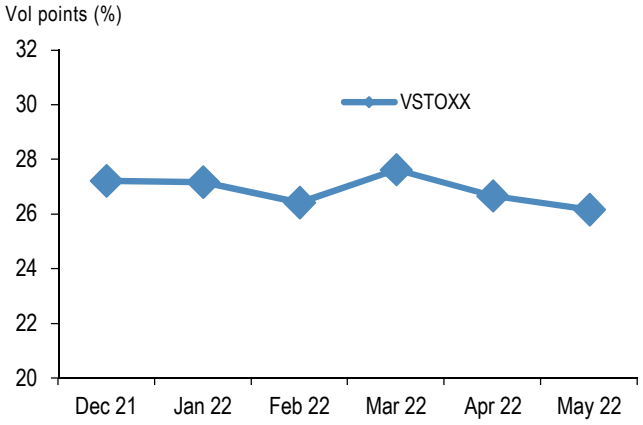
- **Buy VSTOXX Mar-22 futures versus selling Feb-22 futures**, indicatively offered at 1.4 vol points. (ref: FVSH2 27.45)

We prefer structures that do not lose too much in the benign base case scenario of a Macron re-election, given that there is already some risk premia priced into the market and that the likelihood of Macron not winning is relatively small (as highlighted by our economist here).

Figure 203 shows that there was a build-up of risk premia going into the 2017 election, and a structure analogous to our proposed calendar spread would have been profitable back then. In a scenario similar to the 2012 election where there was less build-up of risk premia going into the event, our proposed trade could also have been profitable, thanks to the roll-down in the term structure.

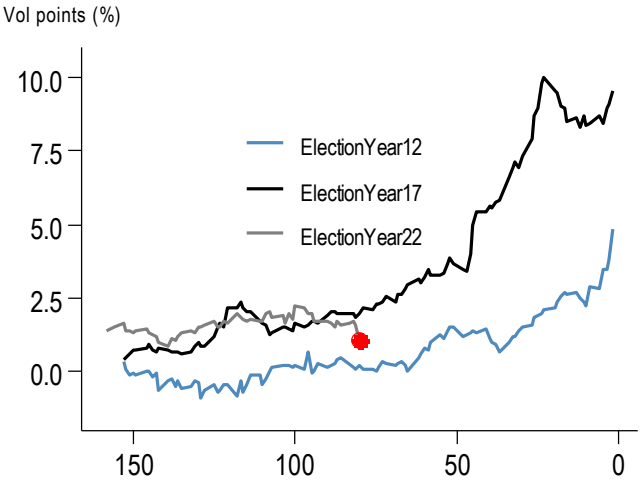
Should the market experience a selloff before the Feb futures expiry, the VSTOXX term structure might invert and our proposed structure would be exposed to negative mark to market.

Figure 202: VSTOXX term structure



Source: J.P. Morgan Equity Derivatives Strategy.

Figure 203: VSTOXX futures spread going into French election, Apr-Mar for 2012 and 2017 elections, Mar-Feb for 2022 election



Source: J.P. Morgan Equity Derivatives Strategy.

Risks of Common Option Strategies

Risks to Strategies: Not all option strategies are suitable for investors; certain strategies may expose investors to significant potential losses. We have summarized the risks of selected derivative strategies. For additional risk information, please call your sales representative for a copy of "Characteristics and Risks of Standardized Options." We advise investors to consult their tax advisors and legal counsel about the tax implications of these strategies. Please also refer to option risk disclosure documents.

Put Sale: Investors who sell put options will own the underlying asset if the asset's price falls below the strike price of the put option. Investors, therefore, will be exposed to any decline in the underlying asset's price below the strike potentially to zero, and they will not participate in any price appreciation in the underlying asset if the option expires unexercised.

Call Sale: Investors who sell uncovered call options have exposure on the upside that is theoretically unlimited.

Call Overwrite or Buywrite: Investors who sell call options against a long position in the underlying asset give up any appreciation in the underlying asset's price above the strike price of the call option, and they remain exposed to the downside of the underlying asset in the return for the receipt of the option premium.

Booster : In a sell-off, the maximum realized downside potential of a double-up booster is the net premium paid. In a rally, option losses are potentially unlimited as the investor is net short a call. When overlaid onto a long position in the underlying asset, upside losses are capped (as for a covered call), but downside losses are not.

Collar: Locks in the amount that can be realized at maturity to a range defined by the put and call strike. If the collar is not costless, investors risk losing 100% of the premium paid. Since investors are selling a call option, they give up any price appreciation in the underlying asset above the strike price of the call option.

Call Purchase: Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is below the strike price of the call option.

Put Purchase: Options are a decaying asset, and investors risk losing 100% of the premium paid if the underlying asset's price is above the strike price of the put option.

Straddle or Strangle: The seller of a straddle or strangle is exposed to increases in the underlying asset's price above the call strike and declines in the underlying asset's price below the put strike. Since exposure on the upside is theoretically unlimited, investors who also own the underlying asset would have limited losses should the underlying asset rally. Covered writers are exposed to declines in the underlying asset position as well as any additional exposure should the underlying asset decline below the strike price of the put option. Having sold a covered call option, the investor gives up all appreciation in the underlying asset above the strike price of the call option.

Put Spread: The buyer of a put spread risks losing 100% of the premium paid. The buyer of higher-ratio put spread has unlimited downside below the lower strike (down to zero), dependent on the number of lower-struck puts sold. The maximum gain is limited to the spread between the two put strikes, when the underlying is at the lower strike. Investors who own the underlying asset will have downside protection between the higher-strike put and the lower-strike put. However, should the underlying asset's price fall below the strike price of the lower-strike put, investors regain exposure to the underlying asset, and this exposure is multiplied by the number of puts sold.

Call Spread: The buyer risks losing 100% of the premium paid. The gain is limited to the spread between the two strike prices. The seller of a call spread risks losing an amount equal to the spread between the two call strikes less the net premium received. By selling a covered call spread, the investor remains exposed to the downside of the underlying asset and gives up the spread between the two call strikes should the underlying asset rally.

Butterfly Spread: A butterfly spread consists of two spreads established simultaneously – one a bull spread and the other a bear spread. The resulting position is neutral, that is, the investor will profit if the underlying is stable. Butterfly spreads are established at a net debit. The maximum profit will occur at the middle strike price; the maximum loss is the net debit.

Pricing Is Illustrative Only: Prices quoted in the above trade ideas are our estimate of current market levels, and are not indicative trading levels.

Companies Discussed in This Report (all prices in this report as of market close on 07 December 2021)
Heineken(HEIN.AS/€93.00/OW), Klepierre(LOIM.PA/€19.35/N), Safran(SAF.PA/€106.1/OW)

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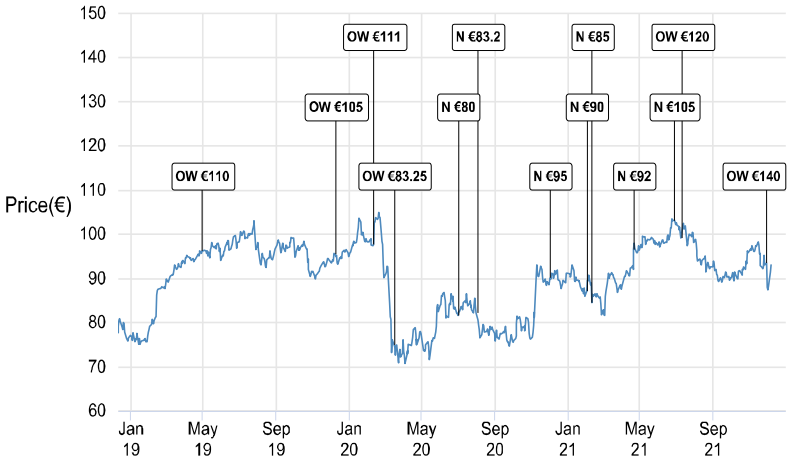
Safran (SAF.PA, SAF FP) Price Chart

Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Oct 17, 2006. All share prices are as of market close on the previous business day.

Date	Rating	Price (€)	Price Target (€)
10-Jan-19	N	108.0	115
13-Mar-19	N	117.0	110
26-Apr-19	N	125.2	115
23-Jul-19	N	133.2	128
05-Sep-19	OW	131.3	156
01-Nov-19	OW	141.8	158
08-Jan-20	OW	137.7	150
05-Feb-20	OW	148.3	156
27-Feb-20	OW	132.3	142
16-Mar-20	N	84.3	95
18-Mar-20	N	68.9	66
30-Mar-20	N	87.0	75
22-Apr-20	N	73.9	68
29-Apr-20	N	82.3	64
27-Jul-20	N	88.5	70
30-Jul-20	N	90.7	68
02-Nov-20	N	90.5	71
13-Nov-20	N	113.8	100
07-Jan-21	N	116.3	106
03-Mar-21	OW	117.2	136
28-Jul-21	OW	115.3	146
04-Nov-21	OW	114.0	155
03-Dec-21	OW	102.1	145

Heineken (HEIN.AS, HEIA NA) Price Chart



Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Sep 16, 1997. All share prices are as of market close on the previous business day.

Date	Rating	Price (€)	Price Target (€)
01-May-19	OW	96.24	110
10-Dec-19	OW	95.50	105
12-Feb-20	OW	97.76	111
17-Mar-20	OW	75.02	83.25
02-Jul-20	N	81.56	80
03-Aug-20	N	82.24	83.2
03-Dec-20	N	90.12	95
02-Feb-21	N	87.10	90
11-Feb-21	N	84.50	85
22-Apr-21	N	96.54	92
28-Jun-21	N	103.10	105
12-Jul-21	OW	99.14	120
30-Nov-21	OW	93.44	140

Klepierre (LOIM.PA, LI FP) Price Chart

Date	Rating	Price (€)	Price Target (€)
21-Jan-19	N	28.44	33
19-Feb-19	N	30.39	32
16-Jan-20	N	33.04	36
03-Mar-20	N	26.73	32
31-Mar-20	N	18.28	22
15-Jan-21	N	19.00	20
22-Jun-21	UW	22.74	20
11-Nov-21	N	22.02	20

Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
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IB clients**	54%	49%	35%
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*Please note that the percentages might not add to 100% because of rounding.
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