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Global Equity Futures Viewpoint

Q1-24 Equity Index Futures Roll Strategy

ES roll could be one of the richest non-Q4s on record

Assuming cash collateralized to Fed Funds forward implied rates and bottom-up Mar/Jun roll dividends of 19.10 index points, the annualized cost of rolling S&P 500 futures is currently 50bps rich. At current levels, the Mar/Jun roll cost is near the richest we've seen for a non-Q4 roll in recent history. The S&P 500 has continued its upward momentum from the prior year setting new record highs and correspondingly 'buy-side' positioning in equity index futures is now in uncharted territory. Elevated financing costs are to be expected, but the key question is what happens to roll costs from here. In prior non-Q4 rolls with stretched positioning the roll has tended to have a ceiling in the low 40bps range, but the current roll has already breached well past that level. Also worth considering is the still volatile and elevated 'Leveraged' short position which is a phenomenon we find correlates with call-overwriting delta hedging. Heading into this expiry, short calls are likely deep in-the-money and should this continue to correlate with 'Leveraged' short positioning, then it would imply a significant portion of that short may not roll this expiry. Factoring this altogether, we see risks skewed towards further richening. Longs may benefit from spacing their rolls out to avoid crowding on flip-day.

Positioning says ESTX50 roll may richen but mind the divs

The current annualized cost of rolling long ESTX50 futures from Mar24 to Jun24 is 3bps rich to fair value (assuming cash is collateralized at 3m EURIBOR), a level in its 56th percentile since Q4-2012. This quarter risks are skewed towards richening, like was saw in the prior two, as our A account and trend follower positioning data indicate crowding on the long side. As this is a Q1, div risk is again important to the roll with 116.1 gross div points (81% of 2023 dividends) set to be paid this quarter with 7.8 expected to be announced prior to March expiry. Dividend futures have recently seen large moves, and we make note of the possibility of using total return futures to manage the dividend risk that comes with the roll. While dividends coming in below expectations could cheapen the roll, long rollers should still roll early to beat possible richening from long positioning.

Roll long Nikkei and Topix futures early

As of the 29 Feb close, the Nikkei (NK) and Topix (TP) rolls traded 4bps and 10bps rich to JPY TONAR rates (based on forecasted gross dividends of 283 and 26.8 index points), respectively. Both rolls are statistically rich (>90th 5yr %-ile), consistent with the positive sentiment towards Japanese stocks, with both indices trading near all-time highs. We think that long futures rollers should consider rolling early this quarter. While rolls are already statistically elevated, it seems likely that long rollers – who dominated during the last roll – will end up pushing roll costs even higher late this week or early next.

01 March 2024

Futures
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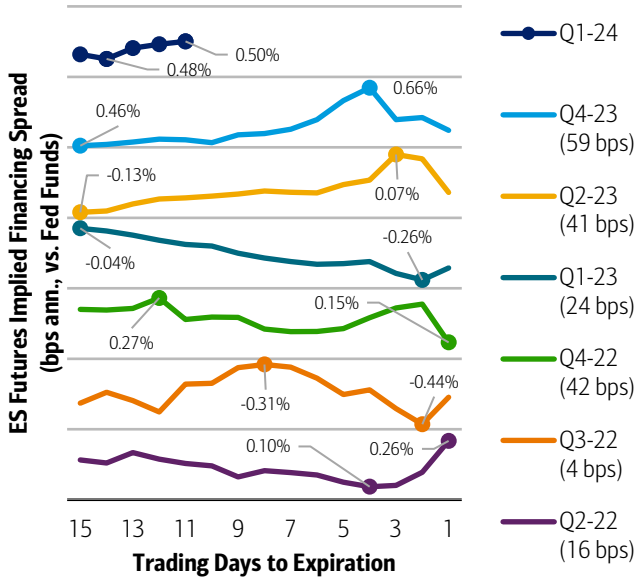
S&P 500 Mar-24/Jun-24 Futures Roll

S&P 500 futures roll snapshot

Exhibit 1: The evolution of S&P 500 futures quarterly roll implied financing spreads (vs. Fed Funds)
Volume weighted average for the quarter shown in legend



Source: BofA Global Research. Data as of 29-Feb-24.

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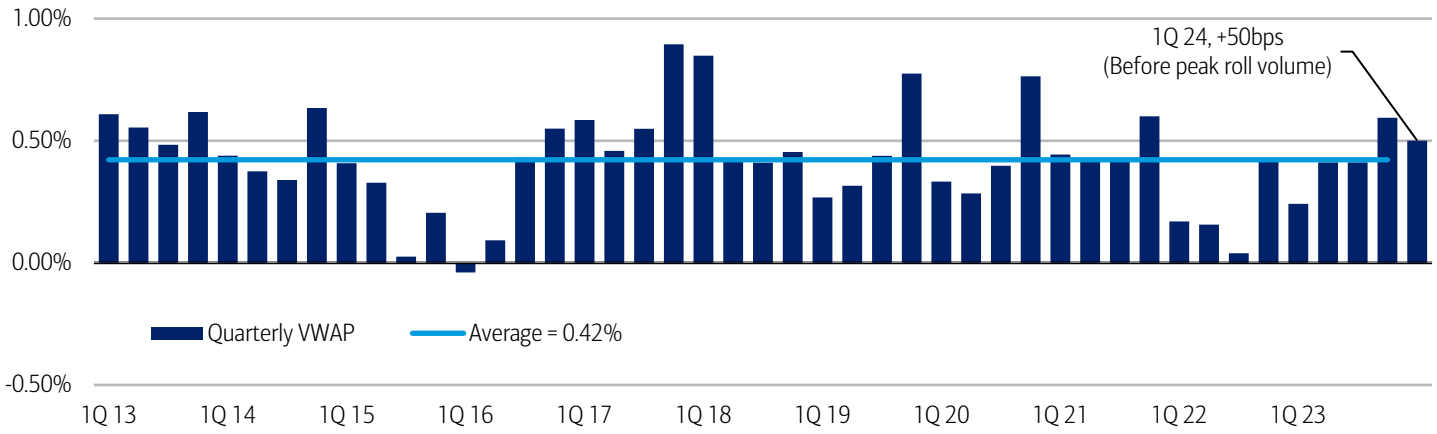
The Mar-24/Jun-24 S&P 500 (ES) futures roll is **currently trading +50bps** to Fed Funds forward implied rates and based on bottom-up forecasted gross dividends of **19.10 index points**. Over the last month, the calendar roll cost has traded between 45bps to 50bps rich. **Quarter-to-date**, the **volume weighted average** spread to fair value is **+48bps**. **Over the last four completed rolls** S&P 500 futures have on **average traded 41bps rich** to Fed Funds forward implied rates (+59bps, +41bps, +41bps, and +24bps, Exhibit 1).

Assuming **cash collateralized at Fed Funds forward implied rates**, the cost of holding S&P 500 futures from Mar-24 expiry through Jun-24 expiry is currently **+50 bps** annualized. Since 2013, S&P 500 futures on average traded 42bps rich (Exhibit 2). At current levels, the cost of rolling SPX futures ranks in the 85th percentile over all non Q4-rolls since 2013.

Exhibit 2: Longer term history of the cost of holding SPX futures each quarter (assuming cash collateralized at Fed Funds forward implied rates)
Quarterly spread cost is a VWAP of daily roll spread costs over the final 15 days of each quarter's roll. Current quarter before peak roll volume.



Source: BofA Global Research. Data as of 29-Feb-24.

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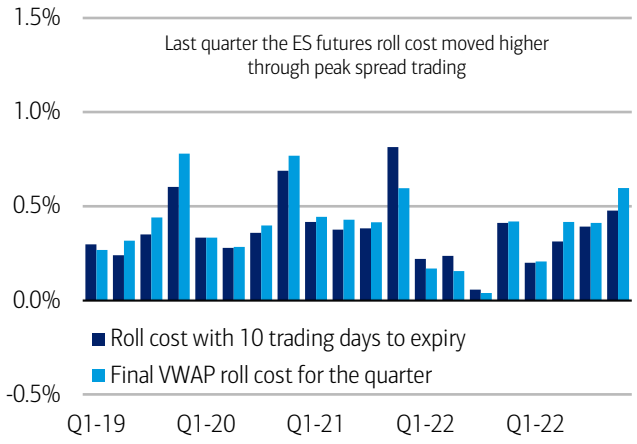
S&P 500 futures prior roll (Dec-23/Mar-24) review

Last quarter the roll richened 12bps through peak spread trading

Before peak spread trading last December, the cost of rolling S&P 500 futures was 48bps rich vs Fed Funds forward implied rates (Exhibit 3). In the final 10 days of spread trading the roll financing spread richened 12bps (Exhibit 4) and traded on average 60bps rich. In our roll report last quarter, we noted that the Dec/Mar roll was trading lower than we'd expect given it was a year-end. Some of the cheapness could have been due to less year-end funding pressure on the back of last summer's squeeze in longer-term financing. However, with the roll entering peak spread trading at what looked to be a floor, we thought the risks were skewed towards richening but perhaps not as dramatic of a squeeze that we've seen in other Q4 rolls in recent history.

Exhibit 3: S&P 500 quarterly roll financing spread (vs. Fed Funds) measured (1) with 10 days remaining for spread trading (2) on average over the entire quarter

Roll spread cost measured on average over the entire quarter is typically not too dissimilar from the cost as measured over the final 10 days as volume peaks into expiry



Source: BofA Global Research

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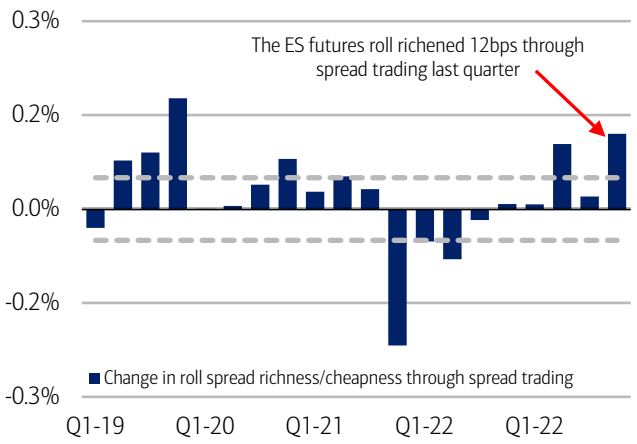
Exhibit 4: Change in SPX roll financing spread (vs. Fed Funds) measured as the difference between the average over the entire quarter and the cost with 10 trading days remaining for spread trading

Dashed lines represent +/- 5bps



Source: BofA Global Research

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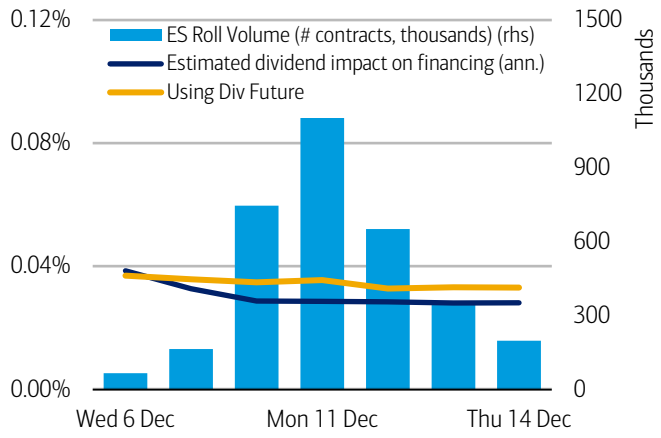
S&P 500 Dec/Mar divs coming in higher than forecasted

S&P 500 dividends from last December to this March expiry are on track to finish at 18.40 index points. When determining last quarter's ES roll cost of 59bps vs. Fed Funds, our bottom-up dividend estimate for roll dividends was lower at 18.06 index points while dividend futures priced in 18.00 index points. About one-third of the error came from META's dividend announcement in February.

The difference between what will likely be realized and our bottom-up estimate equates to 2.9bps annualized cost to last quarter's roll financing spread (Exhibit 5) bringing the roll cost to then 62bps rich. On the other hand, roll costs calculated last quarter using dividend futures estimates for divs would need to be adjusted higher 3.5bps. S&P 500 quarterly dividends have recently tended to come in higher than what was priced into dividend futures during the prior roll, representing a cost to long rollers who mark their rolls with dividend futures.

Exhibit 5: Last quarter S&P 500 dividend forecasts through peak spread trading

The forecast error in our bottom-up dividends from last quarter amounts to 3.5bps annualized cost in holding long Dec-23 futures



Source: BofA Global Research. Data through 29-Feb-24.

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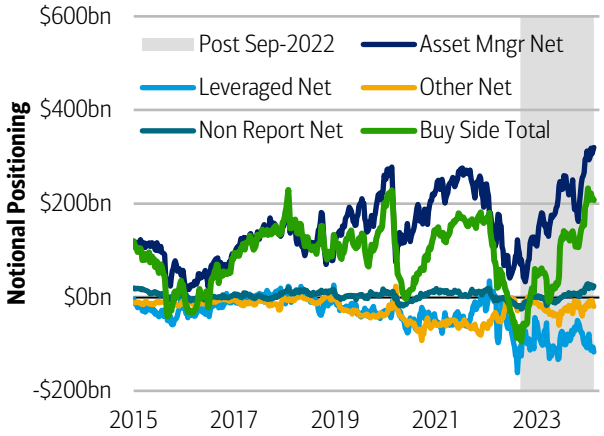
S&P 500 futures current roll (Mar-24/Jun-24) strategy

Equity index futures positioning stretched, ES roll rich

The S&P 500 has continued its upward momentum from the prior year setting new record highs and correspondingly 'Buy-side' positioning in equity index futures is now in uncharted territory (Exhibit 6). As we head into the upcoming Mar/Jun equity index futures roll period, S&P 500 e-mini futures are currently trading 48bps rich to Fed Funds which is at the high-end for a non-Q4 roll in recent history (Exhibit 8). Elevated financing costs are to be expected, given the level of positioning, the key question is what happens to roll costs this quarter.

In Q3 last year, we noted that roll costs may have a concave relationship with increasing levels of positioning and that non-Q4 rolls with stretched 'Buy-side' levels have tended to trade at around 40bps rich (Exhibit 7), but the current roll has already breached well past that level.

Exhibit 6: CFTC TFF net notional open interest for SPX, RTY, NDX, INDU, MID, EAFE, and EM contracts combined
Buy side positioning is elevated heading into the current roll



Source: BofA Global Research. Weekly data through 23-Feb-2024.

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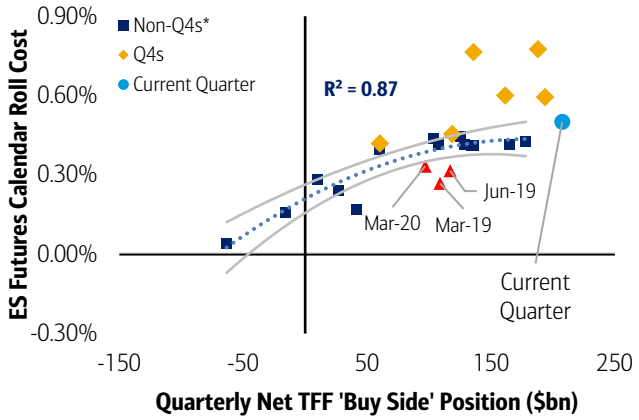
Also worth considering is the still volatile and elevated 'Leveraged' short position which is a phenomenon we correlated to call-overwriting delta hedging in last quarter's report. With short calls from overwriting likely in-the-money, a potentially significant portion of the 'Leveraged' short position could be from short futures hedging March expiring call options. If these futures are left to expire, then the absence of these short rolls could also add some upside to this quarter's roll cost.

Factoring this altogether, we see risks skewed towards further richening. Longs may benefit from spacing their rolls out to avoid crowding on flip-day.

Exhibit 7: SPX futures roll costs versus futures market positioning
Fourth quarter rolls tend to trade richer but this year roll costs are near the low end relative to the prior five Q4s



Source: BofA Global Research. Quarterly data from Q2-2018 through Q1-2024

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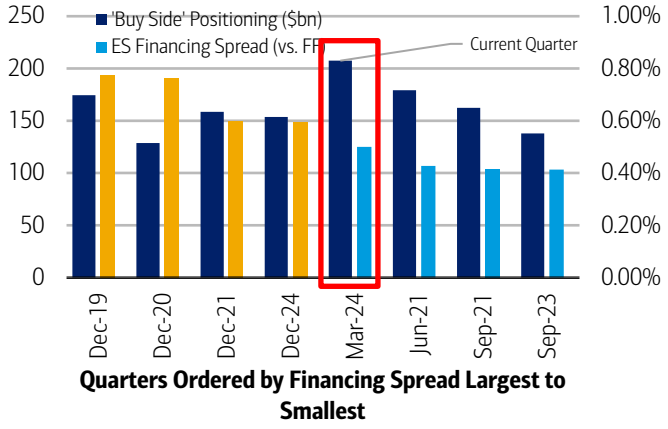
Exhibit 8: Dec/Mar ES roll cost and CFTC TFF Asset Mngr. positioning
The Dec/Mar roll has steadily cheapened since last expiry even despite the pickup in Asset Manager long positioning



Source: BofA Global Research

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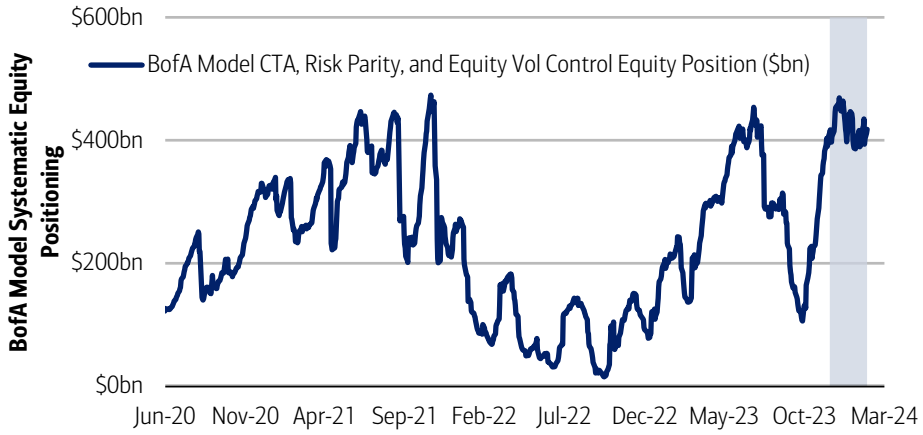
Systematic equity index positioning remains elevated

Based on our model for CTAs (trend followers), risk parity, and equity vol control, the combined global equity notional from this group of strategies remains elevated after rising sharply in December last year. Of the three, stretched CTA positioning is typically the most fragile and a pull-back in the S&P 500 could see trend-followers having to cover. If this happens before peak spread trading, then fewer longs could roll.

Exhibit 9: BofA model systematic equity positioning
Assumes $300bn in CTAs, $200bn in risk parity, and $200bn in equity vol control strategies, current quarter shaded



Source: BofA Global Research. Daily data from 30-Jun-21 through 27-Feb-24.

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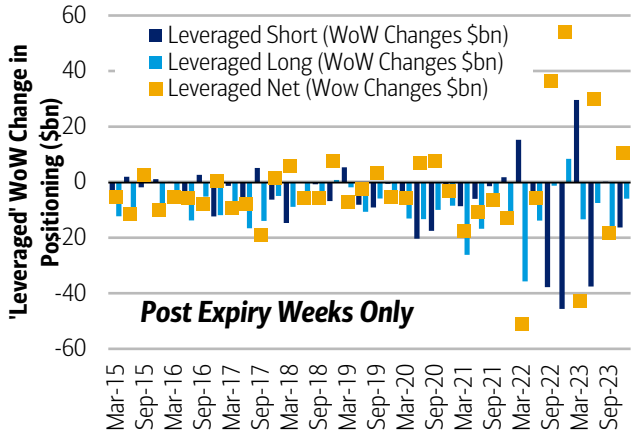
Levered *short* positioning remains volatile & correlated to call-overwriting delta

Last year we started focusing on the significant rise in the volatility of the 'Leveraged' category positioning data. We noted that large changes in 'Leveraged' shorts before and after quarterly expiries could have impacted roll costs. That is, if significant drops (or rises) in 'Leveraged' positioning were futures that were not rolled, then it could have led to a material change in the expected positioning heading into that quarter's roll cycle.

In last quarter's roll report we saw the story was more nuanced as the volatility in the 'Leveraged' data looked to be exclusively driven by 'Leveraged' *short* positions. In Exhibit 11 is the volatility of both the 'Leveraged' short and long series while in Exhibit 10 is the week-on-week change through expiry weeks for quarterly expiries since 2015. Post Sep-22 we see a significant rise in the volatility of only the 'Leveraged' short series, which has continued to-date, and as well in 5 out of the last 6 quarters a large change in 'Leveraged' short positioning through quarterly expiry.

Exhibit 10: 'Leveraged' week-on-week changes before and after quarterly futures expiry split into its respective short and long series
The Leveraged Short has seen more significant changes through expiry week with potential impacts on four of the last five expiries



Source: BofA Global Research. Weekly data through 23-Feb-2024.

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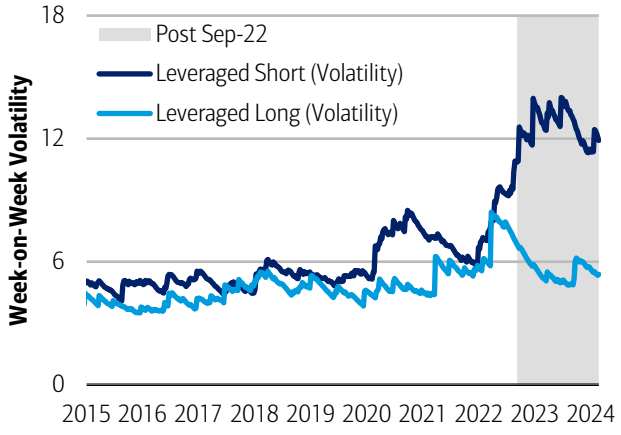
Exhibit 11: Volatility of week-on-week changes in CFTC TFF 'Leveraged' data split into its respective short and long series
The Leveraged Short position is dominating the volatility in the net series and the spike higher to a new regime was post Sep-22



Source: BofA Global Research. Weekly data through 23-Feb-2024.

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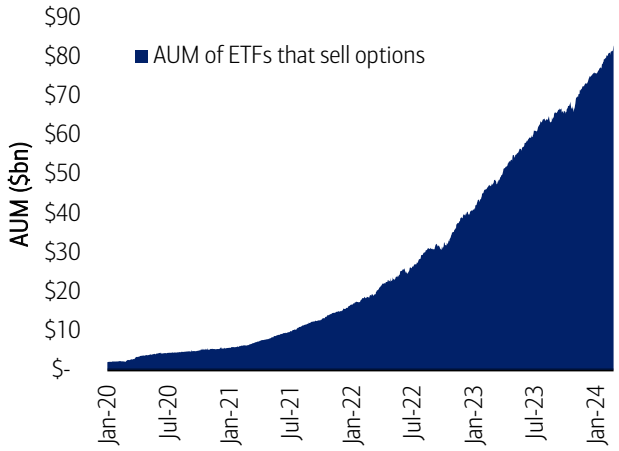
Correlation of 'Leveraged' shorts to call overwriting delta

As well last quarter we highlighted a potential link between the delta-hedging required for S&P 500 call overwriting programs and the changes in 'Leveraged' short positioning. Since Sep-22 and continuing through into this year we've seen a surge in call overwriting as evidenced by the growth of ETFs that sell options for yield or downside protection (Exhibit 12). This is directly relevant to the volatility in the 'Leveraged' short positioning data to the extent that (1) the market makers for the delta hedge on these products are lumped into the "Leveraged" category by the CFTC and (2) they are shorting S&P 500 futures to delta-hedge the short call options that underlie many of these programs.

Even if it's not directly the case, we've seen since Sep-22 a marked shift in the correlation of changes in 'Leveraged' short to changes in call overwriting delta positioning (Exhibits 13 and 14). As a reminder, TFF data is snapshot as of the close on Tuesdays.

Exhibit 12: Appetite has clearly surged for strategies that sell options for yield (or to fund downside protection)
Net assets of indicative ETFs that sell options for yield or to fund protection



Source: BofA Global Research. Data from Jan-20 to 23-Feb-2024.

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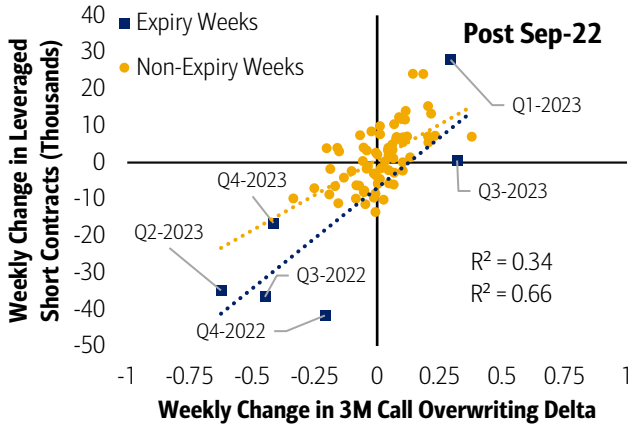
Exhibit 13: Change in 'Leveraged' short versus changes in 3M call overwriting delta since Sep-22
Weekly changes in 3M call overwriting deltas have correlated with changes in the increasingly volatile 'Leveraged' short position



Source: BofA Global Research. Weekly data from 6-Sep-22 to 20-Feb-24. 3M call strike set on quarterly expiry at 103%.

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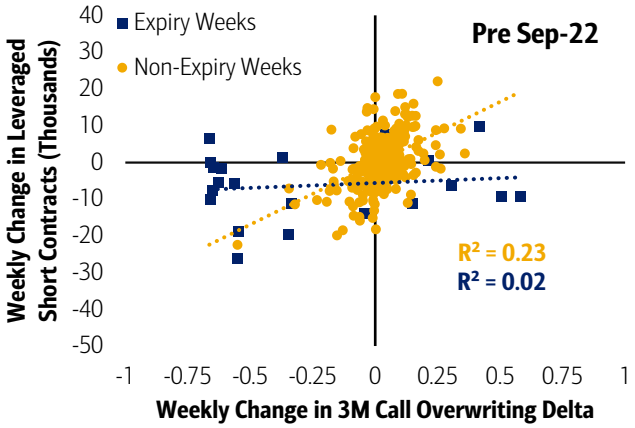
Exhibit 14: Change in 'Leveraged' short versus changes in 3M call overwriting delta before Sep-22
Weekly changes in 3M call overwriting deltas were less correlated to changes in the 'Leveraged' short position before Sep-22



Source: BofA Global Research. Weekly data from 28-Mar-17 to 30-Aug-22. 3M call strike set on quarterly expiry at 103%.

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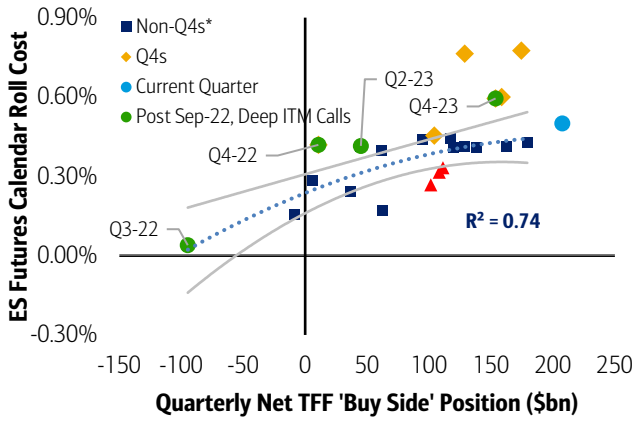
If we assume that indeed the 'Leveraged' short series large changes through expiry weeks are in part being driven by (or at least explained by) delta hedging of short call options, then the impact on roll costs is potentially as follows. For delta-hedges on short call options for whose expiries are the front expiry, if those calls are deep in-the-money (ITM), their hedge would create a large short position on Tuesday before expiry that potentially need not be rolled, creating a large drop in 'Leveraged' short data. Alternatively, if the call options are deep out-of-the-money (OTM), then their delta would be close to 0, creating less of a short position on Tuesday before expiry. However, should those positions be rolled into a new strike and expiry, then the delta would reset back to a higher level creating new shorts in the subsequent Tuesday's TFF report. The impact from deep ITM calls could be roll impacting as a large portion of the leveraged short wouldn't roll while the impact from deep OTM calls would not be roll impacting. Notably, in both cases, it would potentially create a large WoW change in the 'Leveraged' short series.

The classical futures roll cost versus positioning relationship is shown in Exhibits 15 and 16. In Exhibit 15 we snap positioning data on the Tuesday before expiry and find that since Sep-22, quarters in which call overwriting options finished deep ITM (Q3-22, Q4-22, Q2-23, and Q4-23 per Exhibit 13) each appear to outliers. In Exhibit 16 for those outlier quarters, we instead use their positioning from the Tuesday post expiry to account for the drop in 'Leveraged' short futures that may not have rolled and find each to be less of an outlier.

Looking at this quarter, the continued move higher in the S&P 500 could indicate that the delta in call overwriting strategies is deep in-the-money which would imply that once again we could expect a significant drop in the 'Leveraged' short position after expiry and more importantly that those short futures may not roll through spread trading.

Exhibit 15: SPX futures roll costs versus market positioning
Using positioning data as of the Tuesday before expiry, since Sep-22 quarters in which call overwriting options finished deep ITM (Q3-22, Q4-22, Q2-23, and Q4-23) appear as outliers



Source: BofA Global Research. Quarterly data from Q2-2018 through Q1-2024.
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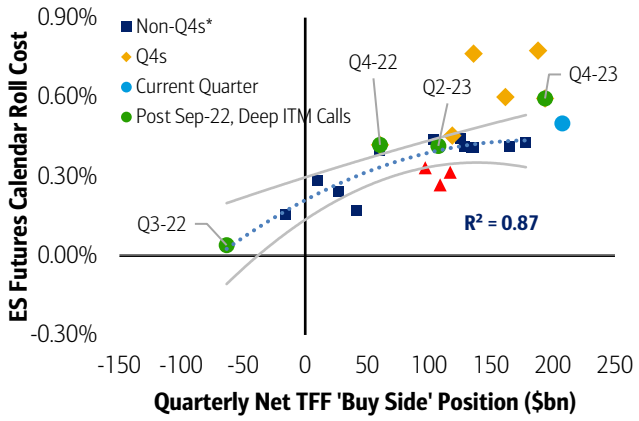
Exhibit 16: SPX futures roll costs versus market positioning
When using positioning data from the Tuesday post expiry, since Sep-22 quarters in which call overwriting options finished deep ITM (Q3-22, Q4-22, Q2-23, and Q4-23) are less an outlier



Source: BofA Global Research. Quarterly data from Q2-2018 through Q1-2024.
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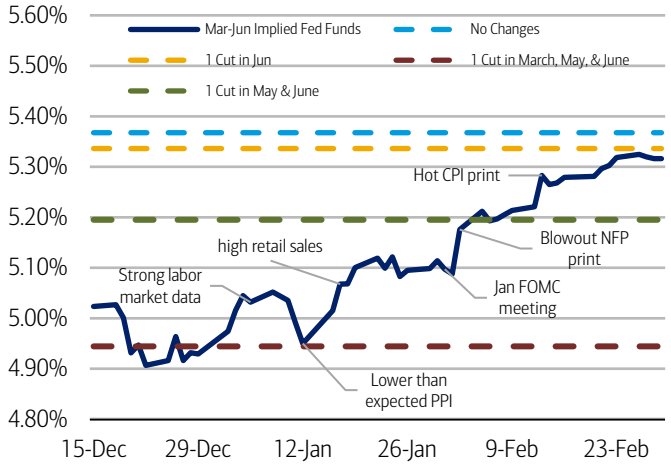
Low rates risk expected this quarter

Through 29-Feb, the Fed Funds futures market is implying a rate of 5.32% over the Mar/Jun S&P 500 futures period. In Exhibit 17 is the evolution of the Mar/Jun Fed Funds implied rate quarter-to-date as well as estimates of Fed Funds if any cuts are announced at the upcoming Fed meetings. This quarter the implied rate rose since December when more than one rate cut at the March, May, and June meetings were priced in to where we stand at present with just one cut in June priced in. In the interim, the market was pricing for cuts in May and June, but the CPI data for January took that off the table. Our economics team agrees stating that current inflation trends support the case for a June cut.

While the market consensus is that the Fed likely to cut rates in June, we have seen the implied rate be reactive to data prints this quarter, especially in upward moves. If a long roller projects that rates will remain at current levels after June, then it could be beneficial to hedge rate exposure. However, risk is limited since the June meeting is close to expiry.

Exhibit 17: Fed Funds implied rate over the Mar/Jun S&P 500 futures period
The Fed Funds futures market is currently pricing in one cut in June.



Source: BofA Global Research. Data as of 29-Feb-2024.
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We also note that the next NFP and CPI prints could induce roll impacting rate risk when they are released on March 8th and 12th, respectively.

S&P 500 bottom-up dividend estimate suggests limited dividend risk

Our bottom-up estimate for Mar/Jun S&P 500 dividends is 19.17 index points and in Exhibit 18 we decompose this dividend into portions that have been announced and forecasts without any growth in dividends and then the growth amount expected. For example, if a name is in-line for a dividend increase, we instead hold the amount paid by that name constant for one more period and then separate out the growth amounts into its own line item. Also in Exhibit 18 are special, inconsistent, and reinstatement dividends. Inconsistent dividends are from companies that do not pay with a particular pattern, and reinstatement dividends are from companies that have not paid dividends in at least 5 quarters. Notably, this quarter there are no projected special or reinstatement dividends which reduces the risk profile of Mar/Jun dividends. Exhibit 19 contains detail on the forecasted inconsistent dividends for the quarter.

Exhibit 18: Decomposition of next quarter's bottom-up S&P 500 dividend estimate

If a name is in-line for a dividend increase, we instead hold the amount paid by that name constant for one more period and then separate out the growth amounts into its own line item

Category	Amount
Announced	1.92
Forecasted without Growth	16.64
Forecasted Growth	0.22
Forecasted Specials	0.00
Forecasted Inconsistent Dividends	0.39
Forecasted Reinstatement Dividends	0.00
Bottom-Up Estimate (Total)	**19.17**
S&P 500 Jun Quarterly Dividend Future	**18.96**

Source: BofA Global Research. Data as of 29-Feb-2024. Inconsistent dividends are those that don't follow a particular payment pattern. Reinstatement dividends are those that have not paid for at least 5 quarters.

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Like last quarter, the bottom-up dividend estimate is higher than what is currently implied by the quarterly dividend future. Last quarter our bottom-up estimate was 18.12, and dividends are projected to finish at 18.40.

Exhibit 19: Inconsistent dividends expected to be included as index dividends in the next quarter

Unlike in recent quarters, this quarter is not projected to have any special or reinstatement dividends

			Forecasted Inconsistent Dividends					
Ticker	**Name**	**Sector**	**Ex-Date**	**Dividend**	**Index Points**	**Prior Div Date**	**Prior Div**	**Prior Div (Ind. Pts.)**
AMT	American Tower Corp	Real Estate	11-Apr-24	1.56	0.09	27-Dec-23	1.700	0.09
F	Ford Motor Co	Consumer Discretionary	23-Apr-24	0.15	0.07	15-Feb-24	0.180	0.08
FANG	Diamondback Energy Inc	Energy	8-May-24	1.78	0.04	4-Mar-24	3.080	0.07
COP	ConocoPhillips	Energy	16-May-24	0.78	0.11	15-Feb-24	0.780	0.11
AMT	American Tower Corp	Real Estate	13-Jun-24	1.57	0.09	27-Dec-23	1.700	0.09
				Total:	**0.39**		**Total:**	**0.45**

Source: BofA Global Research. Data as of 29-Feb-2024.

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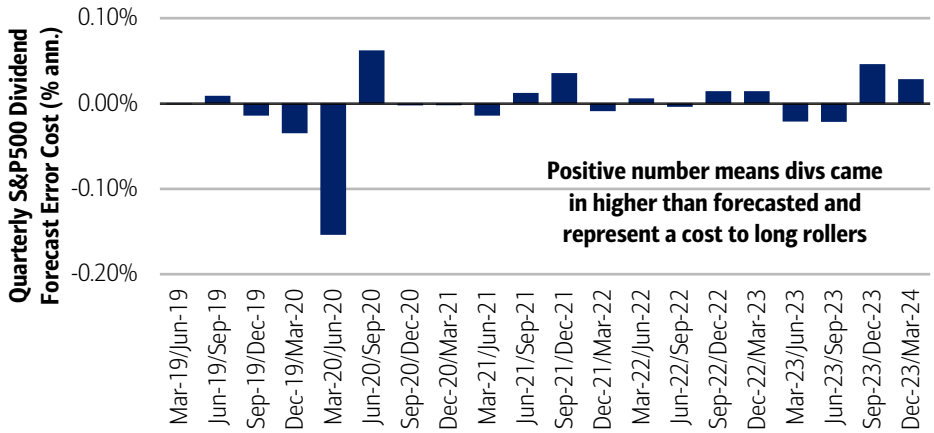
S&P 500 futures dividend forecast error history

Exhibit 20: Quarterly S&P 500 Dividend Forecast Error Cost (% annualized)

The average cost to longer ES futures holders over the prior one year (4 rolls) due to dividend forecast error has been 0.8 basis points. Assumes our bottom-up dividend forecasts and not levels given by div futures.



Source: BofA Global Research. Data as of 29-Feb-2024.

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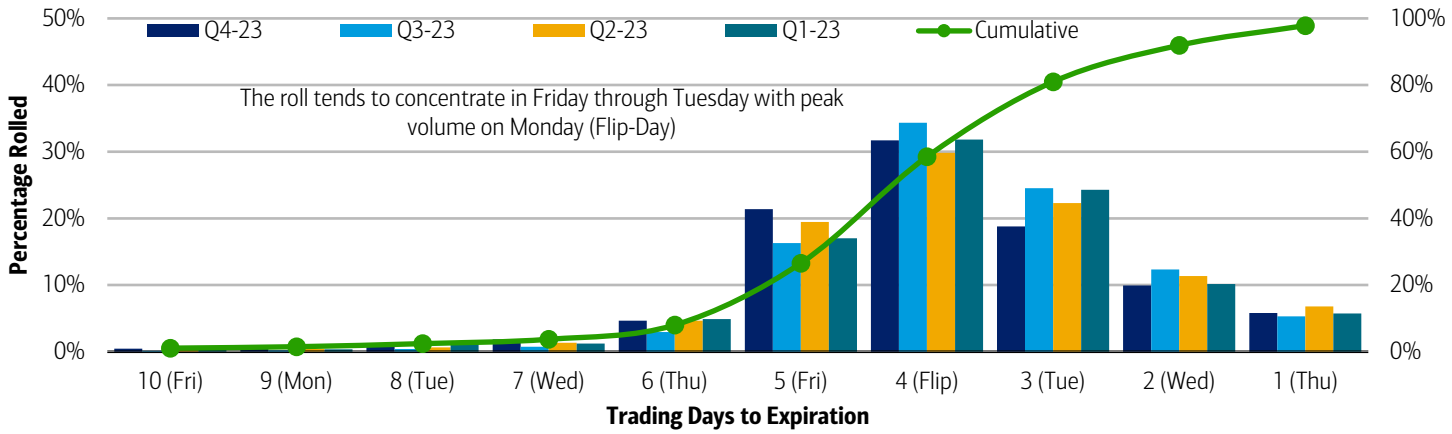
S&P 500 futures roll progression

Peak roll volume through last quarter's roll (Exhibit 21) came on the Monday of expiry week and in recent history peak volume typically had tended to fall on Monday. Starting in Q2-2022, the CME announced a change in the convention of "Flip Day" which now falls on the Monday of expiry week. As the CME noted in its press release, the change reflects the current observed trading patterns around the roll. Interestingly, since Q2-2022 we saw what appears to be a shift in volume from Friday before Flip Day to Tuesday of expiry week. Also, in general we believe short rollers tend to come in on Flip Day waiting for peak volume and in expectation of this long rollers have also concentrated their volume.

Exhibit 21: Percentage of S&P 500 futures roll volume 10 trading days to expiry over the prior four quarters
Roll volume peaks on Flip Day with Friday and Tuesday then dominating volume



Source: BofA Global Research

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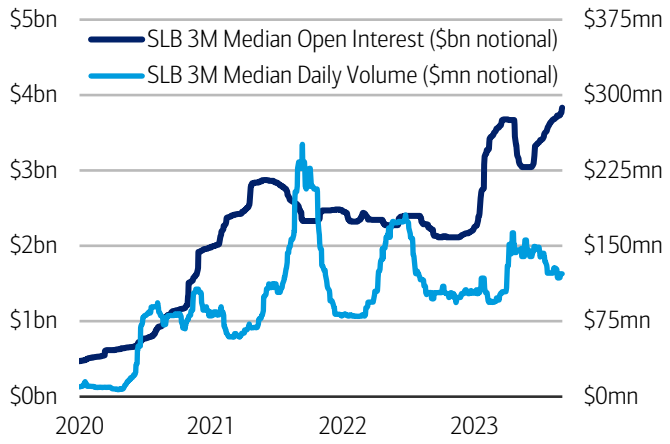
S&P 500 ESG Futures Implied Financing

S&P 500 ESG futures launched in November 2019 and have seen 3M median notional open interest grow to nearly $4 billion. Over the last quarter, 3M median open interest increased by about $800 million to about $3.8 billion but daily volume decreased to about $125 million (Exhibit 22). For background, the S&P 500 ESG index is constructed such that overall industry group weights are similar to the S&P 500 and therefore its return profile is comparable to that of the S&P 500. The S&P 500 ESG index uses the S&P DJI ESG Scores and other ESG data to select companies, targeting 75% of the market capitalization of each GICS industry group within the S&P 500. The S&P 500 ESG Index excludes tobacco, controversial weapons, and companies not in compliance with the UN Global Compact (UNGC). In addition, those with S&P DJI ESG Scores in the bottom 25% of companies globally within their GICS industry groups are excluded.

Regarding financing rates, given the significant overlap in exposure, we would expect to see S&P 500 ESG futures roll richness/cheapness to trade in-line with that of S&P 500 futures. Indeed, we saw this last quarter when S&P 500 and ESG rolls traded at 60bps and 59bps rich to Fed Funds, respectively.

Exhibit 22: S&P 500 ESG futures open interest and turnover
Over the last quarter open interest in ESG futures increased



Source: BofA Global Research. Based on daily data from 1-Jul-20 to 28-Feb-24

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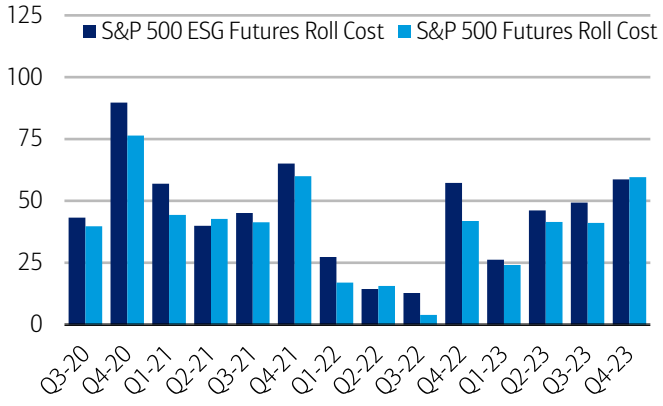
In Exhibit 23, we show the average quarterly roll costs (vs. Fed Funds) for both the S&P 500 ESG futures (ticker SLB) and the S&P 500 futures (ticker ES) since Q3-20. Then in Exhibit 24 is the pace of the roll through peak spread trading. The ESG roll tends to trade in-line with that of S&P 500 futures but often at a slight premium. Tuesday now dominates ESG futures roll volume as it saw over 50% of last quarter's roll traded.

Exhibit 23: S&P 500 ESG futures roll implied financing spread history
Last quarter S&P ESG futures traded slightly cheaper than S&P 500 futures



Source: BofA Global Research. Financing spreads versus Fed Funds.

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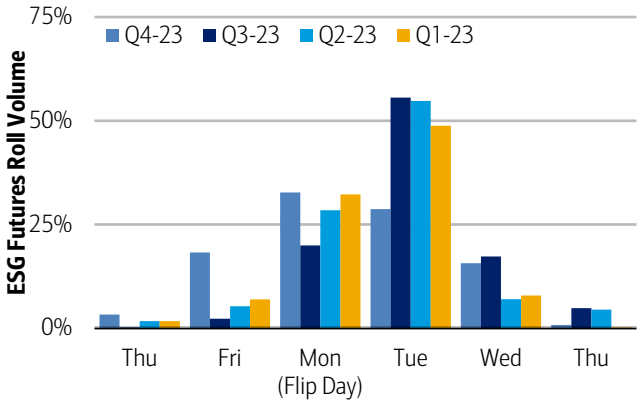
Exhibit 24: S&P 500 ESG futures roll pace
Roll volume for ESG futures has peaked on Monday last quarter with a significant portion trading on Friday as well



Source: BofA Global Research

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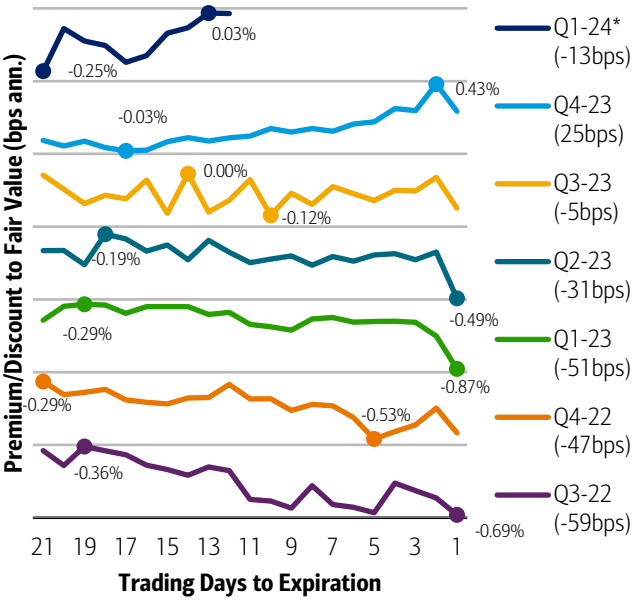
EURO STOXX Mar-24/Jun-24 Futures Roll

ESTX50 futures roll snapshot

Exhibit 25: The evolution of ESTX50 futures quarterly roll spread (net divs) richness/cheapness over the current roll and last 6 quarters
Rolling period = 15 days for historical rolls; 21 days for current roll.



Source: Data as of 28-Feb-24. *Data before completion of quarterly roll spread trading.

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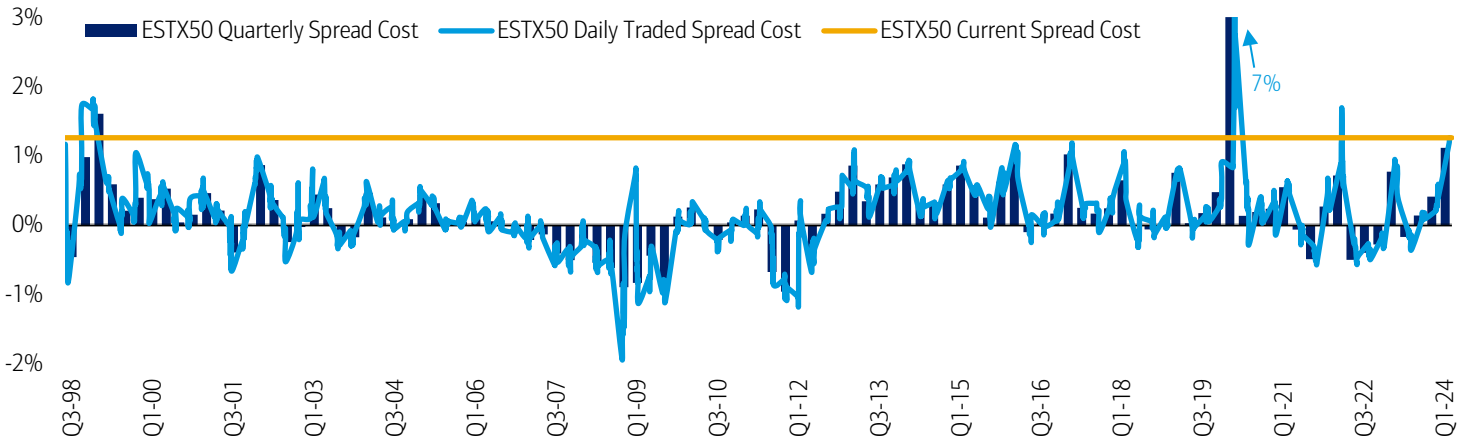
The Mar/Jun24 ESTX50 futures roll is **currently trading 3bps rich** to Jun EUR deposit rates (based on forecasted dividends of 116.1 index points). During the current roll period, the calendar roll cost has traded between 25bps cheap and 3bps rich. **Quarter-to-date**, the **volume weighted average discount** to fair value is **13bps**. **Over the last four completed rolls** ESTX50 futures have on **average** traded **16bps cheap** (+25bps, -5bps, -31bps, and -51bps).

Assuming **cash collateralized at 3m EURIBOR**, the cost of holding ESTX50 futures from the Mar24 expiry through the Jun24 expiry is currently **126bps rich** annualized (gross divs). **Since 1998**, the **average quarterly cost** of holding ESTX50 futures **was 18bps rich** (again gross divs). However, **when accounting for the regime change** in equity financing **that started in 2013**, ESTX50 futures on average **traded higher at 39bps rich**. At current levels, the cost of rolling ESTX50 futures ranks in the 98th percentile since 1998 and at its 98th percentile since 2013 (Exhibit 26). Q1 rolls typically screen rich in gross terms due to the concentration of ESTX50 dividend payments in the March to June period, which we discuss below.

Exhibit 26: The Q1-24 roll is currently trading 126bps rich to fair value (gross divs). This is in the 98th percentile for a roll since the 2013 regime change
Quarterly spread cost is a VWAP of daily roll spread costs over the final 15 days of each quarter's roll. Daily spread costs shown for the final 15 days of each quarter.



Source: Data as of 28-Feb-24.

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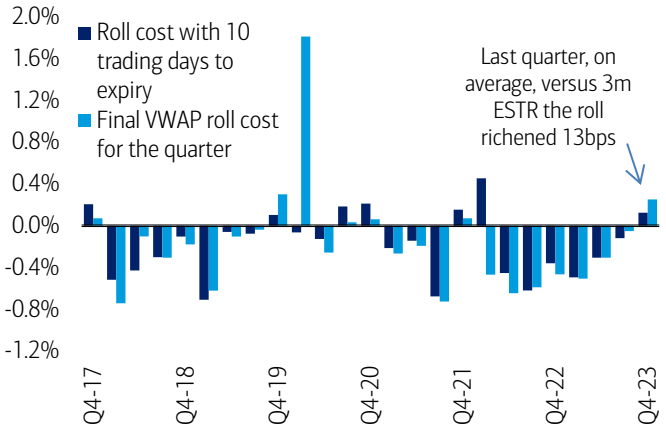
ESTX50 futures prior roll (Dec23/Mar24) review

The roll richened through peak spread trading again last quarter

The cheapest that the Dec23 ESTX50 roll traded was about 3bps cheap to fair value with 17 trading days to expiration, well before any significant roll volume went through. The roll gradually richened through peak spread trading reaching a high of 43bps rich with two days to expiration. The Dec/Mar roll ended with a final VWAP roll cost of 25bps rich making it the richest roll in recent years. This was the second quarter in a row where the final VWAP of the roll was richer than where the roll was trading with 10 days to expiry, meaning that long rollers who waited were again disappointed (Exhibit 28). The source of richening wasn't expected and may have come from larger Q4 balance sheet constraints as investors clamored for long exposure to global equities in the rally leading to expiration.

Exhibit 27: Between 10 days from expiry vs the final VWAP of the roll, the Dec23 roll richened 13bps
ESTX50 quarterly roll spread cost measured (1) with 10 days remaining for spread trading (2) on average over the entire quarter



Source: Data from Dec-17 to Dec-23.

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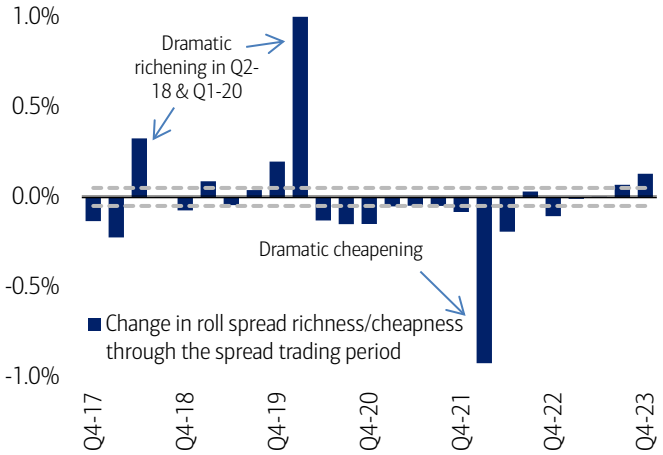
Exhibit 28: Richening/cheapening into the end of the roll
Measured as the difference between the average over the entire quarter and the cost with 10 trading days remaining for spread trading



Source: Data from Dec-17 to Dec-23.

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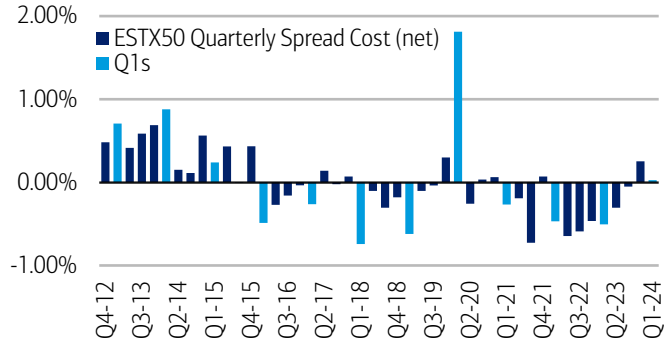
ESTX50 futures current roll (Mar24/Jun24) strategy

With positioning elevated, risks are skewed toward the Mar/Jun roll richening, as the prior two quarterly rolls did. Typical for Q1s dividend risk is elevated, but total return futures can help.

The cost of rolling long Mar24 ESTX50 futures to Jun24 futures is currently +3bps annualized, using *net* divs and assuming that collateralized cash earns 3m EURIBOR – with *gross* divs, the cost is +126bps. With *net* dividends, this roll is trading above median levels, standing in its 56th percentile since Q4-12. Using net divs, we would expect this roll to trade cheaper than last quarter when the final VWAP was 25bps rich simply because it is not a Q4, but that does not mean that this roll lacks room to richen. In fact, we expect that risks are skewed toward richening going into peak spread trading even though this roll is trading richer than any Q1 roll since 2020 (Exhibit 29).

Exhibit 29: The Mar roll is currently in its 56th %ile since '13 (net divs)
Quarterly VWAP roll cost (net divs) over final 15 days of each quarter's roll



Source: Data as of 28-Feb-24

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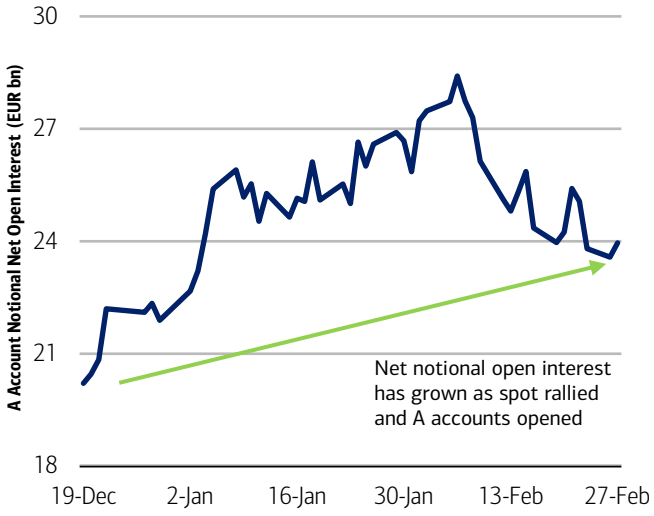
Long positioning has grown since December

The increased long positioning that came with the continued rally since December expiry is a major factor contributing to our call that the roll may richen. Sentiment has risen with 78% of European investors now expecting upside for European equities over the next year, a two-year high for our European Fund Manager Survey. Indeed, we have seen this reflected in our A account and trend follower positioning data. A accounts have significantly added to long positions over the quarter, as we show in Exhibit 30. Additionally, A account positioning is now much less balanced than it was in December which could contribute to richening with a lack of liquidity for long rollers. Finally, we noted in our latest Systematic Flows Monitor that EURO STOXX 50 CTA positioning is in its 97th percentile over the last 10 years, meaning that trend followers have likely added onto long positioning and will need to roll their futures unless spot declines to about 4873, our stop-loss level as of our 23-Feb report.

As shown in Exhibit 6 global positioning is also at levels not seen in recent years. Market makers accommodating global demand for balance sheet use could be a factor outside of Europe that richens this quarter's roll.

Exhibit 30: Net A account open interest has become more long this quarter
Net Mar-24 VG A account notional open interest this quarter



Source: BofA Global Research & Deutsche Borse. Data from 19-Dec-23 to 27-Feb-24.
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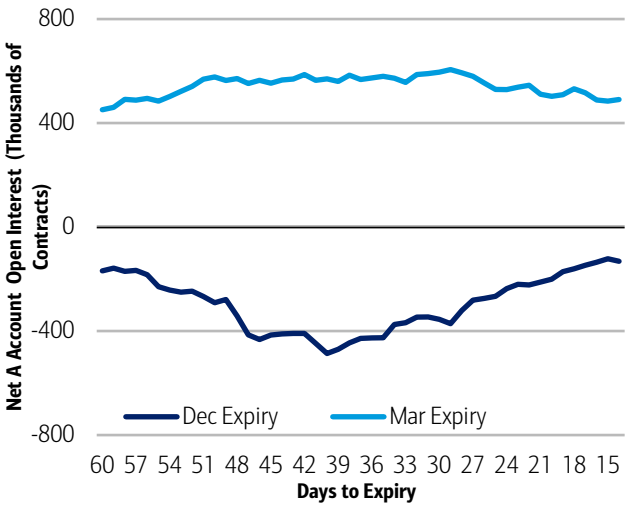
Exhibit 31: A Account open interest is significantly less balanced than it was at this time last quarter
Net VG A account open interest this quarter compared to last quarter



Source: BofA Global Research & Deutsche Borse. Data from 25-Sep-23 to 27-Feb-24.
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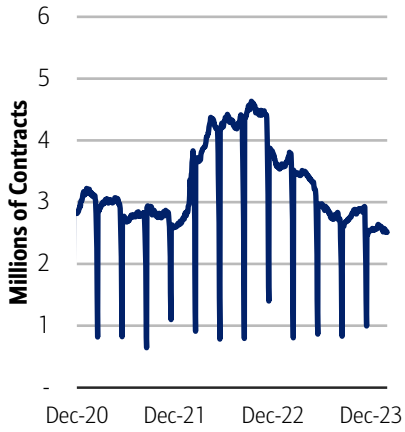
A note on open interest

When looking at positioning ahead of the roll, many market participants have relied on open interest data as shown in Exhibit 32 for one metric to gauge how much positioning could impact the roll. While this measure currently indicates that open interest is low, it provides an incomplete picture that does not consider Total Return Futures (TRFs). Since their launch in 2017, TRFs have grown to about €86 bn notional open interest, which is 40% of the total price return and TRF EURO STOXX 50 futures notional open interest (Exhibit 33). TRFs are especially useful to mitigate dividend risk, which we will discuss in the following section, as they are listed instruments (VHO for ESTX50) that replicate the payoff portfolio of a total return swap. Although VHO liquidity exists beyond the nearest quarterly expiry, its aggregate open interest still matters for the roll as it represents another use of market makers' balance sheets. While VG open interest has fallen by about 300 thousand contracts, likely as shorts were covered, the total notional open interest on of ESTX50 futures is actually very close to where it was in Dec (Exhibit 344). This is of course due to the rise in spot that we've seen over the last 3 months, but the point stands that VHO notional should be considered when assessing open interest's roll impact.

Exhibit 32: Current VG open interest is at the lowest levels seen since 2021
VG1 Open interest



Source: BofA Global Research & Bloomberg. Data from 31-Dec-20 to 28-Feb-24.

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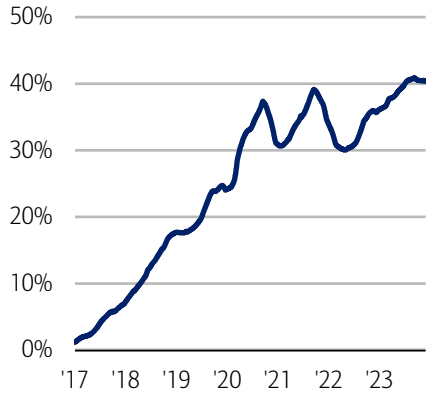
Exhibit 33: VHO (TRF) now accounts for 40% of total notional ESTX50 futures OI
VHO notional open interest as a percentage of VG & VHO total notional open interest (3m MA)



Source: BofA Global Research. Data from 3-Jan-17 to 28-Feb-24.

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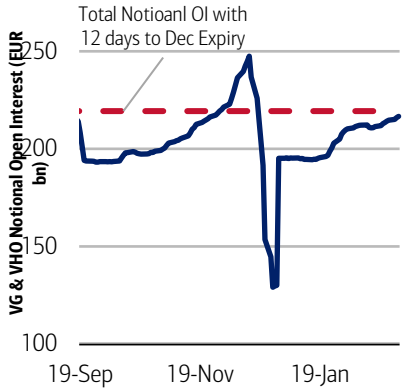
Exhibit 34: Total VG & VHO notional open interest this roll is near Dec levels
5 day rolling average of VG & VHO notional open interest



Source: BofA Global Research. Data from 3-Jan-17 to 28-Feb-24.

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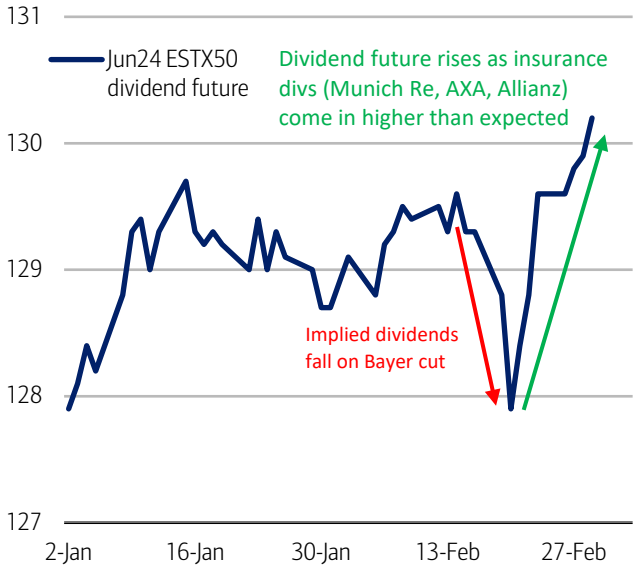
Finally, it is critical to note the open interest shown in Exhibit 32 includes all account types, agent, market marker, and proprietary accounts. We limit our analysis to Agent (A) accounts in the prior section because those accounts trade on behalf of customers and will have the greatest impact on the roll.

ESTX50 futures dividend risks and update on forecasts

Exhibit 35: ESTX50 implied dividends have seen drastic moves recently
Jun24 ESTX50 dividend future



Source: BofA Global Research & Bloomberg. Data from 2-Jan-24 to 29-Feb-24.

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Typical for Q1s, this roll comes with dividend risk

The ESTX50 Jun24 contract currently carries 116.1 gross div points (81% of dividends paid in 2023) while the Mar23 contract carries 0.0 div pts. There are currently 12.7 div points (26bps as a ESTX50 level) of unconfirmed divs in this bucket with 7.8 set to be announced prior to the March expiry, suggesting material dividend risk for the Q1 roll (Exhibit 36). Dividends coming in higher than expected can richen the roll and vice versa.

Dividends have recently seen some surprises as shown in Exhibit 35. Dividend futures or TRFs can be used to hedge against increased roll costs from dividend changes. TRF holders participate in both the price performance and dividend returns of the underlying index, which eliminates the risk that dividends come in higher than what is locked in during the roll. Without a dividend hedge, the recent rapid recovery in implied dividends should provide long rollers with another reason to roll early, effectively locking in higher dividends through the roll, in case some of the 7.8 index points set to announce before expiry disappoint.

Divs came in as slightly lower Dec23/Mar23 roll decreasing roll costs

During the prior roll period last Dec, forecasted ESTX50 Q1 dividends were 13.9 pts. As of 29-Feb-24, dividends are on target to finish at 13.8 (13.8 paid through 29-Feb-23 with 0.0 remaining to be paid). This slight over-prediction represents a decrease in cost of 1bps (annualized) to long rollers from the prior roll.

Exhibit 36: ESTX50 stocks yet to confirm dividends that can impact roll spread trading
There are 7.8 div points at risk from companies announcing Jun-24 divs before the Mar-24 expiry

Ticker	Forecasted Ex-Date	Dividend	Div Points	Declaration Date*
VOW3 GY	30-May-24	9.2	2.7	13-Mar-24
DHL GY	6-May-24	1.9	2.4	6-Mar-24
SGO FP	10-Jun-24	2.1	1.5	29-Feb-24
ABI BB	7-May-24	1.0	1.2	29-Feb-24
ITX SQ	29-Apr-24	0.7	1.0	13-Mar-24
ADS GY	17-May-24	0.7	0.2	13-Mar-24

Source: Data as of 29-Feb-24. * Ex-date and declaration date are both estimated by Bloomberg

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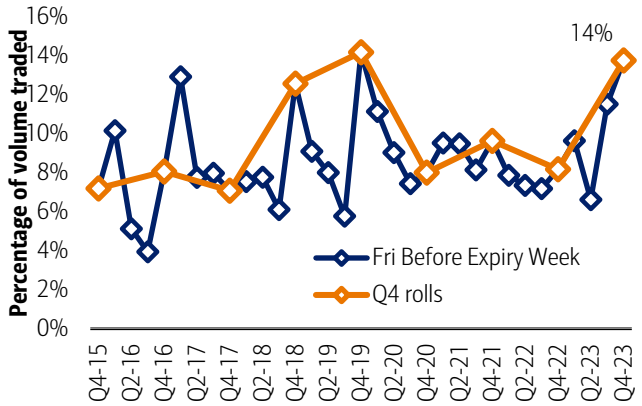
ESTX50 futures roll progression

Exhibit 37: The Dec roll saw the highest concentration
14% of the roll traded on the Friday prior to expiry, the greatest concentration since Q4-19



Source: Data from Dec-15 to Dec-23.

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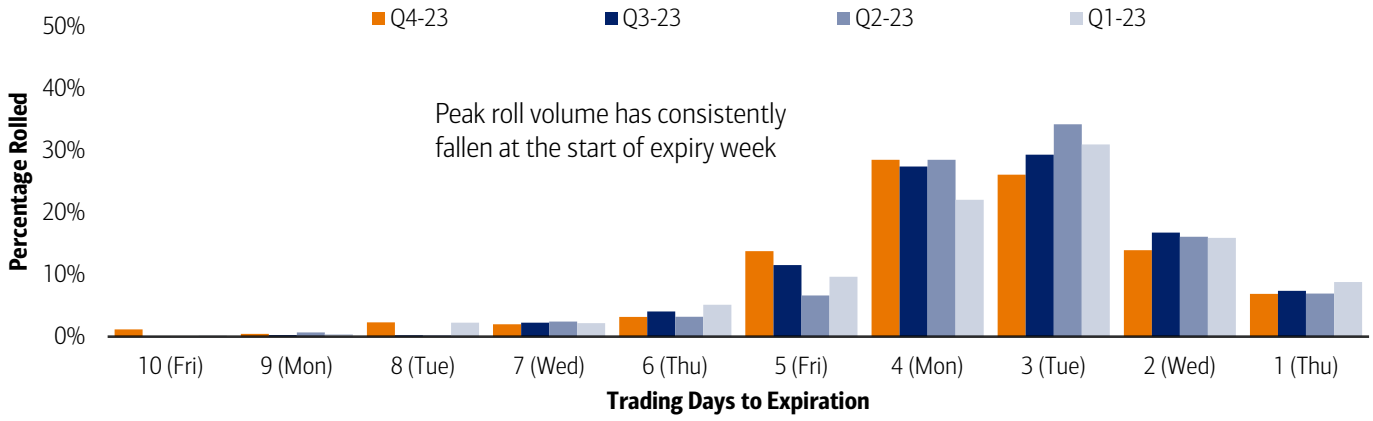
The Dec-23 ESTX50 roll saw an uptick in roll volume on the Friday prior to expiry with 13.8% of the roll trading compared to 12% in the prior quarter and 8% in the prior Q4 (Exhibit 37). This was the most to trade on a Friday before expiry since Q4-19 when 14.2% of the roll traded There was also some early trading on the prior Friday and Tuesday that has not been seen in recent quarters. However, the bulk of the roll again traded on Monday and Tuesday prior to expiry with 29% and 26% of the roll's volume going through on each of those days, respectively (Exhibit 38). This is right on the 55% average that we have seen since Q1-20. Last quarter was the second one in a row to see the roll richen into the end of the roll (Exhibit 28), which could explain the increased early roll volume.

Exhibit 38: Percentage of ESTX50 futures roll volume traded n trading days to expiry over the prior four quarters
Peak roll volume typically falls on the Tuesday of expiry week



Source: Data from Mar-23 to Dec-23.

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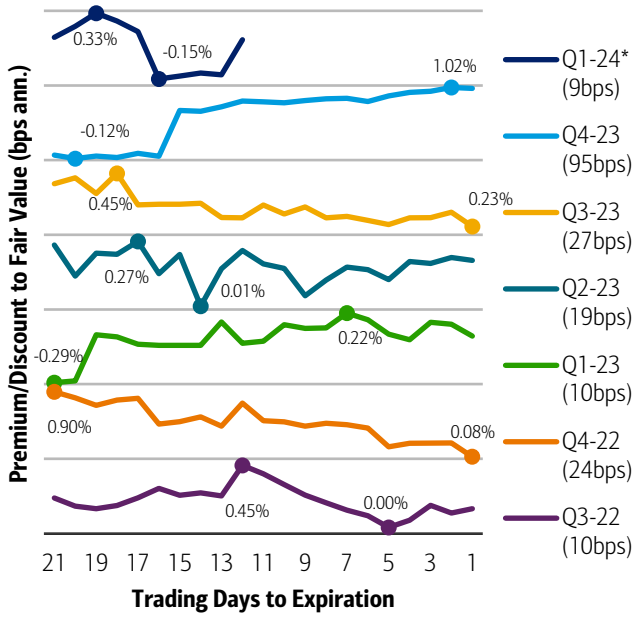
FTSE 100 Mar-23/Jun-24 Futures Roll

FTSE futures roll snapshot

Exhibit 39: The evolution of FTSE futures quarterly roll spread (gross divs) richness/cheapness over the current roll and last 6 quarters
Rolling period = 15 days for historical rolls; 21 days for current roll



Source: Data as of 28-Feb-24. *Data before completion of quarterly roll spread trading.

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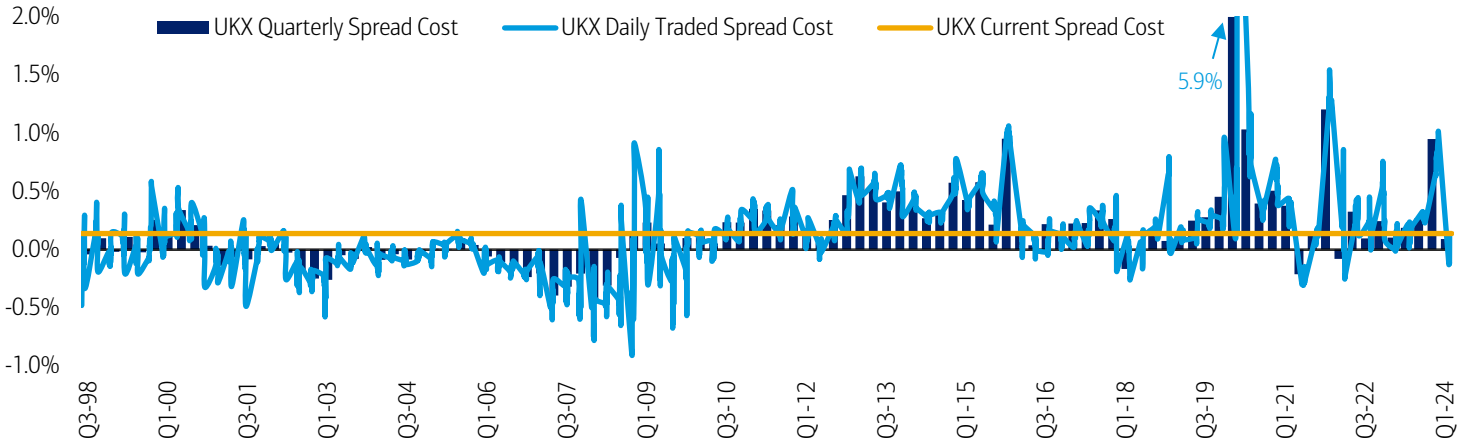
The Mar/Jun24 FTSE futures roll is **currently trading 14bps rich** to Jun GBP deposit rates (based on forecasted dividends of 82.7 index points). During the current roll period, the calendar roll cost has traded between 15bps cheap and 33bps rich. **Quarter-to-date**, the **volume weighted average premium** to fair value is **9bps**. **Over the last four completed rolls** FTSE futures have on **average** traded **38bps rich** (95bps, 27bps, 19bps, and 10bps), dating to last year's Q1 Mar/Jun roll.

Assuming **cash collateralized at 3m LIBOR**, the cost of holding FTSE futures from the Mar24 expiry through the Jun24 expiry is currently **14bps** annualized (gross divs). **Since 1998**, the **average quarterly cost** of holding FTSE futures **was 19bps rich** (again gross divs). However, **when accounting for the regime change** in equity financing **that started in 2013**, FTSE futures on average **traded higher at 42bps rich**. At current levels, the cost of rolling FTSE futures ranks in the 56th percentile since 1998 and in the 26th percentile since 2013.

Exhibit 40: The Q1-24 roll is currently trading 14bps rich to fair value (gross divs), this ranks in the 26th percentile since the 2013 regime change
Quarterly spread cost is a VWAP of daily roll spread costs over the final 15 days of each quarter's roll. Daily spread costs shown for the final 15 days of each quarter



Source: Data as of 28-Feb-24.

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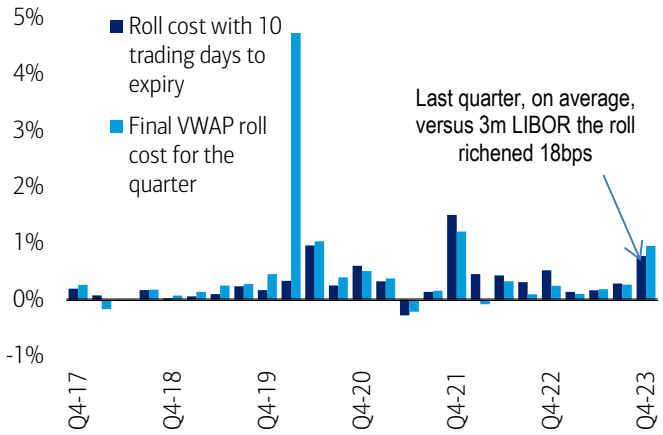
FTSE futures prior roll (Dec-23/Mar-24) review

Dec23 roll richened through peak trading

The Dec23 FTSE saw dramatic richening with 15 days to expiry going from trading 9bps cheap to 65bps rich in one day from growth in dividend expectations. From there, the roll continued to richen as volume increased. The roll traded at its richest, 102bps rich to fair value, 2 trading days before expiration (Exhibit 39). The roll was trading at 77bps rich with 10 days to expiry and richened as the bulk of the roll was traded to reach a VWAP of 95bps rich (Exhibit 411). This was the most richening from 10 days to expiry to the final VWAP roll cost for a roll in recent years (Exhibit 422).

Exhibit 41: Between 10 days from expiry vs the final VWAP of the roll, the Jun23 roll richened 2bps

FTSE quarterly roll spread cost measured (1) with 10 days remaining for spread trading (2) on average over the entire quarter



Source: Data from Dec-17 to Dec-23.

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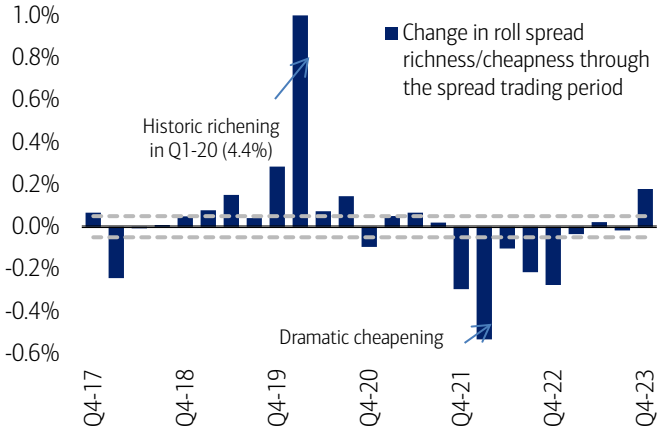
Exhibit 42: Richening/cheapening into the end of the roll

Measured as the difference between the average over the entire quarter and the cost with 10 trading days remaining for spread trading



Source: Data from Dec-17 to Dec-23.

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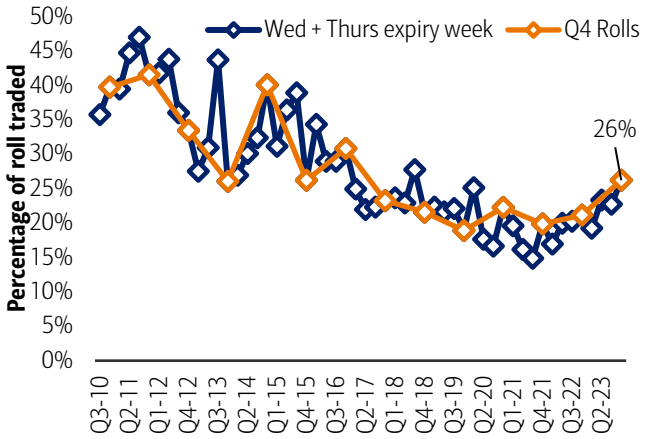
FTSE futures roll progression

Dec23 roll saw an increase in early trading

Exhibit 43: Late trading was high versus recent history

26% of the Dec23 FTSE roll traded on the Wednesday and Thursday of expiry week, the most since Q3-18



Source: Data from Jun-10 to Sep-23.

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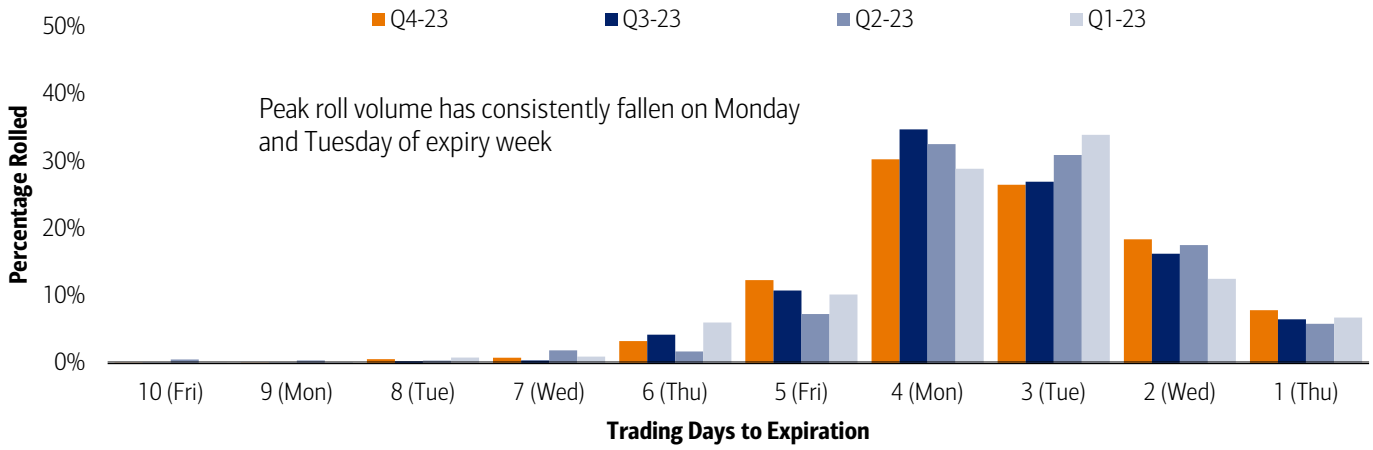
The majority of the roll was again traded on Monday and Tuesday of expiry week with 57% of roll volume going through on those two days (Exhibit 444). However, this was lower than the post-Covid average coming into the roll of 65% and it was the first time since Q2-22 that less than 60% of the roll traded on Monday and Tuesday. Notable, last quarter saw an increase in early trading with Wednesday and Thursday in expiry week accounting for 26% of roll volume. This was the most since Q3-18 (Exhibit 43). Long rollers were not rewarded for waiting as the roll traded at its peak on Wednesday at 102bps rich, as noted above.

Exhibit 44: Percentage of FTSE futures roll volume traded n trading days to expiry over the prior four quarters
Peak roll volume typically falls on the Monday and Tuesday of expiry week



Source: Data from Mar-23 to Dec-23

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FTSE futures dividend risks and update on forecasts

Notable dividend risk for the FTSE Mar24 roll

The expected dividends between the Mar24 and Jun24 expiries sum to 83.1 div points (28% of 2023 divs). Dividends which are yet to be confirmed and going ex between the two expiries sum to 54.5 div points. There is risk of these dividends richening (by beating expectations) or cheapening (by missing expectations) the roll as there are currently 12.2 dividend points (16bps as a FTSE level) slated to be announced before the Mar23 expiry.

Lower divs than our Dec/Mar forecast decreases roll costs

During the prior roll period last Dec, forecasted FTSE Q1 dividends were 94.0pts. As of 29-Feb-24, dividends are on target to finish at 88.5 (45.6 paid through 28-Nov-23 plus 42.9 remaining to be paid). This over-prediction represents a decrease in cost of 29bps (annualized) to long rollers from the prior roll.

Exhibit 45: FTSE stocks yet to confirm dividends that can impact roll spread trading
There are 12.2 div points at risk from companies announcing Jun-24 divs before the Mar-24 expiry

Ticker	Forecasted Ex-Date	Dividend	Div Points	Declaration Date*
LGEN LN	25-Apr-24	0.14	3.41	6-Mar-24
AV/ LN	11-Apr-24	0.22	2.42	7-Mar-24
LSEG LN	2-May-24	0.80	1.44	29-Feb-24
PHNX LN	28-Mar-24	0.27	0.78	14-Mar-24
INF LN	20-Jun-24	0.10	0.55	8-Mar-24
RTO LN	11-Apr-24	0.05	0.54	7-Mar-24
PSN LN	13-Jun-24	0.40	0.51	12-Mar-24
ITRK LN	23-May-24	0.75	0.48	5-Mar-24
ADM LN	9-May-24	0.39	0.48	8-Mar-24
PSON LN	21-Mar-24	0.16	0.45	1-Mar-24
SPX LN	18-Apr-24	1.17	0.34	7-Mar-24
CTEC LN	4-Apr-24	0.04	0.23	6-Mar-24
IMI LN	4-Apr-24	0.19	0.20	1-Mar-24
RMV LN	25-Apr-24	0.05	0.18	1-Mar-24
MKS LN	23-May-24	0.02	0.16	4-Mar-24
FRES LN	25-Apr-24	0.05	0.03	5-Mar-24

Source: Data as of 29-Feb-24. * Ex-date and declaration date are both estimated by Bloomberg

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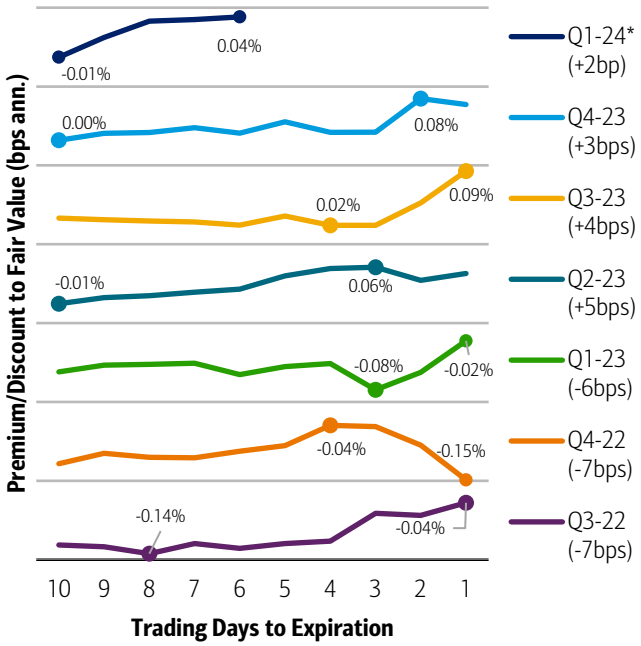
Nikkei 225 Mar-24/Jun-24 Futures Roll

Nikkei 225 futures roll snapshot

Exhibit 46: The evolution of Nikkei 225 futures quarterly roll spread richness/cheapness over the current QTD and prior six quarters
Positive number = Cost to a long futures roller
Negative number = Benefit to a long futures roller



Source: BofA Global Research. Data as of 29-Feb-24. *Data before completion of quarterly roll spread trading.

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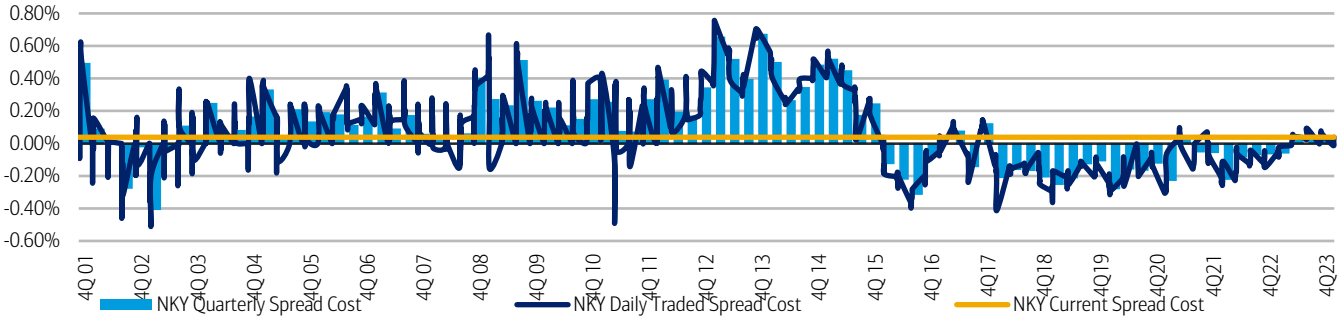
The Mar-24/Jun-24 Nikkei 225 (NK) futures roll is currently trading 4bps rich to JPY TONAR** rates (based on forecasted gross dividends of 283 index points). The volume weighted-average premium to fair value has been 2bps over the last five trading sessions. This is rich versus recent years (94th 5-year percentile) but more in line with the long-term history (40th percentile versus rolls since 2001). Over the last year, Nikkei 225 futures have on average traded 2bps rich (+3bps, +4bps, +5bps, and -6bps; Exhibit 46).

We believe that Nikkei futures positioning remains long. While a potential sell-off could trigger stop-loss, as the bear case in our CTA model suggests (see exhibits 6 and 12 in this report: Systematic Flows Monitor, 23 February 2024). However, stops should not be hit until just above 37,000 on the Nikkei (model has 37,425 as of 27 Feb, or 4.4% down from here; ref 39,166 as of 29 Feb). Therefore, we expect limited impact from CTA positioning on this quarter's Japanese equity futures rolls.

Given that a **statistically rich** roll should not be surprising amid the strong sentiment towards Japanese stocks, we would not rule out a richening trend similar to what we saw during last quarter's roll (long rollers dominated short rollers in December). Moreover, with positioning risks not suggesting any large downside risks, we think that **long futures rollers should roll early**. While the roll could cheapen a few bps from here, locking in roll costs (+4bps) still seems to offer a good risk/reward, in our view.

Assuming cash collateralized at JPY TONAR**, the cost of holding Nikkei 225 futures from Mar-24 expiry through Jun-24 expiry is currently 4bps rich annualised. Since 4Q 2001, the average quarterly cost of holding Nikkei 225 futures was 10bps rich. At current levels, the cost of rolling Nikkei futures ranks in the 40th percentile since the end of 2001 (Exhibit 47).

Exhibit 47: The cost (assuming cash collateralized at JPY TONAR) of holding NKY futures over the next 3 months is quite rich versus recent history**
The current level of 0.04% corresponds to the 40th percentile since 2001 and the 94th 5-year percentile



Source: BofA Global Research. Data as of 29-Feb-24. Quarterly spread cost measured as a volume weighted average of daily roll spread costs over the final 10 days of each quarter's roll spread trading period. Daily spread costs shown for the final 10 days of each quarter. **TONAR has replaced LIBOR in Japan.

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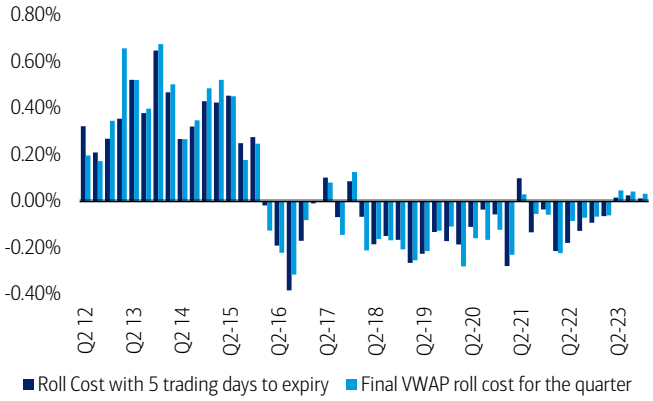
Nikkei 225 futures prior roll (Dec-23/Mar-24) review

The Dec roll richened in the last week

With 5 trading days to expiry, the roll was trading at 1bp rich, and the final VWAP roll cost for the quarter ended up at 3bps rich, after richening by an additional 2bps (Exhibit 48 and Exhibit 49).

The roll richened as roll activity picked up, suggesting that long rollers dominated the flow. As seen in Exhibit 46, the roll richened from 0bp to 8bps as the roll volume bars increased (Exhibit 50).

Exhibit 48: Nikkei 225 quarterly roll spread cost measured (1) with 5 days remaining for spread trading (2) on average over the entire
Roll spread cost measured on average over the entire quarter is typically not too dissimilar to the cost as measured over the final 5 days as volume peaks into expiry



Source: BofA Global Research

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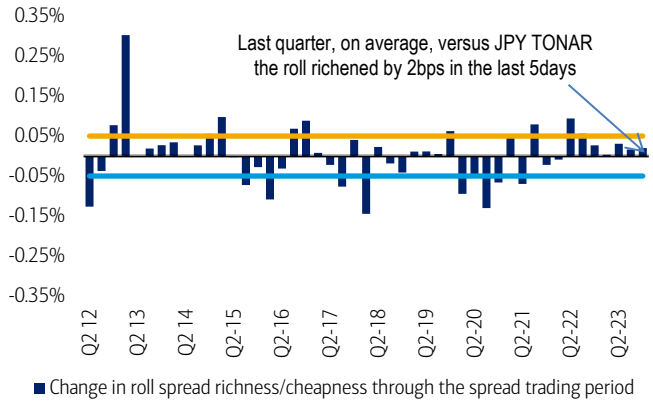
Exhibit 49: NKY roll spread cost measured as the difference between the average over the entire quarter and the cost with 5 trading days remaining for spread trading
The Dec-23 roll richened into expiry



Source: BofA Global Research

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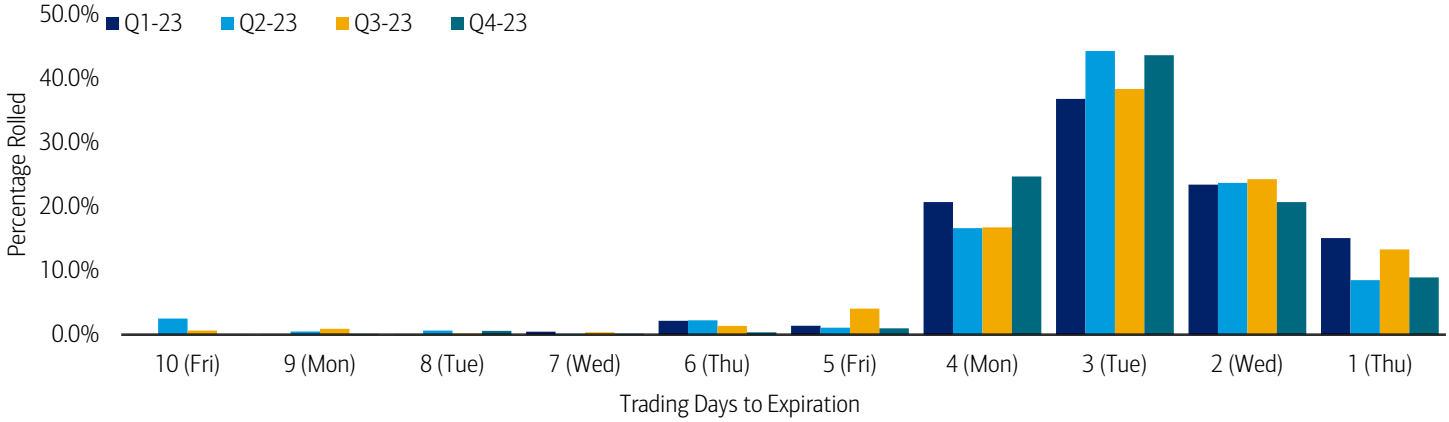
Nikkei 225 futures roll progression

Monday and Tuesday were the most active roll days in December

As is typical, peak roll volume through last quarter's roll came on Tuesday of expiry week Exhibit 50), and the roll progressed largely as per normal. We note, however, that fewer investors than normal waited until the last 1-2 days to roll their positions.

Exhibit 50: Percentage of Nikkei (NK) futures rolls *n* trading days to expiry over the prior four quarters
Based on the volume traded in the futures spread contract



Source: BofA Global Research

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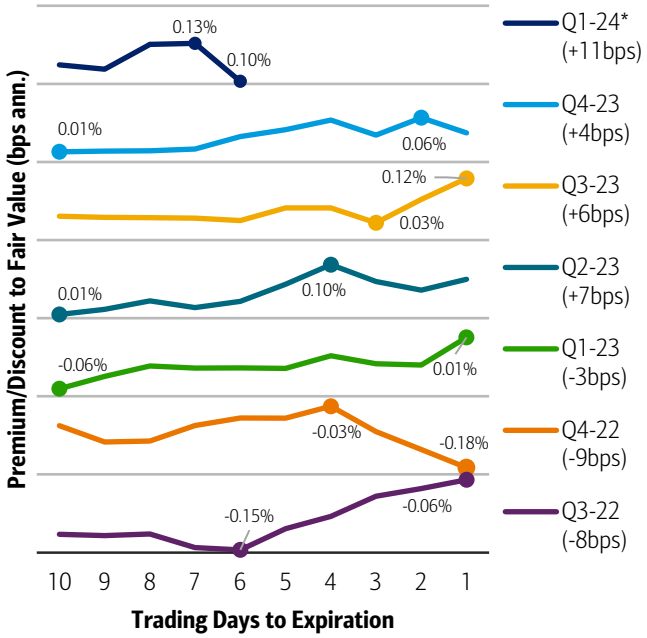
Topix Mar-24/Jun-24 Futures Roll

Topix futures roll snapshot

Exhibit 51: The evolution of Topix futures quarterly roll spread richness/cheapness over the current QTD and prior six quarters
Positive number = Cost to a long futures roller
Negative number = Benefit to a long futures roller



Source: BofA Global Research. Data as of 29-Feb-24. *Data before completion of quarterly roll spread trading.

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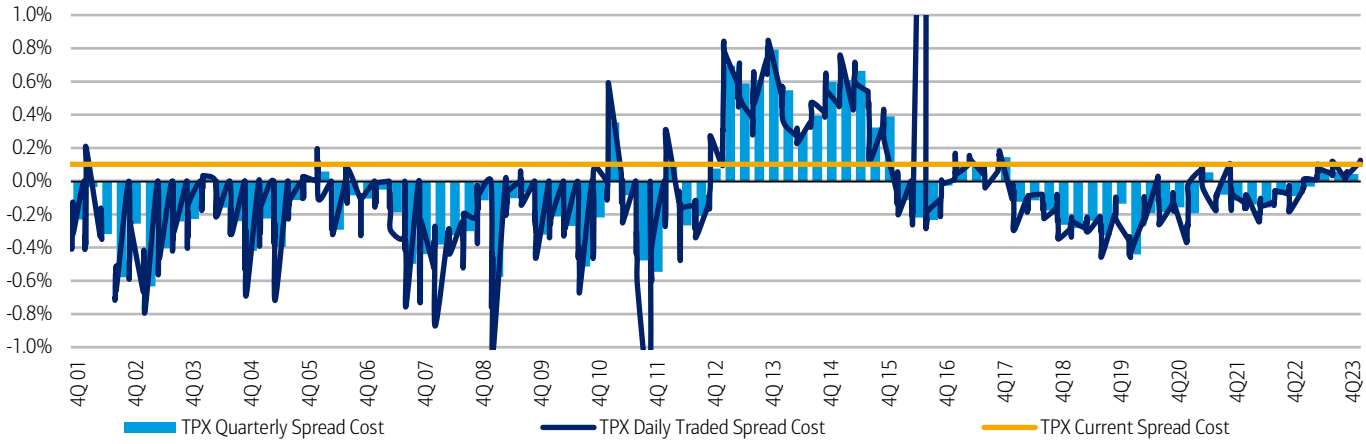
The Mar-24/Jun-24 Topix (TP) futures roll is currently trading 10bps rich to JPY TONAR** rates (based on forecasted gross dividends of 26.8 index points). The volume weighted-average premium to fair value has been 11bps over the last five trading sessions. This is rich versus recent years and elevated relative to longer-term history (99th and 84th 5-year and 21-year percentiles, respectively). Over the last four completed rolls, Topix futures have on average traded at 4bps rich (+4bps, +6bps, +7bps, and -3bps) dating to last year's Q4 Dec/Mar roll (Exhibit 51).

Like Nikkei futures, we believe that **Topix futures positioning is long**. We furthermore see stop-loss levels relatively far from here. As such, positioning risk seems muted going into this roll.

Given that a **statistically rich** roll should not be surprising amid the strong sentiment towards Japanese stocks, we would not rule out a richening trend similar to what we saw during last quarter's roll (long rollers dominated short rollers in December). Despite already elevated levels, risks are that they get even richer from here, and we think that **long futures rollers may roll early**. Locking in roll costs (+10bps) still seems to offer a good risk/reward, in our view.

Assuming cash collateralized at JPY TONAR**, we note that the cost of holding Topix futures from Mar-24 expiry through Jun-24 expiry is currently 10bps rich annualised. Since 4Q 2001, the average quarterly cost of holding Topix futures was 9bps cheap. At current levels, the cost of rolling Topix futures ranks in the 84th percentile since the end of 2001 (Exhibit 52).

Exhibit 52: The cost (assuming cash collateralized at JPY TONAR) of holding TPX futures over the next 3 months is in line with long-term levels**
The current level of 0.10% corresponds to the 84th percentile since 2001



Source: BofA Global Research. Data as of 29-Feb-24. Quarterly spread cost measured as a volume weighted average of daily roll spread costs over the final 10 days of each quarter's roll spread trading period. Daily spread costs shown for the final 10 days of each quarter. ** TONAR replaces LIBOR in Japan.

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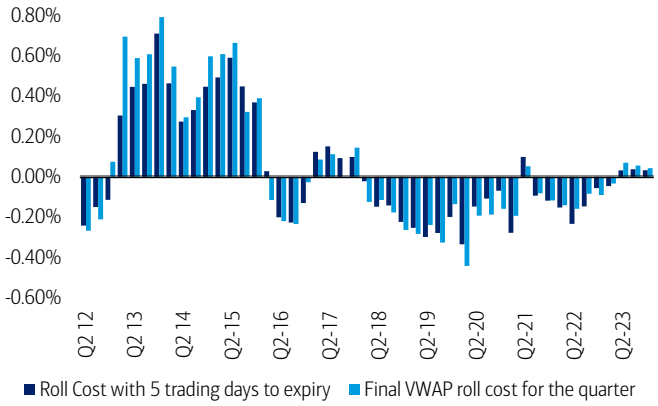
Topix futures prior roll (Dec-23/Mar-24) review

The Dec roll richened as roll volume picked up and stocks rallied

With 5 trading days to expiry, the roll was trading 3bps rich but richened by a further 1bp into expiry, finishing at 4bps. The final volume-weighted average price (VWAP) roll cost for the quarter ended up being 4bps rich (Exhibit 53 and Exhibit 54).

Given that the roll cost richened alongside increasing roll activity and rallying markets, long rollers likely dominated, and/or investors were chasing the Japan rally using futures.

Exhibit 53: Topix quarterly roll spread cost measured (1) with 5 days remaining for spread trading (2) on average over the entire quarter
Roll spread cost measured on average over the entire quarter is typically not too dissimilar to the cost as measured over the final 5 days as volume peaks into expiry



Source: BofA Global Research

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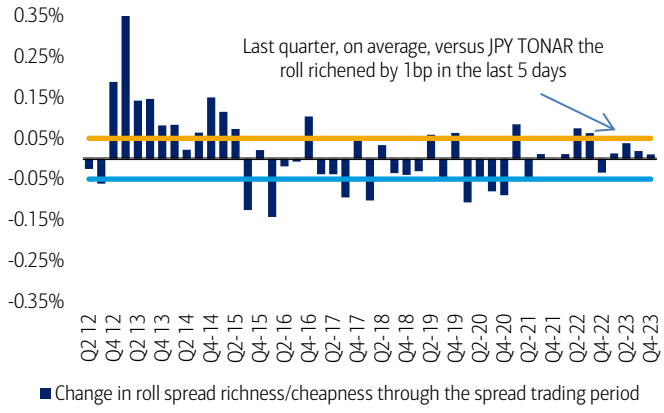
Exhibit 54: Change in TPX roll spread cost measured as the difference between the average over the entire quarter and the cost with 5 trading days remaining for spread trading
The Dec-23 roll cost picked up



Source: BofA Global Research

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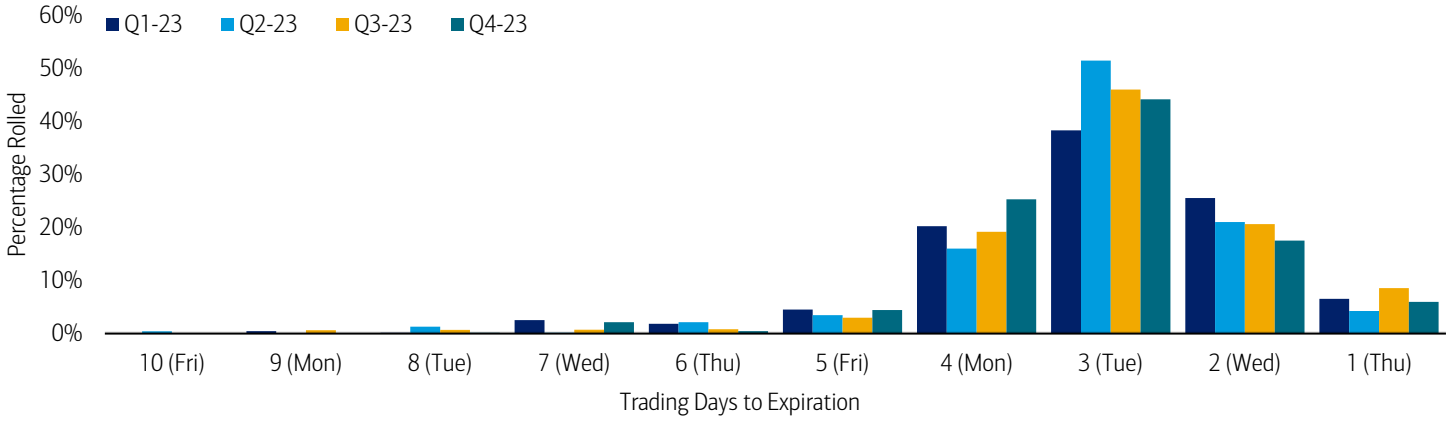
Topix futures roll progression

Most of last quarter's roll went through on Tuesday of expiry week

As usual, peak roll volume through last quarter's roll came on Tuesday of expiry week, when 44% of the rolls were traded (see Exhibit 55). We note, however, that roll trading started a bit earlier than normal, with more roll activity up on the last Monday before expiry.

Exhibit 55: Percentage of Topix (TP) futures rolls in trading days to expiry over the prior four quarters
Based on the volume traded in the futures spread contract



Source: BofA Global Research

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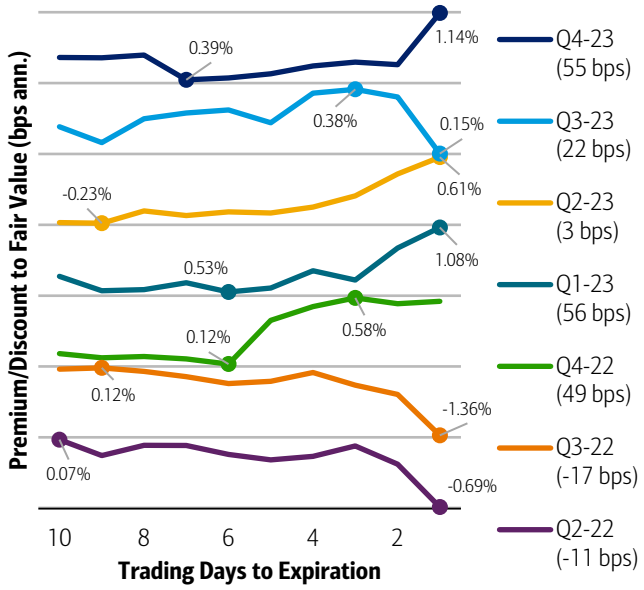
MSCI EM Mar-24/Jun-24 Futures Roll

MSCI Emerging Markets futures roll snapshot

Recent history of MSCI EM futures implied financing spreads

Exhibit 56: The evolution of MSCI EM futures (MES) quarterly roll spread richness/cheapness over the prior six quarters
Measured over the last 10 days of the roll and using net realized dividends



Source: BofA Global Research

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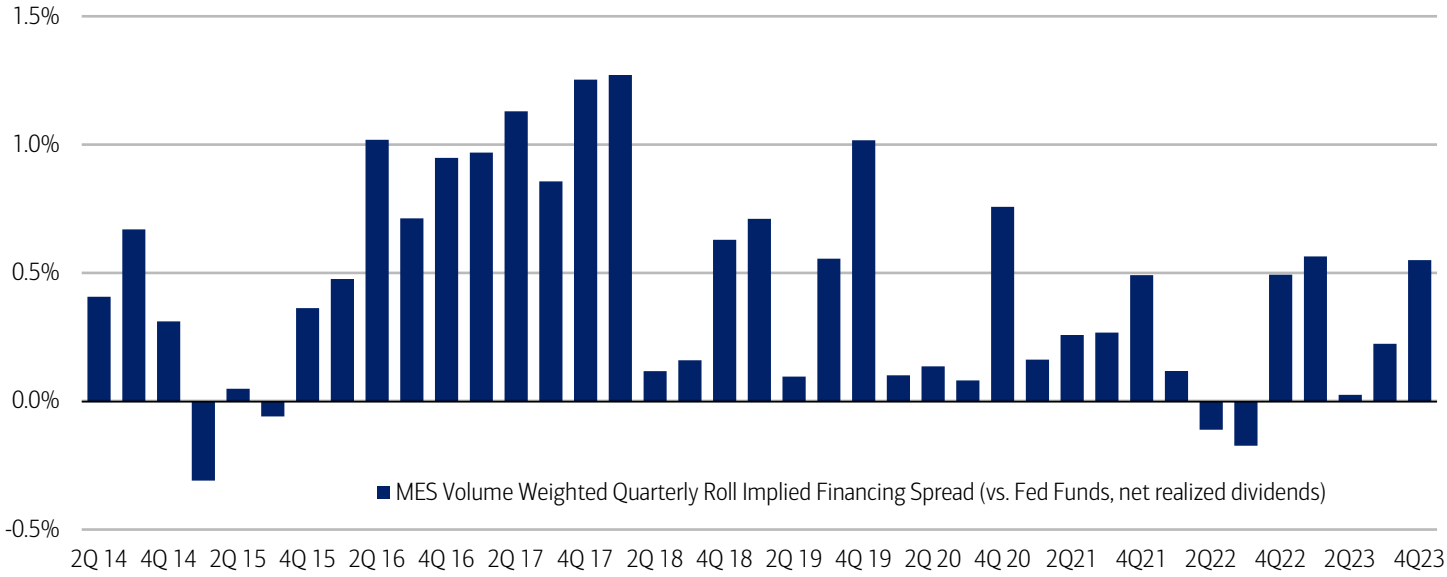
Over the last four completed rolls, MSCI EM futures (MES) have on **average traded +34bps** to Fed Funds forward implied rates (55bps, 22bps, 3bps, and 56bps). Note that our MSCI EM (MES) financing levels are calculated using ***realized net dividends***.

Key findings on MSCI EM futures implied financing levels

- **MES futures positioning and financing levels are related, similar to what we see for S&P 500 (ES) futures**
- **Market makers price MES futures with an expectation of net dividends**
- **Dividend forecast risk for MES futures could be meaningful which can lead to spurious financing estimates during the roll. However, when adjusting for this ex-post (e.g. using realized dividends), EM futures appear to be priced more in-line with their positioning data.**

Longer-term MSCI EM futures implied financing spreads

Exhibit 57: Longer term history of the cost (assuming cash collateralized at Fed Funds forward implied rates) of holding MSCI EM (MES) futures each quarter
Quarterly spread cost is a VWAP of daily roll spread costs over the entire quarter using net realized dividends



Source: BofA Global Research

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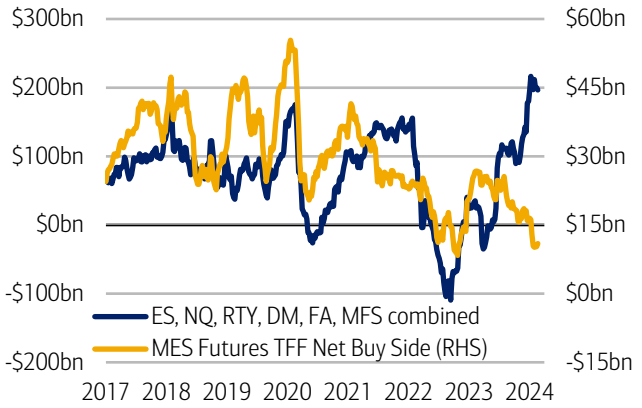
MES positioning data has often moved in-line with other major equity indices

Net buy-side positioning data as of the last weekly CFTC Traders in Financial Futures (TFF) report (20-Feb-24) for MES futures is shown in Exhibit 58 along with the net buy-side positioning data for other major US equity index futures available (specifically, ES, RTY, NQ, DM, MID, and MFS futures). Notably, since 2017 we've often seen the demand for long MSCI EM futures move in-line with the broader demand for other major equity index exposure, apart from dislocations in 2018, 2021, and 2023-24. The dislocation that began last year appears to have become more severe in Q1, likely fueled by large gains in the US led by tech.

In the case of the S&P 500, futures overall net buy side positioning data has tended to correlate with ES futures implied financing spreads. Should positioning also play a role in MES implied financing levels, then we would expect to see some correlation between MES and ES implied financing levels. Moreover, in times like the present when MES positioning is dislocated, we could expect to see a similar gap between MES and ES futures implied financing levels.

Exhibit 58: CFTC TFF Net Buy-Side Notional Open Interest for MES and ES, NQ, RTY, DM, FA, MFS combined

MES (MSCI EM) futures net buy-side positioning has often moved in-line with positioning across other major equity index futures but with notable dislocations in 2018, 2021, and 2023-24



Source: BofA Global Research, Based on weekly data from 3-Jan-2017 through 20-Feb-2024.

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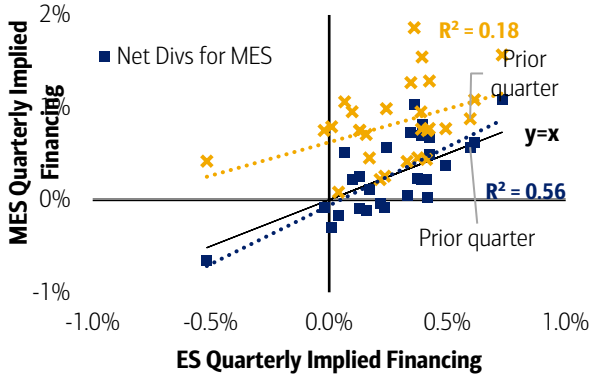
Focus on net divs while paying mind to forecast error

In Exhibit 59 is a scatter of quarterly futures roll implied financing spreads for MES versus ES futures since 2017. For MES futures, financing levels are calculated using ***realized*** dividends and we show levels with both gross and net dividends. Notably, MES futures financing levels have correlated with ES but the relationship was stronger using net dividends. Given that positioning between ES and MES has moved in-line for much of this period and assuming that positioning plays a role for financing levels leads us to believe that MES financing levels should be calculated using net dividends. Notably the relationship between ES and MES financing held up last quarter despite the gap in positioning as noted above.

Equally important, over this period, net financing levels using forecasted dividends have seen a significant level of error, averaging 13bps per quarter (annualized) since 2017, and dividends coming in systematically higher than forecasted implies that financing levels calculated during the roll were too low (Exhibit 60). Last quarter's dividend error of +20bps was the largest error we have seen since Q2-22.

Exhibit 59: MES implied financing levels versus ES

MES implied financing levels have tended to move in-line with ES but the relationship was stronger when using net dividends for MSCI EM futures



Source: BofA Global Research. Note dividends used for financing levels are realized and not forecasts.

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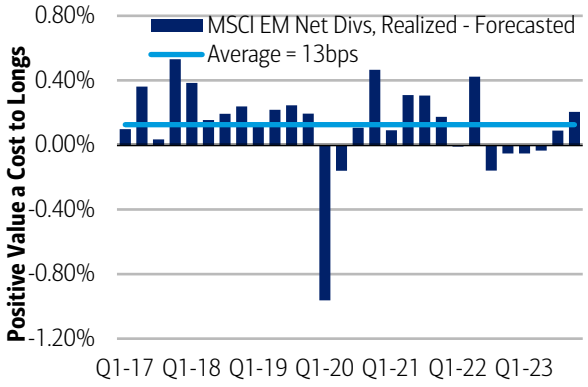
Exhibit 60: Quarterly MSCI EM Futures (MES) Dividend Forecast Error Cost (% annualized)

Often since 2017 MSCI EM futures net dividends have come in higher than what our forecasts would have had during the roll



Source: BofA Global Research

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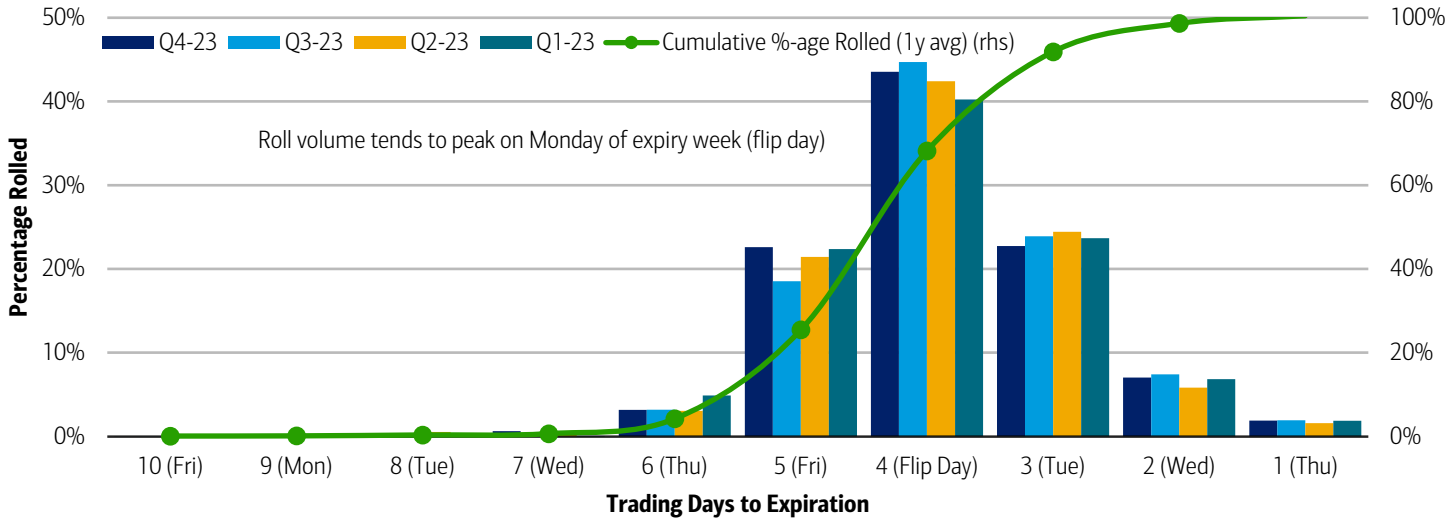
MSCI Emerging Markets roll progression

Exhibit 61: Daily percentage of MSCI EM futures (MES) rolls 10 trading days to expiry over the prior four quarters
Roll volume tends to peak on Flip Day which is the Monday of expiry week



Source: BofA Global Research

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MSCI EM futures implied financing levels require special considerations

MSCI Emerging Markets futures implied financing levels have two distinctive and critical idiosyncrasies relating to the treatment of dividends—(1) the accuracy of dividend forecasts when determining implied financing levels and (2) the tax treatment of dividends, that is, whether or not to look at net versus gross dividends. MES financing levels in our futures roll cost chartbook report addresses both of these issues. First, we show financing levels with both net and gross dividends (with the net tax rate being the same used by MSCI in the calculation of their net MSCI EM index). Second, regarding forecast error, we instead publish roll costs ex-post, that is, we wait for dividends to be realized and then determine the prior quarter's roll implied financing rate using realized dividends.

Summary of Prior Roll Strategy Reports

Exhibit 62: Summary of prior roll strategy reports
Past views

Index	Futures ticker	Roll	Report date	Roll cost on report date	Final quarter average cost	Strategy & rationale
S&P 500	ES	2022-Q4 (Dec-22/Mar-23)	2-Dec-22	41bps	42bps	ES futures positioning remains low, despite rising on the quarter. The roll is trading rich, which is expected given it's a Q4 roll. However, for Q4 standards, the roll is on the low end and we see risk skewed towards cheapening.
EURO STOXX 50	VG	2022-Q4 (Dec-22/Mar-23)	1-Dec-22	-36bps	-47bps	As has been the case for the past 10 rolls, long rollers should roll late as positioning likely remains short in Europe
Nikkei 225	NK	2022-Q4 (Dec-22/Mar-23)	1-Dec-22	-8bps	-7bps	Long rollers should roll early despite the statistically rich roll cost.
Topix	TP	2022-Q4 (Dec-22/Mar-23)	1-Dec-22	-6bps	-9bps	Long rollers should roll early despite the statistically rich roll cost.
S&P 500	ES	2023-Q1 (Mar-23/Jun-23)	3-Mar-23	20bps	21bps	Positioning looks to be higher and absent significant short rolls we expect the roll to richen through spread trading.
EURO STOXX 50	VG	2023-Q1 (Mar-23/Jun-23)	3-Mar-23	-37bps	-51bps	Positioning still likely short in Europe – as has been the case for the last 11 rolls – long rollers should roll late
Nikkei 225	NK	2023-Q1 (Mar-23/Jun-23)	3-Mar-23	-6bps	-6bps	Long rollers should consider rolling late as the roll cost is statistically rich and positioning risks seem skewed to the downside in the near term.
Topix	TP	2023-Q1 (Mar-23/Jun-23)	3-Mar-23	-5bps	-3bps	Long rollers should consider rolling late as the roll cost is statistically rich and positioning risks seem skewed to the downside in the near term.
S&P 500	ES	2023-Q2 (June-23/Sep-23)	2-Jun-23	+33bps	+41bps	Financing higher but in-line with a rise in positioning data. But leveraged data will be key this quarter with risk skewed towards the roll richening.
EURO STOXX 50	VG	2023-Q2 (June-23/Sep-23)	2-Jun-23	-31bps	-31bps	As has been the case for the last 12 rolls now, long rollers should roll late as positioning is likely still short in Europe
Nikkei 225	NK	2023-Q2 (June-23/Sep-23)	2-Jun-23	+4bps	+5bps	Long rollers should roll late since the roll is already historically rich and positioning risk seems very asymmetric with downside risks much larger than upside risks.
Topix	TP	2023-Q2 (June-23/Sep-23)	2-Jun-23	+6bps	+7bps	Long rollers should roll late since the roll is already historically rich and positioning risk seems very asymmetric with downside risks much larger than upside risks.
S&P 500	ES	2023-Q3 (Sep-23/Dec-23)	31-Aug-23	+38bps	+41bps	S&P 500 futures are rolling close to fair relative to positioning data but this assumes an entire 'Leveraged' short notional will roll. If it doesn't, positioning looks to then be near its highest levels on record since 2015 but we find that when this happens roll costs tend to have a ceiling. The most richening we expect is another 10bps.
EURO STOXX 50	VG	2023-Q3 (Sep-23/Dec-23)	31-Aug-23	-8bps	-6bps	With the Sep23/Dec23 ESTX50 roll trading around median levels and a precedent for the roll to cheapen from here, long rollers should roll late to capitalize on any potential cheapening
Nikkei 225	NK	2023-Q3 (Sep-23/Dec-23)	31-Aug-23	+3bps	+4bps	Long rollers should consider rolling early despite a statistically rich roll. With not much positioning risk chances are that long rollers dominate and drive costs higher as in June.
Topix	TP	2023-Q3 (Sep-23/Dec-23)	31-Aug-23	+4bps	+6bps	Long rollers should consider rolling early despite a statistically rich roll. With not much positioning risk chances are that long rollers dominate and drive costs higher as in June.
S&P 500	ES	2023-Q4 (Dec-23/Mar-24)	28-Nov-23	+47bps	+59bps	The Q4-23 roll is cheap given it's a year-end with elevated positioning. Market makers may have less need tighten balance sheet after the summer squeeze which could keep the current roll on the cheaper side.
EURO STOXX 50	VG	2023-Q4 (Dec-23/Mar-24)	28-Nov-23	+6bps	+25bps	Long rollers should roll early. Although the Dec23/Mar24 ESTX50 roll is trading rich relative to recent history, the roll could slightly richen from here with more bullish sentiment and positioning than prior quarters and a muted Q4 balance sheet effect.
Nikkei 225	NK	2023-Q4 (Dec-23/Mar-24)	28-Nov-23	+1bp	+3bps	Long rollers should consider rolling early despite a statistically rich roll. Positioning risks skewed towards additional longs in the near future.
Topix	TP	2023-Q4 (Dec-23/Mar-24)	28-Nov-23	+2bps	+4bps	Long rollers should consider rolling early despite a statistically rich roll. Positioning risks skewed towards additional longs in the near future.
S&P 500	ES	2024-Q1 (Mar-24/Jun-24)	29-Feb-24	+50bps	TBD	Roll coming in at record richness for non-Q4 but in-line with record positioning. Ceiling hypothesis will be tested this quarter.
EURO STOXX 50	VG	2024-Q1 (Mar-24/Jun-24)	29-Feb-24	+3bps	TBD	With positioning elevated, risks are skewed toward the Mar/Jun roll richening, as the prior two quarterly rolls did
Nikkei 225	NK	2024-Q1 (Mar-24/Jun-24)	29-Feb-24	+4bp	TBD	Long rollers should consider rolling early as upside chasing could add further upside pressure to the roll cost. Risks to this view are linked to stop-loss triggers near 37k.
Topix	TP	2024-Q1 (Mar-24/Jun-24)	29-Feb-24	+10bps	TBD	Long rollers should consider rolling early as upside chasing could add further upside pressure to the roll cost. Risks to this view are linked to stop-loss triggers near 2.6k.

Source: BofA Global Research

Options Risk Statement

Potential Risk at Expiry & Options Limited Duration Risk

Unlike owning or shorting a stock, employing any listed options strategy is by definition governed by a finite duration. The most severe risks associated with general options trading are total loss of capital invested and delivery/assignment risk... all of which can occur in a short period.

Investor suitability

The use of standardized options and other related derivatives instruments are considered unsuitable for many investors. Investors considering such strategies are encouraged to become familiar with the "Characteristics and Risks of Standardized Options" (an OCC authored white paper on options risks). U.S. investors should consult with a FINRA Registered Options Principal.

For detailed information regarding risks involved with investing in listed options:

http://www.theocc.com/about/publications/character-risks.jsp

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