Foreign Exchange Research
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FX & EM Macro Strategy

Writings on the Vol: Don't call it a comeback

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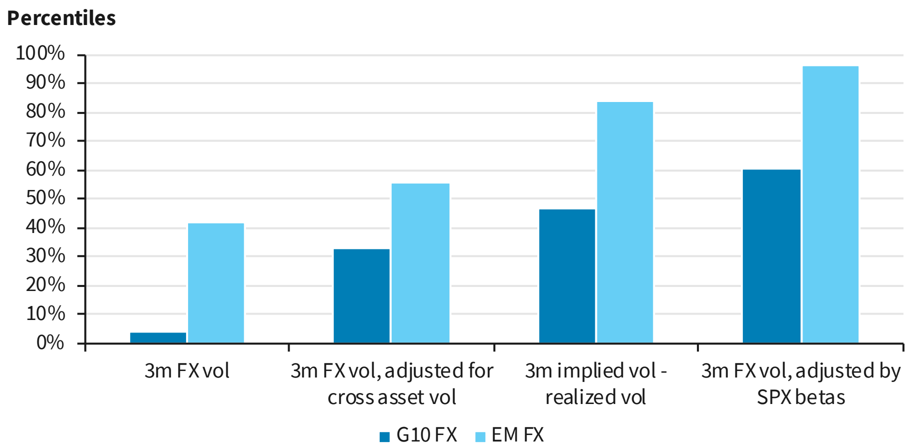
- **Low G10 FX-implied vols do not reflect a systematic underpricing of risks by market participants or low vol premia. The subdued environment for G10 FX vol is supported by low cross-asset (particularly rates) vol, low realized FX vol, converging rate differentials, and low betas of G10 FX to extant global macro risks. This does not extend to EM FX, where vols are also not as low.**
- **Do not count on a generalized move higher in G10 FX vol coming from higher vol premia either. Although growth risks have increased with a new round of US-China tariffs, risk appetite has been stable so far. Furthermore, the Fed on hold implies dampened rates vol amid a broader shift toward more dovish monetary policy.**
- **FX realized vols may, however, be boosted by specific global risks. We identify vols, RRs, calendar spreads, and pair spreads that appear cheap and sensitive to a further escalation in US-China trade tensions, the broad-based slowdown in global growth, a return of Fed hawkishness, and a rise in European political risks. EURUSD 12m vol, EURUSD or USDCAD 6m versus 12m calendar spreads, EURHUF risk reversals and EURUSD, NZDUSD and USDJPY 6m vol versus USDCNY are sensitive to these risks.**

FIGURE 1
G10 and EM FX adjusted for cross-asset vol, realized vol and betas to market risk appetite (percentiles since 2005 shown)



Source: Bloomberg, Barclays Research

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Low FX vols are a reflection of low cross market volatilities…

FX market volatilities are subdued from a historical perspective. This is particularly the case in the G10 space where an aggregate index of implied vols (Bloomberg ticker - BXIIVG10 Index) is in the bottom 4% of levels seen since 2005 (Figure 2). Although EM FX (Bloomberg ticker - BXIIVEMG Index) and equity market volatilities (VIX) are not at similarly low levels (at the 42th percentile for EM FX and 44th for VIX), volatility in interest rate markets is also in the bottom 7th percentile.

There is a common factor driving broader market volatilities – the first principal component in a principal components analysis (PCA) captures about 60% of overall variation. As such, a component of declining FX-implied vols is likely related to the common factor, arguably reflecting lower macro uncertainty in spite of a slowing global growth trend and alongside a move toward dovish monetary policy by the global central banks.

Stripped of the common trends, G10 FX vols are low but not at extremes. Figure 3 shows a relative metric for vols in different asset markets after accounting for their common variation.[1] G10 FX vols have bounced from being in their bottom 4th percentile to the 33rd percentile currently, whereas we find that EM FX vol is above median levels.

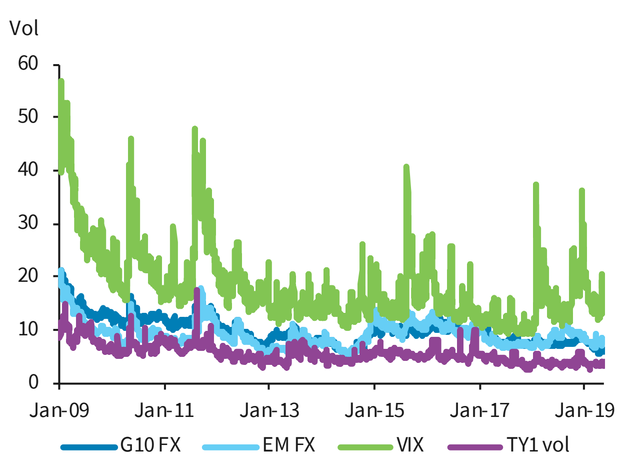
…along with low realized volatilities…

FX-implied vols also reflect the low levels of realized vol in markets. A comparison of FX realized vols shows that those in G10 are generally below the 5th percentile over a 10-year lookback period basis, while those in EM are relatively loftier, particularly if looking at the tenors beyond 6m (Figure 4).

A more pertinent comparison of the level of implied vols is in terms of how these compare with realized. Vol premia, the difference in implied and realized vols, is not at extreme lows. Figure 5 shows that aggregate measures of front-end vols (1m and 3m) are generally elevated in G10 and EM. For EM, back-end vols look particularly low, particularly compared with the volatility that has been realized during recent periods of EM stress.

FIGURE 2

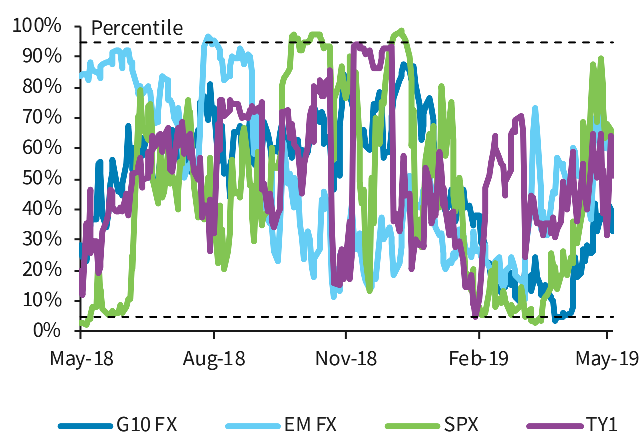
Market-implied volatilities are broadly at low levels



Source: Bloomberg, Barclays Research

FIGURE 3

FX vols do not appear to be at extreme levels after stripping out common asset market volatilities

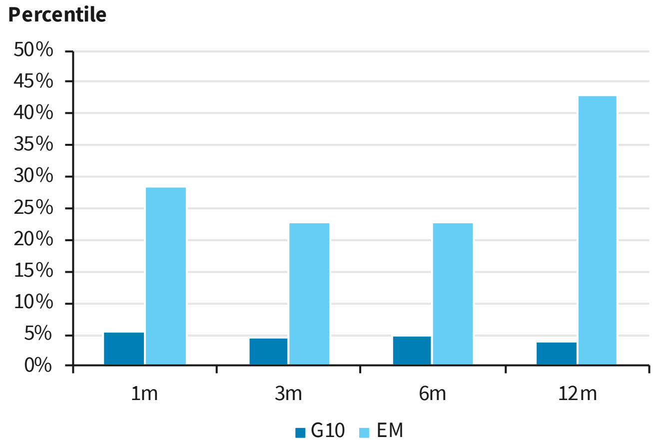


Note: Dashed lines represent 5th and 95th percentiles for implied vols stripped of their common component derived using PCA.
Source: Bloomberg, Barclays Research

[1] We calculate percentiles for the residuals that is unexplained by a common factor (determined by principal component analysis - PCA)

FIGURE 4

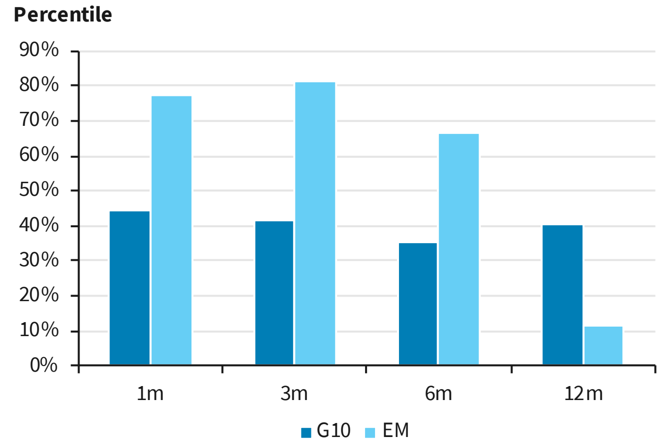
Realized vol in G10 are close to extreme lows…



Note: Percentiles over a 10-year lookback period shown.
Source: Bloomberg, Barclays Research

FIGURE 5

…keeping front-end vol premium high



Note: Percentiles over a 10-year lookback period shown.
Source: Bloomberg, Barclays Research

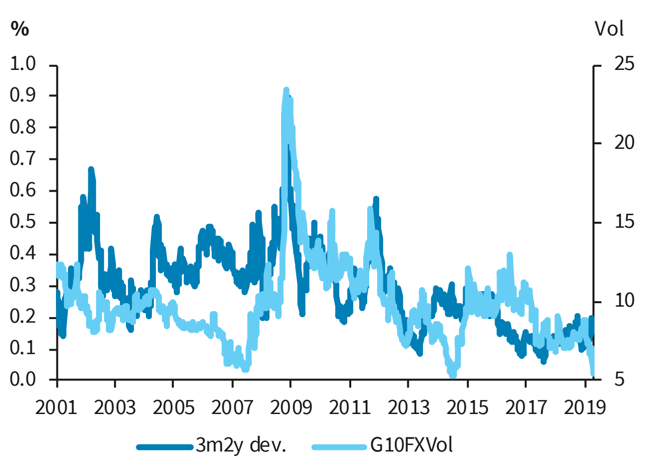
…convergence in rate differentials…

Monetary policy divergence, or the lack thereof, has implications for the level of FX vols. Figure 6 shows the cross-sectional standard deviation of the short end curve spread for G10 countries (3m2y slope) along with an aggregate measure of G10 FX vol. We find that a larger dispersion of short rate expectations, as proxied by the 3m2y slope, has historically correlated with the level of implied volatility.

Higher rate divergence tends to raise the level of FX vol, even after controlling for the level of broader risk appetite. In Figure 7, we run regressions of the change in FX vols (average of G10-USD crosses) on changes in the various rate divergence measures (3m rates and the 3m2y curve slopes), controlling for changes in equity market volatility (VIX). Narrowing rate divergence and stable risk appetite (low VIX) have likely kept G10 FX vols low.

FIGURE 6

G10 FX vols tend to perk up during periods when rate divergences increase



Note: Rate divergences are proxied by the cross-sectional standard deviation of the 3m2y rates spread. Source: Bloomberg, Barclays Research

FIGURE 7

Sensitivity of G10 vols to changes in rate divergences, controlling for market risk appetite (VIX)

		3m dev.	3m2y dev.	VIX	Const	R^2
1m	Coeff	2.46	4.25	0.14	0.00	29.1%
	T-stat	2.25	4.70	15.78	-0.08	
3m	Coeff	1.48	3.10	0.10	0.00	28.7%
	T-stat	1.98	5.01	15.68	-0.19	
6m	Coeff	1.08	2.45	0.08	0.00	29.9%
	T-stat	1.88	5.14	16.02	-0.26	
12m	Coeff	0.88	1.89	0.06	0.00	29.1%
	T-stat	1.93	4.97	15.73	-0.31	

Note: Regressions of changes in implied vol on changes in cross-sectional standard deviations of 3m rates and 3m2y rates spread, along with the VIX.
Source: Bloomberg, Barclays Research

…lower FX betas to macro risks…

Low FX vols, arguably, point to a lower price of hedging in FX markets; however, this ignores the fact that FX itself may have become less sensitive to broader market and macro risks.

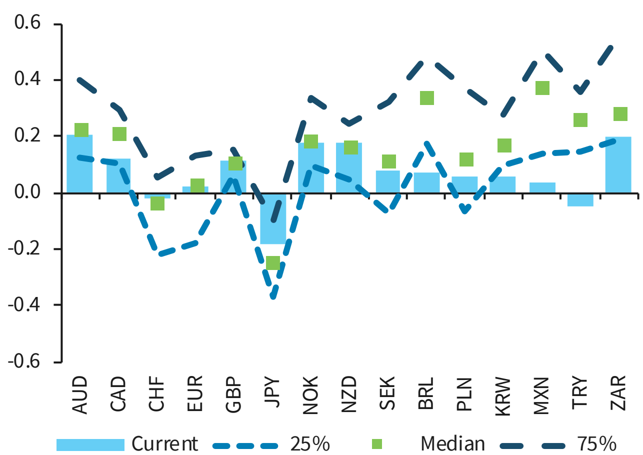
For example, Figure 8 shows that 52-week betas to typical measures of market risk appetite, eg, to US equities, are substantially dampened relative to the historical experience (we consider a long sample going back to the early 2000s). This picture of low FX betas to measures of risk appetite remains, even if we consider equity markets outside of the US (eg, to MSCI World ex-US). Of course, caveats on using bivariate regressions apply, given the potential for omitted variables and over a relative short sample.

However, after adjusting for these low betas, the cost of hedging against equity market downside using FX options does not look particularly compelling relative to equity options. For example, Figure 9 compares the price of 1m 25D puts for various G10 and EM USD pairs versus a 1m 25D put on the S&P 500 index. We find that although FX put options appear inexpensive, they are not as such after adjusting for their lower betas. There are a few exceptions to this, however, with AUD, CAD, NOK and NZD 1m 25D puts cheaper than their S&P 500 equivalent.

This weakening of the FX markets relationship to a whole host of global macro and market risks can be seen in Figure10. We consider betas to market prices that are sensitive to a China slowdown/increase in US-China trade tensions (USDCNH), European risks (EUR NEER), and Fed hawkishness relative to market expectations (FX performance of the Bloomberg Barclays EM Local Bond index).

FIGURE 8

52-week betas of USD crosses to S&P 500 returns compared with historical sensitivities



Note: Median, 75th and 25th percentiles since 2010 shown.
Source: Bloomberg, Barclays Research

FIGURE 9

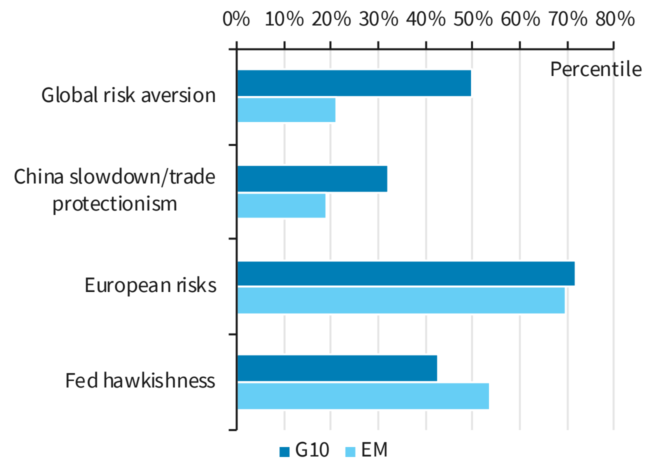
Cost of 1m 25D put options in USD crosses compared to S&P 500, with and without adjustment for 52-week betas

	25D put premium (% USD)	52 week betas	Beta adjusted premium
AUD	0.38%	0.20	1.83%
CAD	0.25%	0.12	2.00%
CHF	0.23%	-0.02	
EUR	0.24%	0.02	11.78%
GBP	0.39%	0.11	3.40%
JPY	0.24%	-0.18	
NOK	0.38%	0.18	2.15%
NZD	0.36%	0.18	1.99%
SEK	0.35%	0.08	4.39%
BRL	0.68%	0.07	9.97%
IDR	0.47%	0.05	8.67%
KRW	0.36%	0.06	6.07%
MXN	0.45%	0.04	11.53%
TRY	1.26%	-0.05	
ZAR	0.74%	0.20	3.69%
SPX		2.69%	

Note: 25D put option premium as of 22 May 2019, 52 week betas as of 17 May 2019. Source: Bloomberg, Barclays Research

FIGURE 10

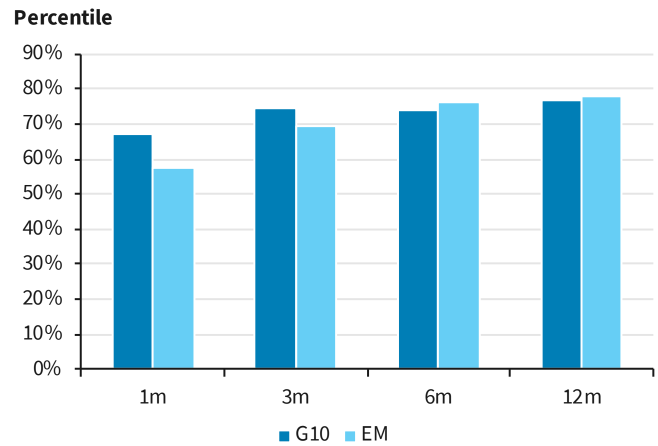
Betas to extant risks compared with history (percentiles for 52-week betas shown)



Note: Average G10 and EM betas shown to moves in global risk appetite (S&P 500), China slowdown/trade protectionism (USDCNH), European risks (EUR NEER), Fed hawkishness (FX performance of EM local bond index).
Source: Bloomberg, Barclays Research

FIGURE 11

Risk reversals (CCYUSD) appear to be underpricing the potential for downside risks



Source: Bloomberg, Barclays Research

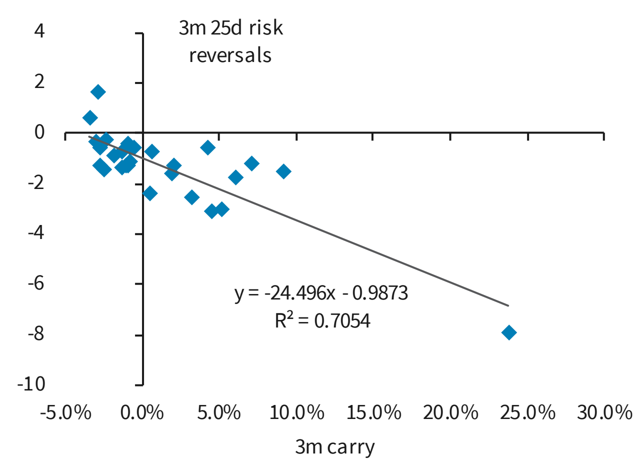
…and a lower price of risk in FX markets

Risk reversals (RR) also do not suggest that markets have become overly sanguine in pricing out downside risks. Although RRs, the relative price for calls versus puts, reflect the market price for downside protection and are elevated from a historical basis (using a 10-year lookback period) pointing to a potential underpricing of downside risks (Figure 11), this ignores the varying levels of FX risk and risk compensation.

For instance, Figure 12 shows that absolute prices of 3m 25D RRs for currencies versus the USD (quoted as CCYUSD) are linearly related to the level of carry, a measure of a currency's riskiness. The regression slope does change over time, reflecting variation in the market price of risk (Figure 13). As such, current levels for RRs may reflect changes in the currency's riskiness (change in carry), along with changes in the price of risk (the regression

FIGURE 12

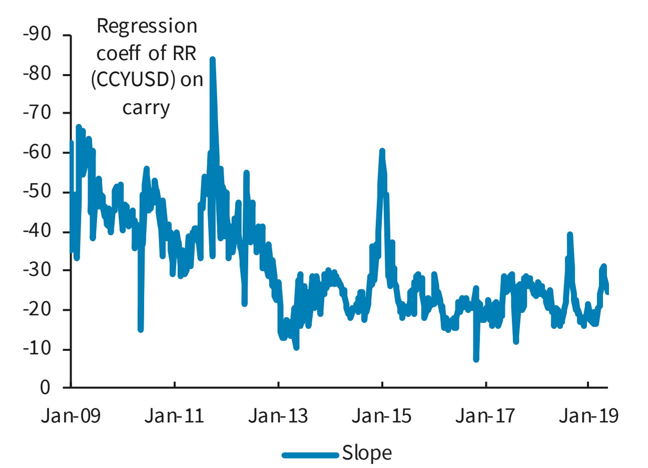
Systematic relationship between option market price of skew (3m 25D RR) and risk (3m carry) for different FX (CCYUSD)…



Note: Cross-sectional regression as of 3 May 2019.
Source: Bloomberg, Barclays Research

FIGURE 13

…which shows significant time variation (historical regression slope of 3m 25D RR and carry)



Note: We run cross-sectional regressions on a weekly basis.
Source: Bloomberg, Barclays Research

slope of RR on carry). Figure 14 shows that RRs adjusted for carry from a historical basis (using a 10-year lookback period) are much less elevated, pointing to less sanguine market pricing of downside risks than is suggested by the level RRs by themselves. This is especially the case in G10 FX than EM, however.

Do not count on a broad-based increase in FX vol…

Overall, the subdued environment for FX vols may remain supported by low macro uncertainty, low rate volatility, and converging rate differentials even as specific risks rise.

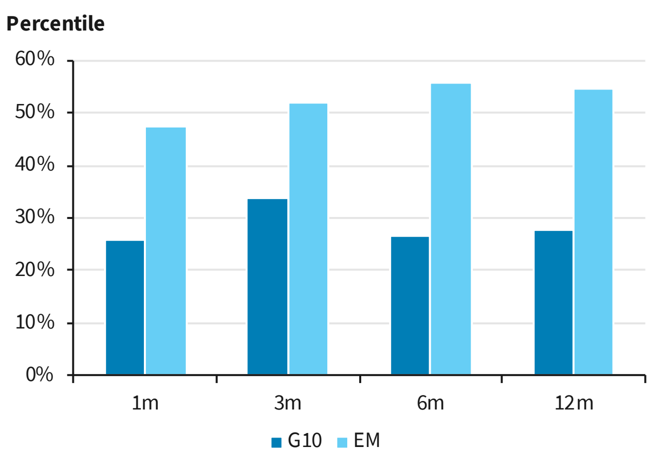
Macro uncertainty, as proxied by the dispersion of growth forecasts, remains at low levels and has kept a lid on market-implied vol (Figure 15). The market may of course recalibrate growth risks in the weeks and months ahead, for example, with respect to US-China trade tensions, US auto tariffs, or European political risks (Brexit or Italy's fiscal issues). However, given the substantial noise related to these risks and their binary nature, markets may have low conviction about the various outcomes and, hence, may be slow to consider their broad implications.

For example, although recent developments indicate rising risks of additional tariffs on US-China trade and have been priced into assets most directly linked to China (*The Emerging Markets Weekly: Trading crosswinds*, 16 May 2019), market risk appetite has remained stable and our economists have not made significant adjustments to their official growth forecasts (*US-China trade tensions: When giants collide: A re-escalation*, 17 May 2019). Market participants and economists alike may wait since it is not entirely clear how much of the recent tensions represent aggressive negotiating tactics and how much a real breakdown in talks. Low conviction may explain the low levels of realized vol, and the presence of specific (binary) macro risks may explain the relatively high levels of vol premia (reflecting the demand for option hedges). If and when these risks present themselves, realized vol may rise but may not lead to an increase in the overall level of implied vol unless risk aversion also concurrently rises (leading to even higher vol premia).

The current global backdrop of low inflation and decelerating growth has resulted in a dovish shift by global central bank policy, which has also been supportive of a low vol environment. G10 and EM central banks have largely abandoned plans of monetary policy tightening and, in

FIGURE 14

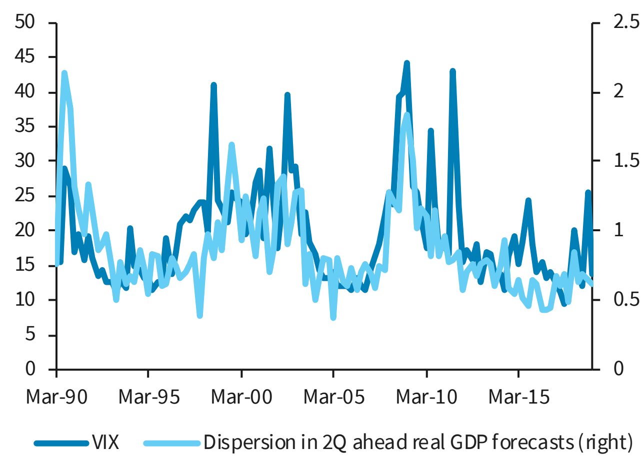
Risk reversals adjusted for carry show less significant underpricing of downside in G10 vs. EM (CCYUSD)



Note: Percentiles are calculated for the residuals from the rolling cross-sectional regressions of 25-day RR on carry for a 10-year lookback period.
Source: Bloomberg, Barclays Research

FIGURE 15

Macro uncertainty remains subdued despite the slowdown in global growth



Note: Dispersion in US GDP forecasts 2Q ahead on a point in time basis shown.
Source: Survey of Professional Forecasters, Bloomberg, Barclays Research

some cases, have moved to outright loosening when the cyclical and inflationary backdrop has allowed. Periods of slowing inflation and an easing cycle generally correspond with lower rates volatility and, hence, are supportive of low FX volatility.

Additionally, monetary policy convergence is more likely than divergence in the coming months and the cross-sectional standard deviations of forward policy rates in G10 and EM have declined recently (Figure 16). This is likely to further dampen volatility, given the relationship between monetary policy divergence and FX volatility.

…keep an eye on specific macro risks

Instead, we ask which FX vols and spreads are likely to be sensitive to the specific macro risks over the weeks and months ahead. Risks include a significant escalation in US-China trade tensions, a catch-all lowering of expectations of global growth, the escalation of political risks in Europe (in the aftermath of EU parliamentary elections and ahead of Brexit), and a Fed on hold for longer and against market expectations. Additionally, with realized vol at extremely low levels (Figure 17), we also look for value among FX volatilities.

We employ our framework for assessing value in option hedges articulated in *How I learned to stop worrying and love carry (again)*, 27 July 2017. In it, we look for historical periods defined by stylized movements in financial market variables that correspond with the specific risks discussed above. These historical sub-samples of 18-111 weeks are taken from data beginning 2000 (Figure 18).

The FX market's reaction to these upcoming risks can be gauged by looking at these historically simulated periods. For instance, Figure 19 shows that vols, by and large, tend to increase during these risk scenarios with EM FX but with varying sensitivity. Furthermore, we also examine the directional bias of historical spot returns over the particular market scenarios constructed, Figure 20. We find that USD versus G3 performance tends to be mixed under the global growth and protectionism risks, but is uniformly higher under the scenarios related to European politics and Fed hawkishness. The USD typically has near-uniform appreciation against EM, along with G10 commodity currencies, under the different macro/market risks.

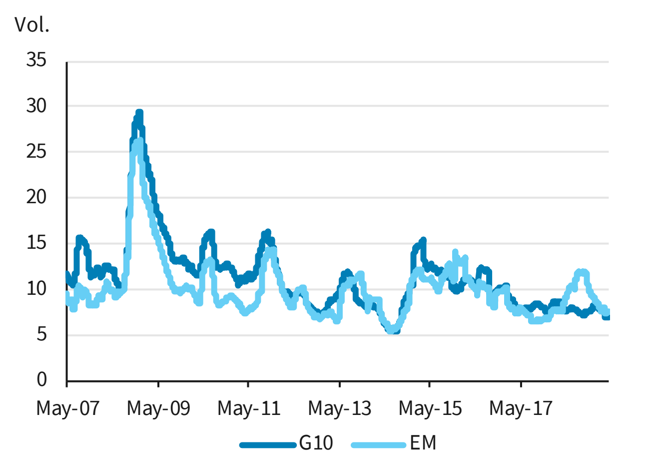
FIGURE 16

Monetary policy shows signs of convergence (cross sectional standard deviation of 1y forward rates)

Source: Bloomberg, Barclays Research

FIGURE 17

As is 3m FX realized vol, with the exception of the EM FX vol spike in 2018



Source: Bloomberg, Barclays Research

FIGURE 18

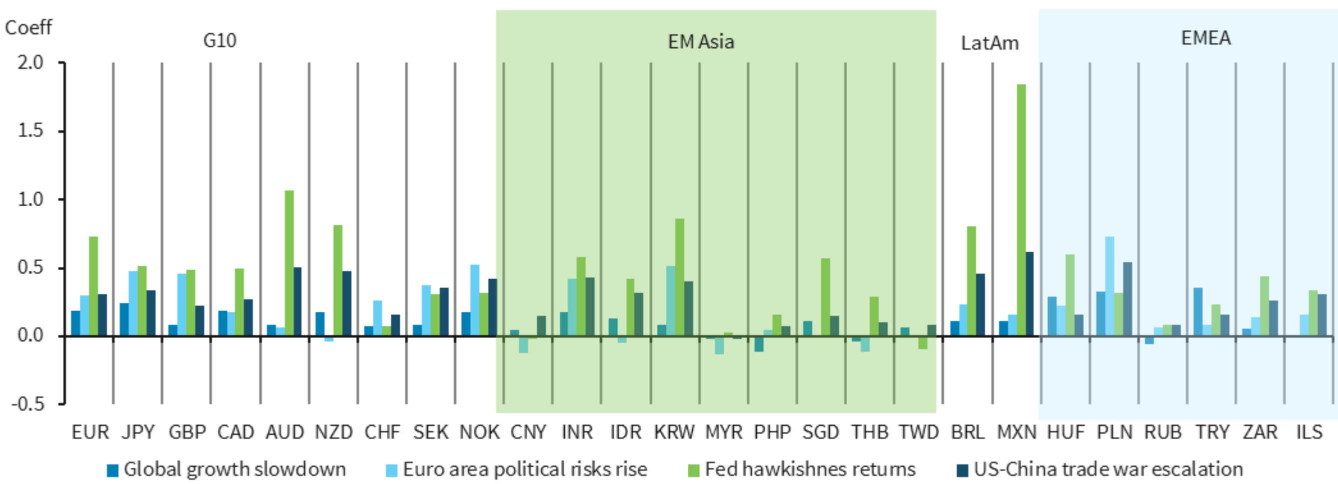
Stylized market scenarios to capture select event and tail risks (based on weekly data back to 2000)

Risk scenario	Market variable(s)	Market shock	Frequency
Global growth slowdown	S&P 500	1 std dev weekly move in S&P 500 (lower)	111 times
Euro area political risks rise	EUR NEER, Avg. of 10y Spain and Italy vs. Germany	1 std. dev. weekly move in EUR NEER (lower), 10y Spain, Italy average vs Germany spread (wider)	23 times
Fed hawkishnes returns	EM FX carry, UST term premium	1 std. dev. weekly move in EM FX carry basket (lower) and UST term premium (higher)	18 times
US-China trade war escalation	MSCI EM Asia, Trade vulnerable FX basket	1 std. dev. weekly move in MSCI EM Asia (lower), trade vulnerable FX basket (lower)	44 times

Source: Barclays Research

FIGURE 19

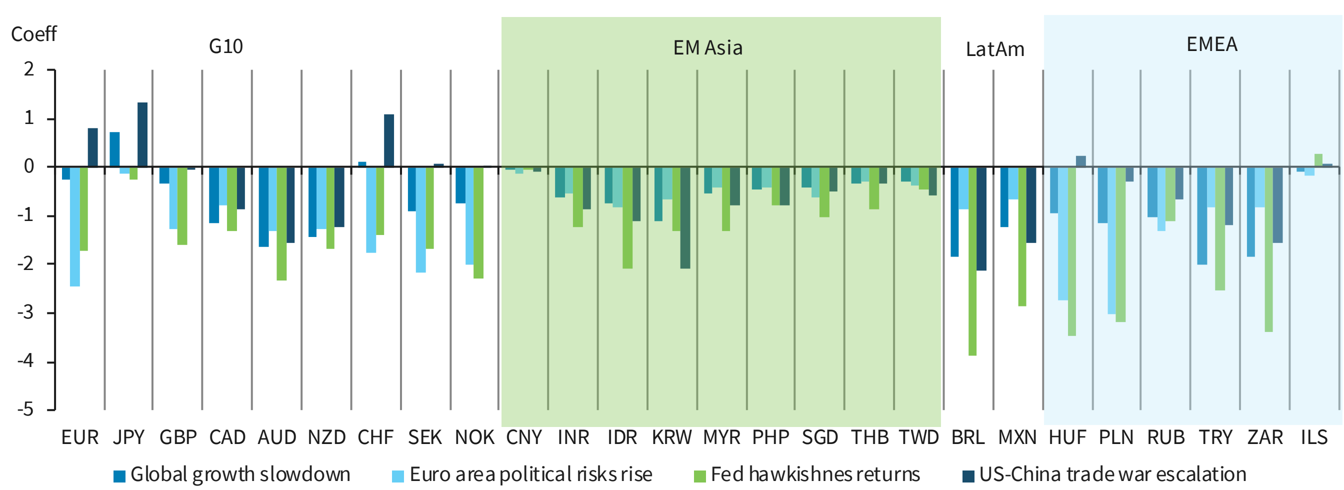
Average 1m FX realized vol changes during simulated historical risk events, normalized by standard deviation



Source: Barclays Research

FIGURE 20

FX spot return (vs. USD) sensitivity during simulated historical risk events



Source: Barclays Research

We examine the space of vol premia – the difference in implied and realized vols, volatility spreads, calendar spreads, and risk reversals – to find those that satisfy two characteristics. First, that they are cheap (0.5SD or below historical levels) and second, that the vols and vol spreads strongly mean-revert during these historically simulated risk scenarios. Figure 21 provides a view of which vols and spreads screen as cheap and likely to rise if the particular risks come to pass.[2]

Key takeaways

- Our analysis suggests that 12m vol in EURUSD has historically performed well in simulated market scenarios that correspond to an increase in European and US-China risks. Back-end EM vols, particularly in high carry FX (TRY, MXN, and INR), are currently cheap and have also been effective hedges during past episodes.

- Risk reversals, particularly for EUR-crosses, screen as cheap and sensitive to the risks considered in our historical simulation. Specifically, EURHUF risk reversals stand out across the curve.

- FX-implied vol curves tend to flatten in most of the simulated risk scenarios considered, suggesting that there has historically been value in buying 6m versus 12m vol in the likes of the EURUSD and USDCAD in G10, and 1m versus 12m USDTRY vol in EM.

- Vol spreads that are long G10 versus EM vol have typically been effective hedges in our analysis. Specifically, our analysis highlights EURUSD, NZDUSD and USDJPY vol versus USDCNY vol.

FIGURE 21

Which vols are cheap and sensitive to key upcoming risks?

	Global growth	Euro area politics	Fed hawkishness	US-China trade war	Overall
Vols	USDMXN 12m	EURGBP 3m	USDINR 12m	EURUSD 12m	EURUSD 12m
	USDTRY 12m	USDINR 12m	USDTRY 12m	USDMXN 12m	USDINR 6m, 12m
	USDINR 6m, 12m	EURUSD 12m	USDMXN 12m	USDTRY 12m	USDTRY 12m
Risk reversals	EURHUF 3m, 6m, 12m	EURHUF 3m, 6m	EURHUF 3m, 6m, 12m	USDPHP 3m	EURHUF 3m, 6m, 12m
	USDBRL 12m	EURGBP 3m, 6m	USDBRL 12m	EURHUF 6m	USDBRL 12m
	USDILS 1m	USDILS 1m	USDILS 1m	USDILS 1m	USDILS 1m
Calendar Spreads	USDCAD 6m vs. 12m	EURUSD 6m vs. 12m	EURUSD 6m vs. 12m	EURUSD 6m vs. 12m	EURUSD 6m vs. 12m
	USDTRY 1m vs. 12m	USDCAD 3m vs. 12m	USDCAD 6m vs. 12m	USDCAD 6m vs. 12m	USDCAD 6m vs. 12m
	USDCAD 6m vs. 12m	EURGBP 3m vs. 6m	USDTRY 1m vs. 12m	USDTRY 1m vs. 12m	USDTRY 1m vs. 12m
Vol spreads	USDJPY vs. USDCNY 6m	EURUSD vs. USDCNY 6m	EURUSD vs. USDCNY 6m	USDJPY vs. USDCNY 3m	EURUSD vs. USDCNY 6m
	NZDUSD vs. USDCNY 6m	EURUSD vs.EURSEK 3m	USDSGD vs. USDCNY 3m	USDKRW vs. USDTRY 3m	NZDUSD vs. USDCNY 6m
	EURJPY vs.USDCNY 3m	EURJPY vs. USDTRY 6m	NZDUSD vs. USDCNY 6m	USDJPY vs. USDCNY 6m	USDJPY vs. USDCNY 6m

Source: Barclays Research

[2] Our algorithm searches the space of vol premia for 28 DM and EM currency pairs over four standard tenors (1m, 3m, 6m, and 12m), 25-day risk reversals for these currency spreads and tenors, six calendar spreads involving the 28 currency pairs, and 378 volatility spreads for each tenor.

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