BIS

BIS Bulletin

No 90

The market turbulence and carry trade unwind of August 2024

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27 August 2024

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The editor of the BIS Bulletin series is Hyun Song Shin.

This publication is available on the BIS website (www.bis.org).

ISSN: 2708-0420 (online)
ISBN: 978-92-9259-782-5 (online)

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The market turbulence and carry trade unwind of August 2024

Key takeaways

- *Financial market volatility resurfaced in early August as the unwinding of leveraged trades in equity and currency markets amplified the initial reaction to a negative macro release in the United States. Markets then stabilised quickly, and volatility receded.*
- *FX carry trades were hit hard by the deleveraging pressures. Their overall size is difficult to measure. Various estimates based on both on- and off-balance sheet activity yield a rough middle ballpark of ¥40 trillion ($250 billion) going into the event, which, if anything, is biased down due to data gaps.*
- *The event was yet another example of volatility exacerbated by procyclical deleveraging and margin increases. Although an outright market dysfunction was averted this time, the structural features of the system underpinning such episodes deserve continued attention by policymakers.*

In the first days of August 2024, financial markets were rocked by an episode of significant volatility. The peak of the stress occurred on 5 August, when the Japanese TOPIX index lost 12% in a single day, and the VIX briefly registered levels not seen since Covid-19. The spike in volatility appears to have been amplified by deleveraging pressures and increases in margins. Strategies that rely on extensive leverage and are predicated on contained volatility, especially in equity, currency and options markets, were forced to unwind. Among them, currency carry trades, especially those funded in yen, were the hardest hit.[1]

This Bulletin discusses the triggers of the turbulence, examines the amplification mechanisms and explores the potential for further flare-ups.

The triggers of the turbulence and the market movements

While the most intense market moves happened in early August, signs of fragility had appeared weeks before. From the first half of July, the yen's depreciation trend had reversed, amid rumoured Bank of Japan interventions, altering the incentives for many leveraged speculators. In addition, a brief equity sell-off with some signs of carry trade unwinding had occurred on 24 July. On that date, valuations of AI/tech stocks, which had been exhibiting strong price momentum in previous months, had dropped by around $1 trillion. In FX markets, the yen (the predominant carry trade funding currency) appreciated sharply.

The turbulence in early August then followed in the wake of seemingly minor news. After what was perceived as a hawkish rate hike by the Bank of Japan and a more cautious approach to rate cuts by the Federal Reserve, investors coalesced around a somewhat disappointing US labour market data release on 2 August. Investors appeared to reassess the likelihood of a potential recession, with some perceiving the prevailing policy stance as too tight. In fact, the news could hardly be taken as an unequivocal sign of a deteriorating outlook, let alone a looming recession. Yet, markets had become hyper-sensitive to any signs

[1] Such strategies entail borrowing in low-yielding currencies, such as yen, to invest in higher-yielding assets in other currencies. Often, they are synthetically implemented via foreign exchange (FX) derivatives such as forwards, FX swaps and options. These trades tend to generate small but consistent returns as long as volatility remains subdued.

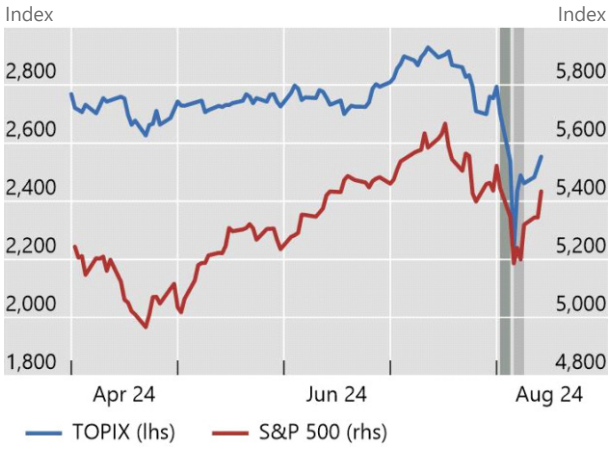
of a change in growth momentum and in the associated monetary policy outlook. Thus, the news acted as a catalyst for an equity market correction, with the S&P 500 losing 1.8%.

Following the weekend, Japanese markets were hit hard by the unwinding of leveraged positions and carry trades (see below) and became the locus of the turbulence. On Monday 5 August the TOPIX lost 12% (Graph 1.A) and the Nikkei volatility index spiked to a level typically seen only during crises (Graph 2.A). Losses and volatility spread to other markets through the day. The Eurostoxx fell by 1.7%; the S&P 500 lost another 3.0%; the MSCI Asia Pacific Index saw its worst drop in a year; meanwhile in off-hours trading, the VIX spiked to levels above 60. The tech sector suffered larger losses, but smaller firms and more cyclical stocks were not spared either. In Japan, bank and insurance company stocks were hit especially hard.

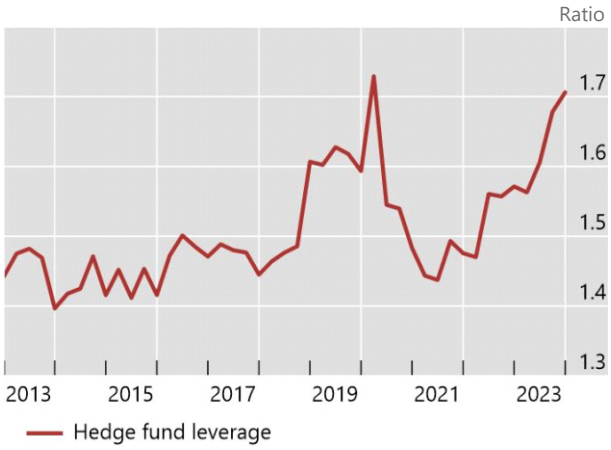
Markets then stabilised almost as quickly. By the close at the end of the week on Friday 9 August, the S&P 500 had recovered all the losses incurred since Monday, while the TOPIX had recovered most of them, and the VIX receded to much lower, albeit still relatively elevated, levels.

Equity market performance and leverage — Graph 1

A. US and Japanese equity indices



B. An indicator of leverage in the hedge fund sector[1]



The darker shaded area indicates 2 August 2024–5 August 2024. The lighter shaded area indicates 6 August 2024–9 August 2024.

[1] Leverage is calculated as the difference between total assets and total secured borrowing via prime brokerage, over total net assets.

Sources: Board of Governors of the Federal Reserve System; Bloomberg; authors' calculations.

The amplifiers: unwinding of leveraged positions in equities and FX carry trades

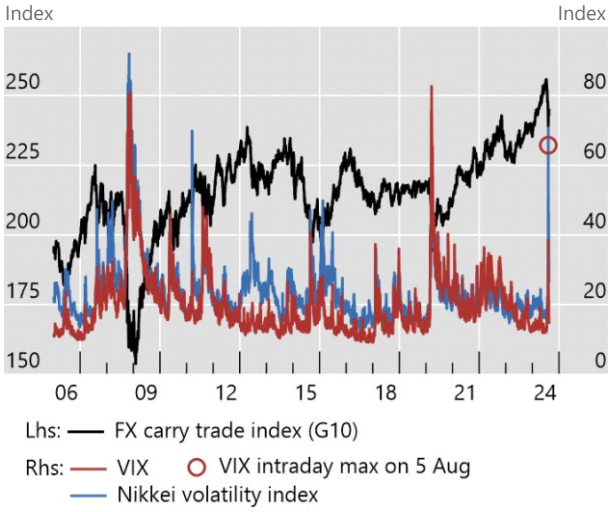
This outsized market reaction to a single data release hints at a key role of amplifying factors, most notably deleveraging pressures amid thin markets (as is common in August). The vehemence of the move reflects in part the prolonged prior phase of risk-taking amid unusually low volatility. This environment had been particularly conducive to the build-up of leveraged positions, such as currency carry trades and related strategies benefiting from low volatility. In line with this, aggregate market leverage in the US hedge fund sector had been on an upward trajectory in the run-up to the event (Graph 1.B).

The spike in the VIX was associated with immediate deleveraging pressures. Upon the initial rise in volatility, market participants faced increased pressure to cover their leveraged positions through outright sales to meet margin calls or purchases of options and VIX futures, thereby further amplifying the rise in the VIX and the size of the volatility shock. The resulting spike in the VIX far exceeded what should have been expected based on the historical relationship between the VIX and S&P 500 returns (Graph 2.B).

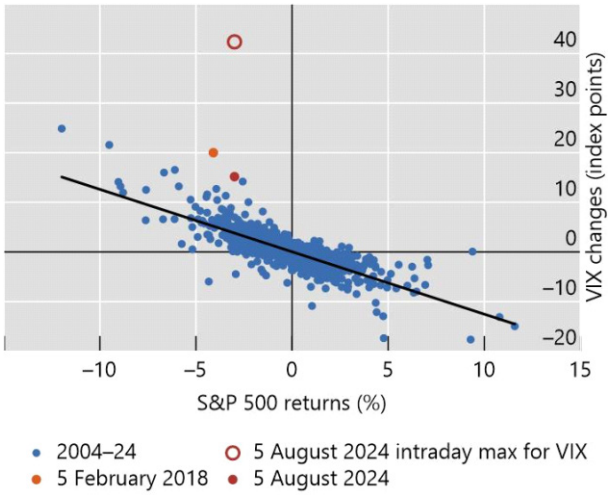
Outsized jump in the VIX on 5 August

Graph 2

A. The VIX and carry trade index



B. Changes in the VIX and S&P500 returns



Sources: Bloomberg; authors' calculations.

Large FX carry trade positions were most sensitive to the volatility spike and were largely forced to unwind. As carry strategies tend to generate small but consistent returns at times of market calm, but quickly generate steep losses as turbulence erupts, they are often portrayed as "picking up nickels in front of a steamroller". A well established pattern is that spikes in volatility go hand in hand with deleveraging pressures and the unwinding of currency carry trades (Menkhoff et al (2012)). There is also evidence that US equity volatility has become closely intertwined with currency carry returns.[2] This common exposure is due to the fact that many equity option strategies entail implicit bets on volatility being contained, akin to currency carry trades. Indeed, the market dynamics of 5 August fit with the historical patterns.

Leveraged carry trade positions had grown rapidly before the event, but their exact size is difficult to estimate. Net short positions in yen futures by "speculative traders" provide a high frequency, albeit very partial, indication. These had reached historical peaks of around ¥2 trillion (or about $14 billion) and were unwound during the event (Graph 3.A). That said, currency futures are only the tip of the iceberg. Over-the-counter (OTC) FX derivatives are behind much larger carry trade positions. A back-of-the-envelope calculation for an upper bound on the size of hedge fund speculative activity with currency forwards yields an estimate of around $160 billion.[3] In addition, there are various other ways to implement carry trades and similar currency bets using off-balance sheet derivatives. For example, an open position in forwards can be rolled using FX swaps.[4] Furthermore, market participants also use currency options (both exchange-traded and OTC), especially when betting on emerging market currencies.

In addition to off-balance sheet (derivatives) positions, carry trades and broader yen-funded investment strategies can be implemented using on-balance sheet instruments. Estimates of the size of these activities can be gleaned from various forms of yen borrowing from banks by entities located outside Japan. For instance, funds channelled by foreign bank affiliates in Japan back to their headquarters often

[2] Brunnermeier et al (2008) show that carry trades incur losses when VIX rises, as margins increase and funding constraints bind. Yen appreciation jumps due to small carry unwinds are also more frequent in periods of higher VIX (Nirei and Sushko (2011)). Caballero and Doyle (2012) find that exposure to short equity volatility strategies helps explain carry trade portfolio returns

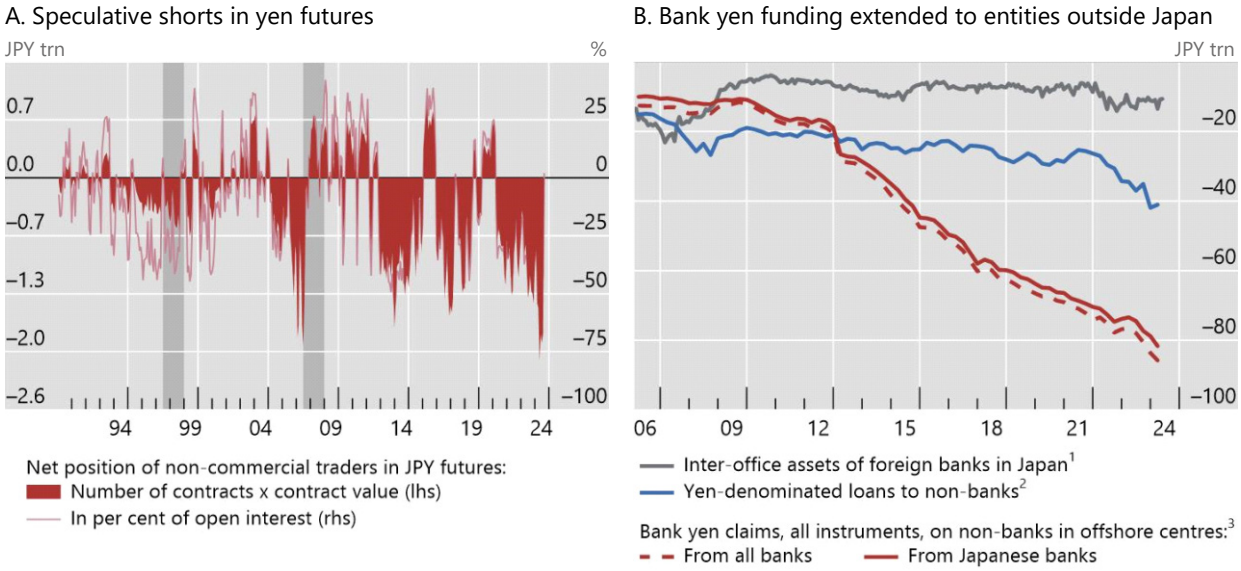
[3] The outstanding notional value of forwards and FX swaps (BIS OTC derivatives statistics) adjusted by the turnover share of hedge funds and principal trading firms, and that of forwards (BIS Triennial Survey): $14.2 trillion × 5% × 24% ≈ $160 billion.

[4] A dollar provider in an FX swap can also convert this covered position into an open currency forward position by eliminating the spot leg of the swap and selling yen spot; see https://x.com/HyunSongShin/status/1821905766439076224.

provide a telltale sign of interbank yen flows to fund carry trades (Hattori and Shin (2009)). These have nearly doubled since 2021 (Graph 3.B, grey line), to almost ¥14 trillion (or over $90 billion). BIS Global Liquidity Indicators further show that yen-denominated loans to non-banks resident outside Japan rose markedly after Covid-19, to about ¥40 trillion ($250 billion) by March 2024 (blue line). Moving beyond just loans to include debt instruments issued to banks by non-banks in offshore centres, such as the Cayman Islands (following Galati et al (2007)), BIS banking statics show that cross-border yen bank claims on this segment had exceeded ¥80 trillion (approximately $500 billion) prior to the event (red lines). This figure covers bank claims of various types, most notably on special purpose vehicles issuing yen-denominated secured notes to fund various investments, such as in the US collateralised loan obligation market. Thus, care needs to be taken when interpreting various estimates. Still, they are broadly consistent with the recent rise in incentives to engage in carry trades, as gauged by carry-to-risk ratios, which peaked in the first quarter of 2024, before policy tightening commenced in Japan (Graph 4.A).

Indicators of yen carry trades and broader yen funding outside Japan

Graph 3



The grey areas: Asian financial crisis (July 1997–December 1998) and the Great Financial Crisis (July 2007–December 2008).

[1] Inter-office assets of foreign banks in Japan (inverted scale); often used as a proxy for the amount of yen sourced by foreign banks in Japan and sent back to headquarters to fund yen carry trades. [2] Cross-border and local bank loans denominated in yen of BIS-reporting banks to non-banks resident outside Japan (inverted scale). [3] Cross-border yen-denominated loan and securities claims (derivatives are negligible in this aggregate, especially for banks in Japan) of BIS-reporting banks on non-banks resident in the following jurisdictions: Andorra, Bermuda, Cayman Islands, Curaçao, Gibraltar, Guernsey, Isle of Man, Jersey, Liechtenstein, and Turks and Caicos Islands (inverted scale).

Sources: Bank of Japan; CFTC; BIS locational banking statistics; authors' calculations.

An unwinding of retail traders' positions via margin brokerage platforms likely also played a role. In aggregate, Japanese retail margin traders had mostly shorted the yen after the pandemic, while their trading volumes ballooned (Graph 4.B). Market commentaries also note that a broader set of positions by the retail segment were forced to unwind. The strong negative reaction of cryptoassets during the episode, with Bitcoin and Ethereum posting losses of up to 20%, also suggests that retail traders faced margin calls and may have been forced to close positions even in seemingly unrelated assets.

The impact of the unwinding reverberated across many currencies, reflecting the use of multiple sources of funding and investments by carry traders. On 5 August, the yen appreciated the most, followed by the Swiss franc (another popular funding currency) (Graph 5.A). Interestingly, the recent episode also involved currencies not typical in carry trade funding, most notably the offshore renminbi (CNH), which also appreciated notably. The Malaysian ringgit gained even more, as it was likely traded as a proxy for

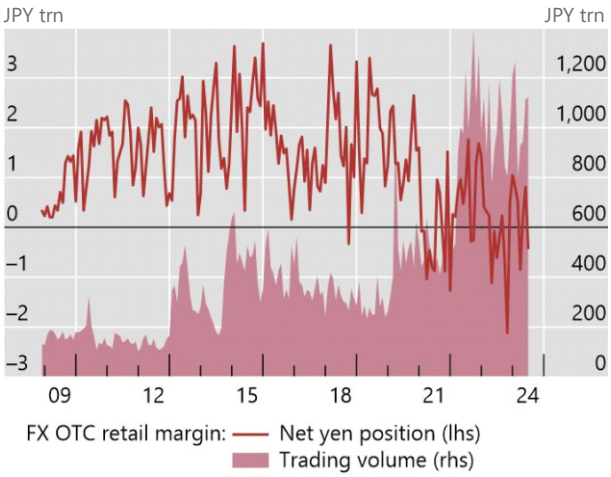
renminbi bets, but is also fairly illiquid and volatile. Among the high-yielding investment currencies, the Mexican peso was hit hardest, followed by the Brazilian real and South African rand (Graph 5.B).

Yen carry trade "Sharpe ratios" and Japanese retail FX margin trading

Graph 4

A. Carry-to-risk ratios

B. "Mrs Watanabe" FX margin trading[3]



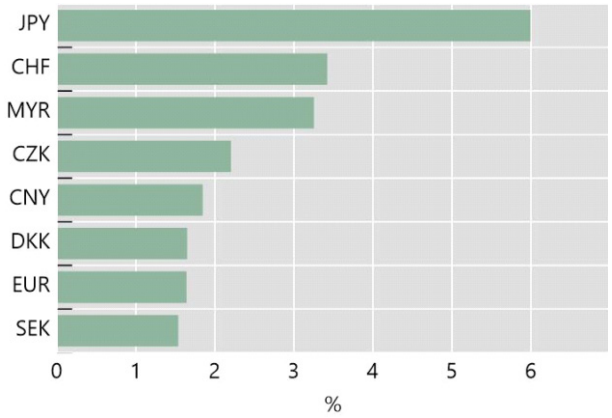
[1] Interest rate differential implied by currency forwards divided by FX options-implied volatility, three-month horizons. [2] Simple average across ARS, BRL, CNY, CZK, HKD, HUF, IDR, INR, KRW, MXN, MYR, PHP, PLN, SGD, THB, TRY and ZAR. [3] Sums of monthly trading volume and open positions in USDJPY, EURJPY, CHFJPY, GBPJPY, CADJPY, NZDJPY, ZARJPY, EURUSD and GBPUSD.

Sources: Bloomberg; LSEG Datastream; JP Morgan Chase; The Financial Futures Association of Japan; authors' calculations.

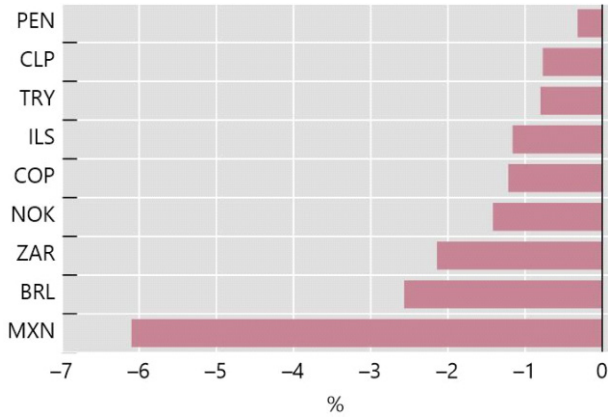
Changes in exchange rates against the US dollar, 1–5 August

Graph 5

A. Currencies that appreciated most



B. Currencies that depreciated most



Sources: BIS bilateral exchange rates; authors' calculations.

Overall, there were many signs of spillovers as investors liquidated other assets to cover margin calls. Reports suggest that the volatility spike triggered margin calls across various markets and central counterparties (CCPs), giving rise to procyclical deleveraging akin to, but less pronounced than, other recent market stress events, such as the Covid-19 crisis (Schrimpf et al (2020)). The Japan Securities Clearing Corporation increased initial margins for long positions of equity indexes by 60–80%, while margins on short positions in Japanese government bond futures increased by 43%; unsurprisingly, margin calls appeared to be particularly large for entities with large FX positions (Clancy (2024)). Leveraged positions beyond carry trades, notably some momentum strategies popular among certain hedge funds (so-called "managed futures"), may have also constituted an additional amplifier. While initially shorting

the yen during its depreciation phase, many momentum players likely went long upon the trend reversal earlier in July, thus further amplifying the moves.

Underlying vulnerabilities linger

Overall, markets showed substantial resilience in the face of considerable volatility. The speed of their recovery was remarkable. Despite multiple signs of currency carry trade unwinding, the magnitudes of exchange rate changes were not outsized when compared to past well-known carry crashes, and indicators of FX volatility did not rise nearly as much as those of equities. Trading also continued to be orderly across other asset classes, and liquidity conditions, while having deteriorated, still allowed for undisrupted trading. CCPs and their members were able to manage large changes in margins, and public authorities did not need to intervene to restore calm.

That said, the factors behind the volatility spike and large market moves have not changed significantly. Risk-taking in financial markets remains elevated. Only a share of various trades predicated on low volatility and cheap yen funding appear to have been unwound. Some broader trades funded in the yen, potentially involving more illiquid assets, may be unwound more sluggishly. Furthermore, there were already indications that some leveraged positions were quickly being rebuilt.

More broadly, a number of factors behind the recent turbulence reflect structural features of our financial system, notably the greater heft of market-based finance (Aramonte et al (2021)). Of particular concern are the ones that enable the build-up of large positions in periods of calm and necessitate their quick unwinding when volatility rises. The reliance on leverage for many of these positions implies that investors will have to respond more strongly to adverse shocks to avoid significant losses. If such behaviour takes place in a jittery and illiquid market environment, volatility could be further exacerbated, and a negative feedback loop could be kindled. In addition, sudden (and large) changes in margins from derivatives and securities positions that are not directly linked to trades that rely on low volatility could add further pressure to markets, infrastructures and intermediaries.

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