FX QUANT SERIES · 1 OF 6

# USD/JPY: A Quantitative Review

carry vs the MoF

*The dollar-yen rate is back near 158, close to the level where Tokyo and Washington intervened in July. This note measures the trend, volatility, tail risk and drivers of the pair, and what the numbers say about the coming weeks.*

Global Markets Research · FX Quantitative Strategy Desk Prepared by ANDRA MARKETS

flat YTD, wild inside

**Coverage summary.** USD/JPY fixed at 158.28 on 8 October, only 1.0 per cent higher than at the end of 2025 but after a round trip through 163.91 in late July, when Japan and the US Treasury intervened jointly to support the yen. Since early September the pair has risen 2.6 per cent as the Federal Reserve raised rates and the yield gap with Japan stayed close to 2.9 percentage points. The quantitative picture is mixed: the trend is flat, volatility is normal, but the distribution of daily moves is the most skewed of any major pair, with sharp falls when the authorities act. Our signal scorecard leans towards a higher dollar, with intervention as the main risk.

| USD/JPY, 8 OCT | 2Y YIELD GAP | 1M REALISED VOL | DAILY SKEW |
|---|---|---|---|
| **158.28** | **+2.88pp** | **7.4%** | **-1.60** |
| *+1.0% YTD* | *US 4.79% vs JGB 1.91%* | *53rd pct of 10 years* | *most negative in this series* |

*Exhibit A. Quantitative dashboard: USD/JPY*

| Metric | Value | Context |
|---|---|---|
| Spot (8 Oct, ECB reference) | 158.28 | end-2025: 156.67 |
| Return 1 week / 1 month | +0.2% / +2.6% | 3 months: -2.6% |
| Return YTD / 12 months | +1.0% / +3.7% | |
| 52-week range | 150.42 to 163.91 | position: 58% of range |
| 50-day / 200-day average | 157.68 / 158.49 | spot -0.1% vs 200-day |
| z-score vs 1-year mean / RSI(14) | +0.2 / 55 | |
| Realised vol 1m / 3m / 1y | 7.4% / 9.2% / 7.9% | 1m in 53rd percentile of 10 years |
| Skew / excess kurtosis (1y daily) | -1.60 / 6.8 | fat tails if kurtosis > 1 |
| Daily 95% VaR (historical, 1y) | -0.73% / +0.66% | down / up tail |
| Variance ratio (5-day) / autocorr. | 1.09 / +0.07 | >1 trending, <1 mean-reverting |

*Source: ECB euro reference rates (14:15 CET), crossed through EUR/USD to obtain dollar pairs; Andra Markets calculations on log returns, 252-day year. Data to 8 October 2026.*

## 1.0 Executive Summary

*Key takeaways*

trend: flat, no edge

**No trend, but a strong carry.** The pair sits almost exactly on its 50-day and 200-day averages (+0.4 and −0.1 per cent), so trend models give no signal. What supports the dollar is carry: the two-year yield gap of 2.88 percentage points pays an investor about 2.9 per cent a year to hold dollars against yen, and twelve-month momentum is slightly positive.

skew −1.6: falls are violent

**The risk is in the left tail.** Daily returns over the past year show a skew of -1.60 and excess kurtosis of 6.8. In plain terms, the pair tends to rise slowly and fall suddenly. The five largest daily moves of the year were all falls, four of them of more than 2 per cent, including the intervention in early August.

1m range: 154 to 163

**Statistical range.** With three-month volatility of 9.2 per cent, the one-standard-deviation range for the next month is about 154.1 to 162.6. The upper end overlaps the area where Japan intervened in July, which makes a move above 162 statistically possible but politically difficult.

## 2.0 Price and Trend

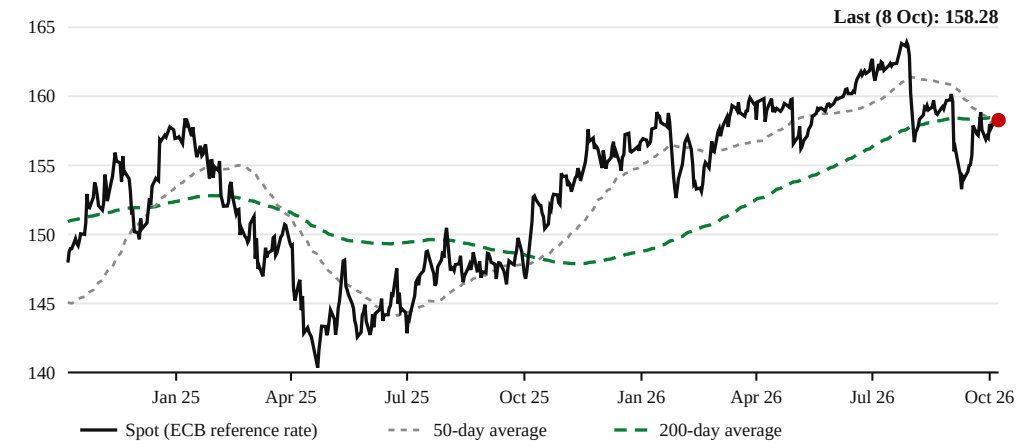
*Range-bound around the averages*

Jul: 163.91 high

Aug: −4% in 3 days

Over the past two years USD/JPY has moved inside a broad 140 to 165 band. In 2026 it rose to 163.91 on 28 July, then fell to 156.68 by 3 August, about 4 per cent in three sessions, after a joint intervention by Japan and the United States, confirmed by the Ministry of Finance on 3 August. Since then it has climbed back steadily. The 50-day average (157.68) has crossed above the 200-day (158.49) only marginally, and the price is in the middle of its 52-week range (58 per cent), with an RSI of 55 and a z-score of +0.2: none of the usual measures shows an extreme.

**Exhibit 1. USD/JPY over two years, with 50-day and 200-day moving averages**




intervention zone 162 to 164

spot = both averages

*Source: ECB euro reference rates, Andra Markets calculations. Moving averages are simple averages of daily fixes.*

## 3.0 Volatility

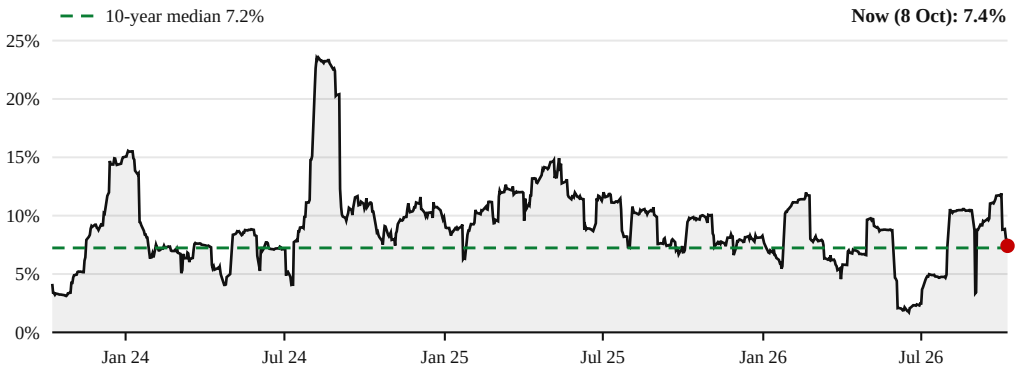
*Normal, after a volatile summer*

3m vol > 1m vol

One-month realised volatility is 7.4 per cent, in the 53rd percentile of the past ten years and close to its median of 7.2 per cent. Three-month volatility is higher at 9.2 per cent because it still includes the intervention in early August and the sharp fall on 3 September. USD/JPY is structurally more volatile than the other majors in this series, and its volatility rises when the price approaches levels that worry Tokyo.

**Exhibit 2. USD/JPY: one-month realised volatility, annualised**

spikes = intervention




*Source: Andra Markets calculation from ECB reference rates: 21-day standard deviation of daily log returns, annualised with √252. The median is over ten years.*

## 4.0 Distribution of Returns

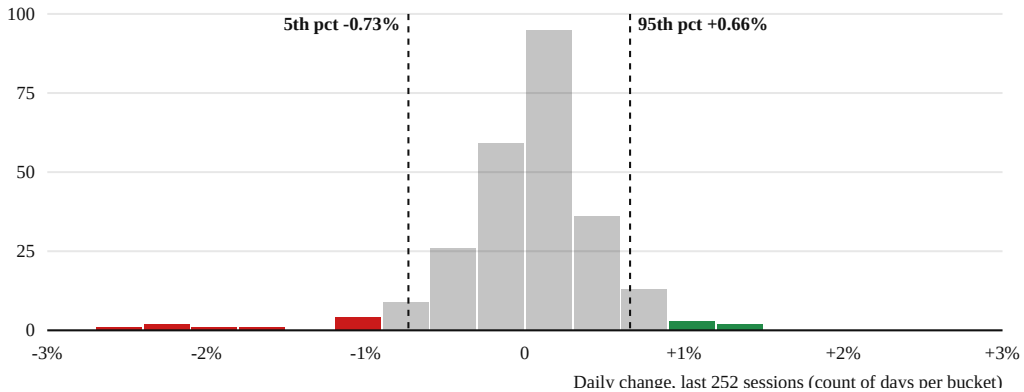
*A negative skew*

VaR 95%: −0.73% a day

The historical one-day value at risk at 95 per cent is -0.73 per cent on the downside and +0.66 per cent on the upside. The asymmetry is clearer in the extremes: the largest daily fall of the year was −2.53 per cent on 26 January, followed by −2.27 per cent on 3 September and −2.24 per cent on 3 August, while the largest rise was only +1.47 per cent. For a dollar buyer, the payoff resembles selling insurance: small gains most days, with occasional large losses.

26 Jan −2.5%, 3 Sep −2.3%

**Exhibit 3. USD/JPY: distribution of daily changes over the last year**




left tail longer

*Source: Andra Markets calculation. Red bars are days beyond the 5th percentile (historical value at risk), green bars beyond the 95th.*

## 5.0 What Moves the Pair

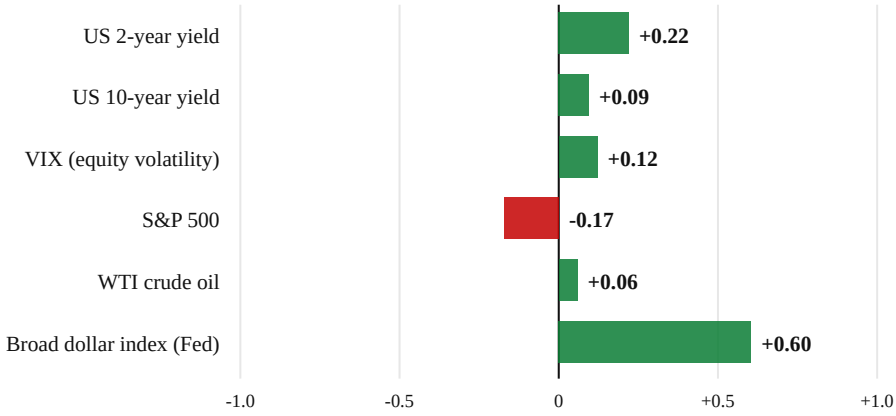
*The dollar, more than yields*

broad USD: +0.60

Over the past 52 weeks, weekly changes in USD/JPY show a correlation of +0.60 with the Fed's broad dollar index, but only +0.22 with the US two-year yield and +0.09 with the ten-year. The textbook link with US rates is therefore weaker than usual: our regression gives a rise of only 0.24 per cent in USD/JPY for every 10 basis points on the US two-year yield. The reason is that Japanese yields have also risen sharply, with the ten-year JGB above 3 per cent, so the gap has moved less than US yields alone.

US 2y: only +0.22

**Exhibit 4. USD/JPY: correlation of weekly changes with market drivers, last 52 weeks**




rates matter less than usual

*Source: Andra Markets calculation from weekly (Friday) changes; FRED for US yields, VIX, S&P 500, WTI and the Fed broad dollar index. Weekly data avoid the gap between the ECB fixing time and US closing prices.*

## 6.0 Macro and Policy Context

*Two hiking central banks*

BoJ: 7-2 vote, 2 dissents

Both central banks are raising rates. The Fed lifted its target range to 3.75 to 4.00 per cent on 16 September and the median projection shows one more increase this year; markets price about an 80 per cent chance of a move in December. The Bank of Japan raised its rate to 1.25 per cent on 18 September by a vote of seven to two, with two members preferring a slower pace. MUFG expects the next BoJ increase in December and a path to 2 per cent by mid-2027. The yield gap therefore depends on the relative pace of the two banks, and on Japanese fiscal policy, which

under Prime Minister Takaichi remains expansionary.

*Exhibit B. USD/JPY macro and policy dashboard*

| Indicator | United States | Japan |
|---|---|---|
| Policy rate | 3.75 to 4.00% (hike 16 Sep) | 1.25% (hike 18 Sep) |
| Next meeting | 28 Oct | 30 Oct |
| 2-year yield | 4.79% | 1.91% |
| 10-year yield | 5.24% | 3.04% |
| Inflation (latest) | CPI 3.4% (Aug) | CPI 1.9%, core 1.7% (Aug) |
| GDP growth (Q2) | 2.2% annualised | +0.4% q/q, +0.7% y/y |

*Sources: Federal Reserve; Bank of Japan via Trading Economics; Trading Economics and FRED for yields (9 October 2026); national statistics. Next BoJ meeting date per Trading Economics.*

gap still ~2.9pp

## 7.0 Positioning and Forecasts

*Speculators long yen*

Speculative investors remain long the yen: CFTC data show a net long position of 55,440 contracts in the week to 29 September, down from 71,982 the week before, so part of the bet on a stronger yen is being reduced as the pair rises. Forecasters expect a gradual decline: MUFG sees 155 at the end of the year and 149 by the third quarter of 2027, while the August Reuters poll had 159 at three months and 154 at twelve months. These forecasts assume that the BoJ keeps raising rates and that the Fed stops after December.

CFTC: +55k long JPY

MUFG: 155 by Q4

## 8.0 Quantitative Outlook

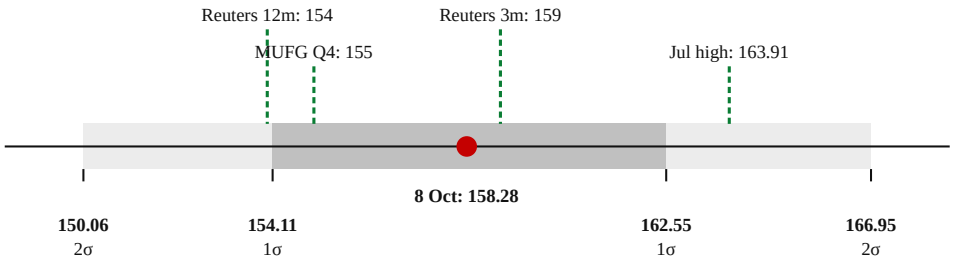
*Ranges and signals*

Using three-month volatility, the statistical range for the next month is 154.1 to 162.6 at one standard deviation and 150.1 to 166.9 at two. Published forecasts sit in the lower half of this range. Combining the quantitative signals gives a composite score of +3 out of 5, driven by carry, mildly positive momentum and seasonality: in eight of the last twelve years, USD/JPY rose in the fourth quarter, with an average gain of 2.0 per cent.

1σ: 154.1 to 162.6

**Exhibit 5. USD/JPY: statistical one-month range from current volatility, with published forecasts**

forecasts below spot




*Source: Andra Markets calculation. Bands use three-month realised volatility of 9.2% and assume normally distributed returns: about two-thirds of outcomes fall inside 1σ and 95% inside 2σ. Forecast markers: MUFG (1 October 2026); Reuters poll (August 2026); 28 July 2026 high.*

*Exhibit C. Quantitative signal scorecard for USD/JPY*

| Signal | Reading | Implication for the pair |
|---|---|---|
| Trend | +0.4% vs 50-day, -0.1% vs 200-day | neutral |
| Momentum (12 minus 1 month) | +1.1% | supports higher |
| Mean reversion | z-score +0.2; RSI 55 | neutral |
| Carry (2-year yield gap) | +2.88 pp in favour of holding the pair | supports higher |
| Seasonality (Q4, 2014 to 2025) | average +2.0%, up in 8 of 12 | supports higher |
| **Composite score** | **+3 out of ±5** | **leans higher** |

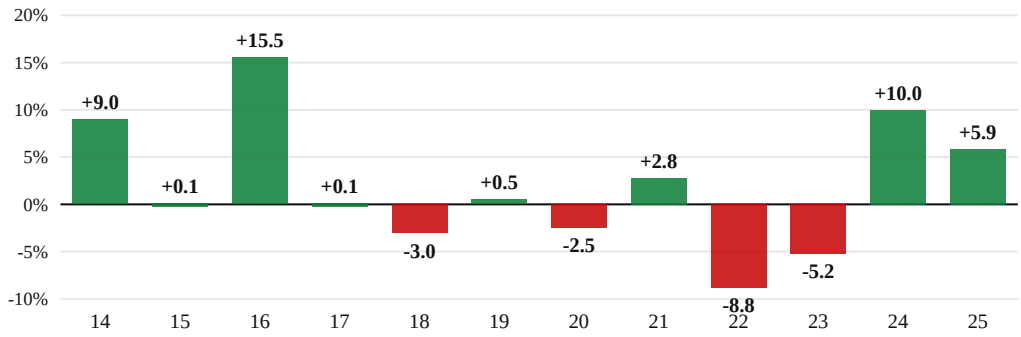
*Andra Markets rules: trend is positive if the pair is above both averages and negative if below both; momentum uses a ±1% band; mean reversion flags a z-score beyond ±2 or RSI beyond 30/70; carry uses a ±0.5 point band; seasonality needs at least 8 of 12 years in one direction. Signals are descriptive, not trading advice.*

The scorecard leans towards a higher USD/JPY, but its main input, carry, is also what makes the pair vulnerable: when many investors borrow in yen to buy dollars, an official intervention or a surprise from the BoJ can force them to close positions quickly, which explains the negative skew. The seasonal pattern is positive on average but uneven, with gains of 10 per cent or more in 2016 and 2024 and a loss of 8.8 per cent in 2022.

score +3: leans higher

**Exhibit 6. USD/JPY: fourth-quarter returns, 2014 to 2025 (%)**

8 of 12 years up




*Source: Andra Markets calculation from ECB reference rates, 30 September to 31 December of each year.*

## 9.0 Risk Considerations and Calendar

*What to watch*

intervention = biggest risk

The main risk to a higher dollar is a second intervention if the pair approaches the July highs; Japan showed in July that it is prepared to act, and with US support. A faster BoJ, a pause by the Fed after weak US jobs data (payrolls rose only 29,000 in September) or a sell-off in global equities, during which the yen usually strengthens, would also push the pair lower. On the other side, a December Fed hike and Japanese fiscal expansion would support it. Key dates: US CPI on 14 October, Japanese CPI on 22 October, the FOMC on 28 October and the BoJ on 30 October. The numbers favour the dollar; the policy risk favours the yen.

14 Oct US CPI, 30 Oct BoJ

verdict: carry says up, the skew says be careful near 162

## Methodology and Source Notes

**Method.** This note applies standard quantitative measures to USD/JPY using ECB euro reference rates, crossed through EUR/USD, to 8 October 2026. Returns are log returns; realised volatility is annualised with 252 trading days; value at risk is historical; correlations use weekly changes. Ranges and signals are statistical descriptions of past behaviour and do not predict future prices. Handwritten notes and highlights are informal commentary by the desk. This note is analysis, not investment advice.

**Principal sources.** ECB euro reference rates (data to 8 October 2026); FRED (US yields, VIX, S&P 500, WTI, broad dollar index); Trading Economics (BoJ decision, JGB yields, Japanese data, 9 October 2026); Federal Reserve; MUFG Research, monthly FX outlook (1 October 2026); Reuters poll via Yahoo Finance (August 2026); CFTC Commitments of Traders (29 September 2026); Ministry of Finance confirmation of intervention as reported by Trading Economics (3 August 2026); babypips (US payrolls, 2 October 2026).


**Disclaimer**

This document is produced by **Andra Markets** Global Markets Research for informational and educational purposes only. It is not investment, legal, accounting or tax advice, and it is not an offer or solicitation to buy or sell any security or financial instrument. Figures are drawn from public sources believed to be reliable but are not independently verified. Multiples are illustrative calculations; analyst views are reported for reference only. Views are those of the desk at publication and may change without notice. Past performance is not indicative of future results. Andra Markets accepts no liability for any loss arising from the use of this material.