Lost in Transmission: Does BOJ Policy Reach US Financial Conditions?

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Abstract

Does Bank of Japan policy reach US financial conditions? Japan is the largest foreign holder of US long-term bonds, and its policy has shifted since December 2022. I construct level and risk financial-conditions factors for Japan and the US, estimate BOJ monetary policy shocks, and use them to instrument Japanese financial conditions. Over the full sample I find no significant transmission to the US. After the BOJ widened its yield-curve-control band in December 2022, however, the Japanese level factor moves the US level factor, consistent with portfolio rebalancing, and the US risk factor, consistent with a carry-trade unwind. Transmission from Japanese to US risk is not significant.The results rest on a short post-2022 sample and on shocks constructed from daily data.

1 Introduction

Motivation. Japan is the largest foreign holder of US long-term bonds, which include Treasury, agency and corporate bonds. In June 2025, Japan held $1.6 trillion of these bonds, about 11.5% of all foreign holdings (Figure 1). Other large foreign holders, such as the UK and the tax-haven financial centres, [1] also hold a considerable chunk of US corporate bonds, but Japan is specifically important for the US Treasury market. Since bonds held through funds in Cayman, Luxembourg or Ireland are recorded against those countries, this number likely understates Japan's true exposure.

Japan matters for other countries as well. Figure 2 shows that more than half of Japan's foreign bond holdings are US bonds, but Japan also holds 7.9% of the reported holdings of bonds issued by other advanced economies, and 4.5% of those issued in Europe.

The post-pandemic surge in inflation has brought a structural shift in Bank of Japan policy. The BOJ widened the yield-curve-control band in December 2022, ended the negative interest rate policy in March 2024, and raised its policy rate to 0.25% in July 2024. Japanese cross-border bond holdings moved with this shift. Figure 3 shows that in the 12 months to December 2023, before the BOJ started hiking, Japanese holdings of US bonds rose by $136 billion. In the following 12 months, which include the hikes in March and July 2024, they

[1] Luxembourg, Belgium and Cayman Islands

fell by $23 billion. Japanese holdings of European bonds rose by $16 billion and then fell by $86 billion. These changes in holdings also include valuation effects.

Figure 4 removes the valuation effects and shows the transactions only. Japanese net purchases of US bonds were very elevated in the pre-COVID era, reaching $138 billion in 2019. They turned into net sales of $65 billion in 2022, when the Fed started hiking. US purchases of Japanese bonds, on the other hand, picked up after the pandemic to $39 billion in 2021, but fell sharply as the Fed raised rates. In the last couple of years, Japanese demand for US bonds has oscillated, whereas US demand for Japanese bonds has picked up again and stayed elevated since 2025.

The structural change in Japanese interest rate policy since December 2022, together with the fact that Japan is a very important holder of debt securities across the globe, motivates me to think about the ways in which Japanese financial conditions transmit to the US.

Research Question. In this paper, I ask whether BOJ monetary policy reaches US financial conditions, and through which channels. To answer it, I proceed in three steps. First, I construct measures of financial conditions for the US and Japan following Lombardi et al. (2025). Second, I estimate monetary policy shocks for Japan following Carrière-Swallow et al. (2025). Third, I study the spillover from Japanese financial conditions to US financial conditions, first in a reduced form and then with an instrumental variable regression, where I instrument Japanese financial conditions with the Japanese monetary policy shocks.

Broadly, I find that, as expected, Japanese monetary policy shocks move Japanese financial conditions, with a more significant effect on the Japanese level factor than on the Japanese risk factor. In the daily data, Japanese and US financial conditions move together, but the link is weak and changes over time. Before the BOJ exit from negative rates in March 2024, a risk-off day in Japan comes with lower US yields, pointing to a flight to safety; after the exit, the Japanese level factor moves with the US level factor. Where Japanese investors own a larger share of the US market, the pass-through is stronger only for the 1-year Treasury, and the effect builds up over the following weeks rather than on the same day; for the 10-year Treasury, the same-day pass-through is weaker.Since this ownership share moves slowly over time, the result may reflect other trends.

In the IV, I find no significant transmission from Japan to the US over the full sample. The transmission only shows up after December 2022, when the BOJ widened the yield-curve-control band, the first step towards ending yield curve control and raising interest rates in 2024. Before December 2022, the BOJ shocks barely move the Japanese level factor (the first-stage F is about 1), so the IV cannot tell whether the transmission in that period was weak or strong. However, the post-2022 results rest on only 22 to 23 BOJ meetings. I also exclude the BOJ meeting of 31 July 2024: its short-rate shock is an 8.5 standard deviation outlier, and the following days were dominated by the weak US payroll report and the unwinding of the yen carry trade, which my controls do not absorb. Since this meeting is the clearest carry-trade episode in my sample, the carry-trade channel I find comes from the other post-2022 meetings.

While most of my results are correlations, I do find some evidence of a portfolio rebalancing channel and a likely carry-trade unwind channel in the post-2022 era. Both channels are driven by the Japanese level factor spilling over to the US: to the US level factor through portfolio rebalancing, and to the US risk factor through the carry-trade unwind.

I do not find significant transmission from the Japanese risk factor to the US risk fac-

tor,partly because of two limitations of my study. First, my Japanese risk factor needs a proper re-evaluation, as it is not yet cleanly estimated from the data. Second, my Japanese monetary policy shocks are constructed from daily data rather than intraday data because of licensing restrictions. To firmly establish which channel is at play, I will need micro-data in future work.

Literature Review. My paper is closest to Carrière-Swallow et al. (2025), who study the spillovers from BOJ unconventional monetary policy to sovereign bond yields abroad. They identify forward guidance and LSAP shocks from high-frequency asset price surprises around 151 BOJ meetings between 2010 and 2023, and estimate local projections of 10-year sovereign yields in a panel of 38 economies at horizons of 0 to 5 days. Since the Fed and the ECB often meet close to the BOJ (37 of the 151 BOJ meetings had a Fed or ECB meeting in the following five days), they control for the shocks of these two central banks. They find that BOJ forward guidance and LSAP shocks that lower the 10-year JGB yield by 10 basis points lower foreign 10-year yields by about 5 basis points. The LSAP spillovers seem to transmit through term premia, and they are stronger in countries where Japanese investors hold a larger share of government debt. They measure this share as its 2010–2023 average, because the share itself is endogenous.

The mechanism behind my results builds on Nenova et al. (2025), who show that FX swap volumes track the hedging of cross-border bond investments by advanced-economy investors, mostly non-bank financial institutions. In their portfolio choice model, asset managers allocate between domestic and US bonds after taking into account the cost of hedging the exchange rate risk. Empirically, FX swap activity of these institutions is higher when the US yield curve is steeper, when the local yield curve is flatter, so that domestic long-term bonds pay less, and when global risk aversion is lower. The euro and the yen account for most of the link between local yield curve slopes and hedging demand, which they relate to quantitative easing flattening the euro-area and Japanese curves.

In their model, the hedged return on US bonds depends on two things: the yield curve slopes, which drive the attractiveness of the investment, and the cost of hedging, which depends on the short-rate differential and the cross-currency basis. FX hedging is therefore itself a channel of transmission. When they instrument the yield curve slopes with the announcement surprises of six central banks, including the BOJ, they argue that spillovers run not only from the US to other economies but also in reverse, although the first stage for the local yield curve slope is weak.Their framework gives two predictions for BOJ shocks. A shock that steepens the JGB yield curve should make Japanese bonds more attractive relative to hedged US bonds, which is the mechanism behind my portfolio rebalancing channel. A rise in the yen short rate, in contrast, lowers the cost of hedging US bonds for Japanese investors and should raise their demand for them. Their evidence, however, is on semi-annual changes in FX swap volumes pooled across five currencies, and does not show the effect on US bond yields or financial conditions, which is what I test.

Contribution. This paper makes four contributions. First, I study the spillover from Japanese to US financial conditions as a whole, whereas Carrière-Swallow et al. (2025) look at sovereign yields alone. Second, to the best of my knowledge, this is the first paper to construct financial conditions for Japan with the safe-rate level factor and the risk factor of Lombardi et al. (2025). Third, I instrument Japanese financial conditions with the BOJ shocks, so I can ask how much of a move in Japanese financial conditions passes through

to the US. Fourth, my sample runs beyond 2023 and covers the BOJ exit from yield curve control and negative rates, which is exactly the period in which I find the transmission.

2 Measuring Financial Conditions

A financial conditions index (FCI) is typically a weighted average of a few broad components: short-term rates, long-term rates, corporate spreads, equity prices and exchange rates. Indices differ mainly in how they choose the weights. The Goldman Sachs FCI, for example, sets the weights by each variable's estimated effect on GDP growth one year ahead (Hatzius et al., 2017). Lombardi et al. (2025) instead use a dynamic factor model, which sets the weights statistically, and BIS Annual Economic Report (2025) apply the same framework. A dynamic factor model reduces the dimension of the data by extracting a small number of common components, or factors, chosen to explain the largest possible share of the variation in the data. Lombardi et al. (2025) distill the inputs into two factors: a level factor, which reflects the level of interest rates, and a risk factor, which reflects risk perceptions and risk appetite in the economy.

Design Philosophy. Lombardi et al. (2025) set out three objectives for the design of a financial conditions index. First, the index should broadly capture the cost and ease of financing faced by the main agents in the economy: firms, households, the government and financial intermediaries. Second, the index should be simple and transparent, and should distill the diverse inputs into common factors that have an economic meaning. Finally, the index should be related to subsequent developments in the real economy, in particular to credit and investment.

It is important to feed a diverse set of financial indicators into the dynamic factor model.[2] As Lombardi et al. (2025) note, and as I found in this project, if the inputs are dominated by one category of variables, such as government bond yields, the second factor is likely to capture a feature of the yield curve, such as its slope, rather than risk.

I group the inputs into five blocs. The first bloc is money-market rates. They are the first link in the transmission of monetary policy: they respond quickly to policy decisions and directly affect the funding conditions of financial intermediaries such as banks. This bloc includes the overnight rate, the 3-month OIS rate and the 3-month T-bill rate.

The second bloc is government bond yields, which represent risk-free rates at longer maturities and determine the government's financing cost. It includes Treasury yields from 2 to 10 years for the US, and JGB yields from 2 to 30 years for Japan.

The third bloc covers spreads, in particular corporate bond spreads, and captures the funding conditions faced by firms. For the US, it includes Moody's Aaa and Baa corporate yields over the Treasury yield, the spread of 3-month non-financial commercial paper over OIS, and the TED spread. For Japan, it includes the spreads of corporate bonds rated AA by Rating and Investment Information (R&I), a Japanese credit rating agency, over JGBs of the same maturity, for maturities from 1 to 10 years.

The fourth bloc covers equity markets. For Japan, it includes the daily returns on the TOPIX, the Nikkei 225 and the TOPIX banks sub-index, and the TOPIX dividend yield. For the US, it includes the daily total return on the S&P 500, the daily return on the financials

[2] Appendix Tables A2 and A3 list the series used to construct the US and Japanese FCIs, respectively.

sector, and two valuation ratios: the forward price-to-earnings ratio and the dividend yield . The final bloc, "bank rates", includes the 30-year fixed mortgage rate for the US.

Appendix Tables A2 and A3 summarize the baseline inputs for each country by bloc, with their definitions, data sources, oriented factor loadings and idiosyncratic variances. Figures 15 and 16 plot these inputs in raw units and show their coverage and variation over time. Figure 5 compares the average loadings of the two indices by bloc.

The filtered-factor decompositions in Figures 6 and 7 show how each bloc contributes to the level and risk factors.

2.1 The Two-Factor Dynamic Factor Model

I follow the methodology of Lombardi et al. (2025) and construct the financial conditions indices with a dynamic factor model. A dynamic factor model extracts the common components from a diverse set of indicators. These common components, or factors, explain the largest possible share of the variation in the data.

Let $X_{1:T}$ denote a K-dimensional multiple time series with T observations. Some observations in X_t may be missing, or may be observed at a lower frequency than the others, such as weekly or monthly series alongside daily ones. I write X_t in factor form as

$$X_t = \Lambda F_t + e_t, \qquad e_t \sim N(0, R), \tag{1}$$

$$F_t = \sum_{i=1}^{p} A_i F_{t-i} + u_t, \qquad u_t \sim N(0, Q), \tag{2}$$

where F_t is an $r \times 1$ vector of unobserved common factors, Λ is the $K \times r$ matrix of factor loadings, and the idiosyncratic errors e_t are orthogonal to the factors, with a diagonal covariance matrix R. The parameters $\Theta = (\Lambda, A, R, Q)$ must be estimated together with the factors F_t. I set $r = 2$. Lombardi et al. (2025) let the factors follow a VAR process of order p; I instead consider two uncorrelated AR(1) processes, so that $p = 1$ and both A_1 and Q are diagonal.

I estimate the loadings with the expectation–maximization (EM) algorithm of Bańbura and Modugno (2014), which handles missing observations and series observed at a lower frequency. Once I have the loadings, I aggregate the standardized inputs into the two indices in a simple way: each index is a loading-weighted sum of the inputs on the same day, without weighting the series by the inverse of their idiosyncratic variances, as in principal components and as in Hartigan and Wright (2021). Each index is therefore a filtered measure that uses no future data. I name and sign the two factors so that the level factor moves with government bond yields, the risk factor moves with corporate spreads, and higher values of both mean tighter financial conditions. Appendix A.1 gives the details of the estimation, the identification and sign of the factors, and the construction of the indices.

2.2 The factor structure

For both the US and Japan, the dynamic factor model yields two factors that together explain more than 60% of the variance of the inputs. The first factor loads mostly on the

"rates" blocs, short-term funding and government bond yields, whereas the second factor loads mostly on corporate spreads (Figure 5). Higher values of either factor mean tighter financial conditions.[3]

Figure 6 decomposes the US level and risk factors into the contributions of each bloc. In line with Lombardi et al. (2025), I find that the level factor broadly tracks US monetary policy, and that its dynamics are driven by short-term funding rates and Treasury yields. The level factor rose during the 2004–06 tightening cycle and peaked in 2006–07, then fell quickly during the Great Financial Crisis. Conditions remained easy for most of the following decade. They eased further after the pandemic, and then tightened very quickly as inflation surged.

The risk factor appears to be mainly an indicator of stress in corporate bond markets. It peaked during the Global Financial Crisis and briefly spiked at the onset of the COVID-19 pandemic, signalling extreme stress and risk-off behaviour by investors. Despite the sharp monetary tightening that followed the post-pandemic inflation, the risk factor rose only moderately in 2022–23 and has been below average since 2025, because corporate spreads stayed compressed and equity markets rose.

Figure 7 decomposes the Japanese factors in the same way. The Japanese level factor follows the stance of monetary policy. It was below average in the early 2000s, rose after the Bank of Japan ended quantitative easing and raised its policy rate in 2006–07, and peaked in 2007–08. It rose briefly after the March 2011 earthquake and tsunami, when corporate spreads widened. It then declined further after the Bank of Japan introduced quantitative and qualitative easing (QQE) in April 2013, and remained very accommodative until Japan began to tighten monetary policy in 2024. Since then, the level factor has kept climbing, driven by higher policy rates and rising government bond yields.

The Japanese risk factor is driven by movements in corporate bond spreads.[4] In the early 2000s, the risk factor signalled very loose conditions, because corporate spreads were very compressed. It tightened sharply during the Global Financial Crisis and then declined rapidly in 2010. It spiked after the March 2011 earthquake and tsunami, stayed elevated through 2012, and declined rapidly after the Bank of Japan introduced QQE. It returned to tight territory in 2016, after the Bank of Japan introduced negative interest rates in January 2016: because the risk factor loads negatively on short-term rates and government bond yields, the fall in these rates pushed it up. It has remained moderately tight since then, and fell back towards its average only in 2026.

[3]In both countries, the risk factor barely loads on daily equity returns. On the equity side, it loads mainly on valuation measures: positively on the dividend yield (0.86 in Japan and 0.33 in the US) and, in the US, negatively on the forward price-to-earnings ratio (Appendix Tables A2 and A3). Because dividends are sticky while prices fall quickly in risk-off episodes, the dividend yield rises when equities become cheaper. For Japan, I construct the TOPIX dividend yield as the dividends paid over the past 12 months divided by the current price, so it moves with equity prices: it rose from 2.1% to 2.6% between 31 July and 5 August 2024. Lower equity valuations therefore come with tighter financial conditions, as expected of a risk factor.

[4]The Japanese risk factor loads negatively on government bond yields and short-term rates. The very low money-market rates and government bond yields after the introduction of negative rates therefore pushed the risk factor up. In contrast, as these rates began to rise in 2025, the risk factor declined. This shows that the risk factor is not fully independent of the level factor, and that the Japanese risk factor needs a more refined extraction.

2.3 Financial Conditions and Economic Activity

One of the goals of a financial conditions index is to help assess its effect on the real economy. In this section, I document how the financial conditions factors relate to subsequent real activity. I follow the two-step procedure of Lombardi et al. (2025). First, I estimate a univariate forecasting regression of a real-economy variable, Y, on its own lags. Second, I regress the residuals of this regression on each of the financial conditions factors and compute the partial R^2.

$$\Delta^h Y_{t+h} = \alpha + \sum_{i=1}^{4} \beta_i \Delta Y_{t-i} + \varepsilon_{t+h} \tag{3}$$

$$\hat{\varepsilon}_{t+h} = \alpha_1 + \gamma_j FC_t^j + u_{t+h} \tag{4}$$

where $\Delta^h Y_{t+h} = \frac{400}{h+1} \ln\left(\frac{Y_{t+h}}{Y_{t-1}}\right)$ is annualized growth over quarters t to $t+h$, $\Delta Y_{t-i} = 400 \ln\left(\frac{Y_{t-i}}{Y_{t-i-1}}\right)$, and $FC_t^j \in \{\text{F1 Level}, \text{F2 Risk}\}$ is one of the two financial conditions factors, averaged over quarter t. I estimate both equations by OLS for $h = 0$ (one quarter) and $h = 3$ (one year), with Newey–West standard errors (four lags). Y is, in turn, credit to the private non-financial sector, real business fixed investment (real private non-residential investment for Japan), real GDP, the GDP deflator, and core prices (the core PCE price index for the US and the core CPI excluding fresh food and energy for Japan).

Table 1 shows that, for the US, the risk factor matters much more for the economy than the level factor. A higher risk factor is associated with lower subsequent growth in every real-economy variable, at both the one-quarter and the one-year horizon. In contrast, the level factor does not predict any of the macroeconomic variables . Lombardi et al. (2025) find a similar result: the level factor predicts only real GDP growth, negatively, at the one-year horizon, and none of the other variables at either horizon. For real GDP, the coefficient on the risk factor is largest at the one-quarter horizon, while for credit and the GDP deflator it is larger at the one-year horizon.

Table 2 shows that, for Japan, the level factor predicts only real private non-residential investment, at both horizons, with a larger partial R^2 at the one-year horizon. In contrast, the risk factor predicts real GDP at both horizons, but real private non-residential investment only in the current quarter. Its effect on real GDP declines as the horizon extends from one quarter to one year. Overall, the Japanese risk factor is much weaker than the US risk factor in predicting real activity.[5]

[5]The strong predictive power of the US risk factor may be driven only by crisis quarters such as the Global Financial Crisis and the COVID-19 pandemic. To check this, I drop the stress quarters of the GFC (2008Q3–2009Q2) and of COVID (2020Q1–2020Q4). The results become much weaker: only credit and investment remain significantly affected.I suspect that the results of Lombardi et al. (2025) are also strongly influenced by these crisis quarters.

3 BOJ Monetary Policy Shocks

Monetary policy influences financial conditions in various ways. First, it changes interest rates at the short end by influencing interest rates in the money market. At the long end, monetary policy influences interest rates through forward guidance and asset purchases. The BOJ has also used yield curve control to anchor long-term interest rates directly. In January 2016, the BOJ introduced a negative interest rate of -0.1 percent on a portion of commercial banks' reserves. In September 2016, it introduced yield curve control, under which it buys JGBs to keep the 10-year JGB yield around 0 percent. It widened the tolerance band around this target in December 2022, and ended both negative rates and yield curve control in March 2024.To study the spillover of Japanese financial conditions to the US, I construct Japanese monetary policy shocks to the policy rate, forward guidance, and large-scale asset purchases (LSAP) following Carrière-Swallow et al. (2025) (hereafter CSKS), who in turn draw on the methodology of Swanson (2021).

CSKS use the high-frequency asset price approach to identify the monetary policy shocks. They consider the changes in six asset price series from Refinitiv Eikon in a window from 5 minutes before to 30 minutes after each announcement: the 10-year, 2-year, and 1-year JGB yields, the 1-month and 3-month overnight index swap (OIS) rates, and the dollar-yen spot exchange rate. I use the same six series, but measure their changes over the day of the announcement.[6] They derive three factors from the changes in the six asset prices around the monetary policy meetings (MPMs):

$$X = F\Lambda + \varepsilon \tag{5}$$

where X is a $T \times N$ matrix of the asset price responses across all MPMs, F is a $T \times k$ matrix of factors with $k = 3$, Λ is a $k \times N$ matrix of factor loadings, and ε is a $T \times N$ matrix of residuals. CSKS adapt the restrictions of Swanson (2021) to Japan and impose them on the factor loadings through an orthonormal matrix Q, which rotates the factors without changing the fit:

$$FQQ'\Lambda = F\Lambda \tag{6}$$

They impose the following conditions on the columns of Q:

1. Neither the LSAP shock nor the forward guidance shock affects the 1-month OIS rate. That is, forward guidance only affects asset prices beyond the current monetary policy meeting.
2. The LSAP shock is the shock that maximizes the variance of the 10-year JGB yield, subject to the restriction that it cannot drive more of the variance of the 1-year JGB yield than the forward guidance shock.

I apply the same rotation to the one-day changes around 173 BOJ meetings between January 2010 and September 2026.

[6] I could not obtain the tick or minute-by-minute data of Japanese asset prices from Refinitiv Eikon because of licensing limitations: the license available to me gives access to tick data only for the past year. Hence, I use daily data to construct the Japanese monetary policy shocks.

3.1 Monetary Policy Results

Figure 8 plots the contribution of the three estimated factors as a share of the common variance explained. As expected, LSAP explains most of the variation in the 10-year JGB yield; however, the LSAP and forward guidance shocks explain almost equal shares of the variance of the 1-year JGB yield. My variance shares for the 1-year yield are very different from those of CSKS, who find that the forward guidance shock explains the majority of the variance of the 1-year JGB yield.

Table 3 shows the factor loadings on the asset prices. My estimated LSAP loadings follow those of CSKS quite closely, except for the yen-dollar exchange rate.However, due to the data restriction, my forward guidance and short-rate loadings are quite different from theirs. For example, my estimated forward guidance shock loads more on the 10-year JGB yield than on the 1-year JGB yield. My estimated short-rate shock loads positively on the 10-year, 2-year, and 1-year JGB yields, whereas the CSKS short-rate factor loads negatively on the 10-year and 2-year JGB yields and almost not at all on the 1-year JGB yield.

I suspect that the differences between my results and those of CSKS are driven by the fact that I measure the shocks with daily data, not in narrow windows around the monetary policy announcement. As a result, some global factors, such as US monetary policy, feed into my estimated shocks.

Table A4 compares my estimated shocks with the Kubota and Shintani (2022) surprises. The correlations of my LSAP shock with their path and target factors are similar to those of the CSKS LSAP shock. However, my forward guidance shock is only weakly correlated with the target factor and the JGB futures surprise, in contrast to the CSKS forward guidance shock.

Figure 9 shows the time series of the LSAP and forward guidance shocks. My estimated LSAP shock for December 2022, when the BOJ widened the yield curve control band, is similar to that of CSKS. My estimated LSAP shocks for the launch of QQE in 2013 and the introduction of negative interest rates in 2016 are substantially larger than theirs, because I estimate them from daily changes in interest rates, whereas CSKS use a short window around the announcement, in which the full impact of the policy may not yet have occurred.

3.2 Relationship between the Japanese FCI and the Monetary Policy Shocks

In this section, I consider the impact of the monetary policy shocks on the Japanese financial conditions indices. Specifically, I estimate the following regression:

$$\Delta F^{JP}_{j,e} = \pi_{0,j} + \pi_{1,j} s^{rate}_e + \pi_{2,j} s^{fg}_e + \pi_{3,j} s^{\text{LSAP}}_e + v_{j,e} \tag{7}$$

where $\Delta F^{JP}_{j,e}$ is the one-Tokyo-trading-day change in the standardized Japanese FCI on the BOJ meeting date e for the factor $j \in \{\text{level}, \text{risk}\}$, and s^k_e is the estimated monetary policy shock $k \in \{\text{rate}, \text{fg}, \text{LSAP}\}$ in standard-deviation units.

Table 4 shows that hawkish short-rate news and hawkish bond-buying (LSAP/YCC) news pull the level factor up, indicating tighter conditions. The same news lowers the risk factor, which partly reflects the mechanical link between JGB yields and credit spreads (columns

1 and 2). When I exclude from the FCI the inputs that are directly used to construct the shocks, the results become even stronger for the level factor but weaker for the risk factor (columns 3 and 4). The risk response is likely not robust to changes in the inputs, as the re-estimated FCI contains fewer credit-spread series. Together, the shocks explain about a fifth of the variance of the Japanese level factor and almost half of the variance of the risk factor (columns 1 and 2).

4 Spillovers from Japanese to US Financial Conditions

In this section, I study the spillover of financial conditions from Japan to the US, and from the US to Japan. Since Tokyo trading closes before New York on the same calendar day ($\text{Tokyo}_t < \text{US}_t < \text{Tokyo}_{t+1}$), I study the spillover from Japan to the US on the same calendar day, and the spillover from the US on one calendar day to Japan on the next. I estimate the following spillover equations:

$$\Delta F^{US}_{k,t} = a_k + \gamma'_k \Delta F^{JP}_t + \rho'_k \Delta F^{US}_{t-1} + u_{k,t} \tag{8}$$

$$\Delta F^{JP}_{j,t+1} = b_j + \theta'_j \Delta F^{US}_t + \phi'_j \Delta F^{JP}_t + v_{j,t+1} \tag{9}$$

where $\Delta F^c_t = (\Delta F^c_{\text{level},t}, \Delta F^c_{\text{risk},t})'$ are the daily changes of the standardized FCI indices of country c between consecutive common trading days, and $k, j \in \{\text{level}, \text{risk}\}$.

Panel A of Table 5 shows the estimates of equation (8) for two sample periods: the first runs from the start of QQE in April 2013 to the end of the BOJ negative interest rate policy in March 2024, and the second from March 2024 to the present. Panel A shows that risk-off episodes in Japan, associated with a higher Japanese risk factor, are associated with a lower US level factor in the first period. This indicates a flight-to-safety channel. However, this association becomes substantially weaker after March 2024, when the BOJ ended negative interest rates and yield curve control.

In the period after negative interest rates, a higher Japanese level factor is associated with a higher US level factor. Within the period since QQE, this transmission from the Japanese level factor to the US level factor is a very recent phenomenon: it appears only after the BOJ widened the yield curve control band in December 2022 (Table A5).The transmission of the Japanese level factor to the US level factor potentially indicates a portfolio rebalancing channel at work. For instance, when BOJ tightening makes domestic bonds more attractive to Japanese investors, it reduces their demand for US Treasuries, or leads Japanese funds to sell Treasuries to fund domestic purchases, which could raise US yields.

Panel B shows that the feedback from the US level factor to the Japanese level factor on the next day is highly significant in the period from the introduction of QQE to the exit in March 2024. The transmission has become even stronger in the period after negative interest rates. The pass-through of US risk to the Japanese level factor probably remains weak because US risk mostly represents US credit and equity market conditions, which are very noisy, whereas the Japanese level factor reflects rate variables such as the short rate and JGB yields. So a movement in the US credit or equity market is not closely associated with movements in the Japanese safe-rate level.

Similarly, the pass-through of US risk to the Japanese risk factor remains very weak in both periods. This may be because, in a US risk-off episode, Treasuries rally and equities fall, which leads to a simultaneous fall in Japanese equities and a rally in JGBs. As JGBs load negatively while equities load positively on the Japanese risk factor, their combined effect cancels out.

The weak transmission of US risk to either the Japanese level or the Japanese risk factor is also supported by Table A5: across the different sample periods, including those starting at the Fed liftoff and at the YCC band widening, there is no evidence of transmission from the US risk factor to the Japanese level or risk factor.The mild association in the full sample could reflect the period before QQE in 2013, when the rolling coefficients of US risk on both Japanese factors were mostly positive (Figure 18).

4.1 Unconditional Co-Movement

Table 6 shows the daily estimates of the relationship between Japanese and US asset prices. There is a significant same-day pass-through from Japanese to US asset prices for every asset class except the corporate spread. The pass-through is largest for the 1-year and 10-year government bond yields, followed by equity prices, and is smallest and insignificant for the corporate spread. The local projections in Figure 12 show the same pattern: the pass-through is statistically significant for government bond yields and equities, but not for the corporate spread.

4.2 Does Japanese Ownership Matter?

If Japanese ownership matters for the spillover, I would expect asset price movements in Japan and the US to be more strongly correlated in the asset classes where Japanese ownership is concentrated. Figure 13 shows that Japanese ownership as a share of the US amount outstanding has declined over the last decade for coupon Treasuries and T-bills. For coupon Treasuries, it has declined from about 10% in 2013 to about 5%, whereas for T-bills, it has declined from about 4% to just one to two percent. The Japanese ownership share of US equities has stagnated over the last decade, while the share of US corporate bonds has increased, from about 2% in 2013 to a peak of about 3% in 2021.

Specifically, I estimate the following local projection:

$$y^{US}_{i,t+h} = \alpha_h + \beta_h \left(\tilde{E}_{i,m-1} \times \Delta y^{JP}_{i,t} \right) + \theta_h \Delta y^{JP}_{i,t} + \kappa_h \tilde{E}_{i,m-1} + \sum_{j=1}^{6} \gamma_{h,j} y^{US}_{i,t-j} + \varepsilon_{i,t+h} \qquad (10)$$

where $E_{i,m}$ is Japanese holdings of US asset class i as a share of the US amount outstanding of class i at the end of month m, and $\tilde{E}_{i,m-1}$ is the previous month's value of $E_{i,m}$, standardized within asset class to mean zero and standard deviation one.

Figure 14 plots the interaction coefficient β_h for the five asset prices. The interaction coefficient is positive and statistically significant only for the 1-year Treasury, where it builds up from about $h = 3$ to $h = 30$ trading days. For the 3-month T-bill, it is also positive but significant at most at long horizons, and the two regressions share the same T-bill ownership series, so they are not independent evidence. For the 10-year Treasury, the coefficient is

negative and significant on the same day (Table A6), so higher ownership comes with a weaker same-day pass-through. The ownership share is a usual confounder because it moves slowly over time. As shown in Figure 13, the T-bill share has declined from about 10% to about 2% over the years, so the interaction term may simply capture whether the pass-through has changed over time.The share can also be confounded by total US debt outstanding: the share can fall simply because US debt outstanding grew, not because Japanese holdings fell.

5 IV Regressions: BOJ Shocks and US Financial Conditions

I identify the spillover from Japanese financial conditions to US financial conditions in two ways. First, in a reduced-form setup, I regress the US financial conditions indices, and their components, on the BOJ monetary policy shocks. Second, in an instrumental variable setup, I instrument Japanese financial conditions with the BOJ monetary policy shocks and estimate the transmission to US financial conditions.

5.1 Reduced Form

In the reduced-form exercise, I estimate the following local projection across BOJ meeting days t, at horizons $h = 0, \ldots, 5$ trading days, for the two US financial conditions indices, $j \in \{\text{level}, \text{risk}\}$:

$$F^{US,j}_{t+h} - F^{US,j}_{t-1} = a^j_h + \sum_k \beta^{j,k}_h s^k_t + \sum_{l=1}^{4} \left(\phi^j_{l,h} \Delta F^{US,\text{level}}_{t-l} + \psi^j_{l,h} \Delta F^{US,\text{risk}}_{t-l} \right) + \delta^{j\prime}_h z_{t,h} + \varepsilon^j_{t+h} \quad (11)$$

where s^k_t, $k \in \{\text{rate}, \text{fg}, \text{LSAP}\}$, are the BOJ monetary policy shocks. To separate out the channels through which financial conditions spill over to the US, I also estimate equation (11) for individual asset prices:

$$y^{US}_{j,t+h} - y^{US}_{j,t-1} = a^j_h + \sum_k \beta^{j,k}_h s^k_t + \sum_{l=1}^{4} \gamma^j_{l,h} \left(y^{US}_{j,t-l} - y^{US}_{j,t-l-1} \right) + \delta^{j\prime}_h z_{t,h} + \varepsilon^j_{t+h} \quad (12)$$

where j denotes the S&P 500, the 3-month, 1-year, and 10-year Treasury yields, and the corporate spread (Moody's Aaa corporate yield minus the 10-year Treasury yield). In both equations, $z_{t,h}$ collects the Fed and ECB policy shocks summed over the response window $t, \ldots, t+h$: the target and path surprises of the Federal Reserve (USMPD $MP1$, $MP2$) and the monetary policy and central bank information shocks of the ECB (Jarociński and Karadi, 2020), as in CSKS.[7]

I exclude the BOJ meeting of 31 July 2024 for two reasons. First, it is an extreme outlier: the BOJ raised its policy rate to 0.25 percent and announced a reduction in its JGB

[7]The ECB series ends on 30 October 2025, so meetings whose window reaches later dates drop out (163–164 meetings remain).

purchases, and as a result the meeting gives a short-rate shock of 8.5 standard deviations (Figure 9). Second, the Fed and ECB policy surprises that I control for do not account for the economic news of the following days: the weak US payroll report surprised markets on 2 August 2024, and the large-scale carry trade unwind followed on 5 August 2024, when the Nikkei 225 fell by 12.4 percent.[8]

Table 7 shows that, as expected and as already shown in Table 4, the short-rate shock raises the Japanese level FCI, and the effect persists over several days. This indicates that the short-rate shock leads to a persistent rise in the level of safe-rate yields in the Japanese bond market. The forward guidance shock has no effect, while the initial impact of the LSAP/YCC shock disappears after a few days. The Japanese risk FCI is persistently and negatively affected by the forward guidance shock and the LSAP/YCC shock. Since these two shocks together represent changes in yields at maturities from 1 year to 10 years, any rise in yields at those maturities mechanically lowers the credit spread. Moreover, since government bond yields load negatively on the Japanese risk factor (Figure 5), any rise in government bond yields further lowers the risk factor.

Table 8 shows a very muted response of the US level FCI to the BOJ shocks, after controlling for the Fed and ECB monetary policy shocks and excluding the outlier BOJ meeting of 31 July 2024. The US risk FCI is positively associated with the BOJ short-rate shock, but not with the other shocks. Since the short-rate shock is primarily an indicator of very short-term money market conditions in Japan, an increase likely points to risk-off sentiment in the US.

However, this explanation is not really credible: when I inspect the impact of the BOJ shocks on the major constituents of the US FCI, I find that the short-rate shock has no significant effect on US equities (S&P 500) or on the Aaa corporate spread (Table 10).

I conclude from these reduced-form results that, while the BOJ shocks affect Japanese safe-rate yields and, likely mechanically, the Japanese risk factor, their effect on US financial conditions is quite muted.

5.2 IV Estimates

To establish the causal channel from the Japanese FCI to the US FCI, I instrument the Japanese FCI with the BOJ shocks as follows:

$$\text{First stage: } \Delta F_t^{JP,j} = \pi_h + \sum_k \gamma_h^k s_t^k + \delta_h' W_{t,h} + v_{t,h} \tag{13}$$

$$\text{Second stage: } F_{t+h}^{US,i} - F_{t-1}^{US,i} = \alpha_h + \beta_h \widehat{\Delta F}_t^{JP,j} + \theta_h' W_{t,h} + u_{t,h} \tag{14}$$

where i and j denote the US and Japanese level or risk factor, respectively, and $W_{t,h}$ is the vector of controls, which includes the lagged changes in the US FCI indices and the monetary policy shocks of the Fed and the ECB.

[8] I found in the reduced form, and in the subsequent steps, that including 31 July 2024 materially changes the estimated coefficients in a counterintuitive way. For instance, when I include 31 July 2024, the BOJ short-rate shock, which raises the Japanese level factor, lowers the US level factor. This is contrary to the OLS spillover regressions in equations (8) and (9).

Tables A8 and A9 show no evidence of a causal effect when I pool all the shocks together, and Tables A10 and A11 show none when I consider one shock at a time.

I hypothesize that the pass-through of Japanese financial conditions to US financial conditions is a very recent phenomenon, as shown in Table 5 (and confirmed in Table A5). Hence, I estimate the spillover over two periods: before the BOJ widened the YCC band in December 2022, and after.

Table 7 shows that the Japanese level FCI is strongly and positively affected by the short-rate shock, which makes intuitive sense. The response of the Japanese risk factor is harder to interpret, as corporate spreads decline mechanically whenever long-term interest rates rise. Thus, I focus on the Japanese level factor:

$$\text{First stage: } \Delta F_t^{JP,L} = \pi_h + \gamma_h s_t^m + \kappa_h' s_t^{-m} + \delta_h' G_{t,h} + v_{t,h} \tag{15}$$

$$\text{Second stage: } F_{t+h}^{US,i} - F_{t-1}^{US,i} = \alpha_h + \beta_h \widehat{\Delta F}_t^{JP,L} + \lambda_h' s_t^{-m} + \theta_h' G_{t,h} + u_{t,h} \tag{16}$$

where s_t^m is the shock of interest, s_t^{-m} are the other two shocks, which enter both stages as controls, L denotes the Japanese level factor, i denotes the US level or risk factor, and $G_{t,h}$ collects the Fed and ECB policy shocks summed over the response window.

In Table 11, I find two distinct mechanisms, with the caveat that after December 2022 I have only 22 to 23 meetings.

Carry-Trade Unwind Channel. This channel operates through short-term Japanese interest rates (Panel A of Table 11). A rise in short-term interest rates in Japan immediately leads to yen appreciation and mark-to-market losses. Leveraged yen-funded carry traders (hedge funds, Japanese retail FX accounts) then face margin calls and value-at-risk constraints, as they have less equity than before, and are forced to shrink their positions. These constrained investors sell risky assets such as US equities and credit. Thus, equity prices fall and spreads widen, which raises the US risk index. Panel C shows no effect of Japanese short-term interest rates on the US level factor, so investors are likely not selling US Treasury bonds.

Portfolio Rebalancing Channel. In this channel, BOJ LSAP/YCC shocks raise long-term interest rates in Japan, which gives global investors an incentive to shift from US long-term bonds to Japanese bonds. In equilibrium, this shift reduces the demand for US long-term bonds and thus raises the US level factor (Panel B of Table 11). Investors are likely not switching across asset classes, for instance selling US equities or US corporate bonds to buy JGBs, and thus the US risk factor does not respond to the BOJ LSAP/YCC shock (Panel D).

These two causal mechanisms appear only after the YCC band widening in December 2022. Before December 2022, I find no support for either mechanism: neither shock moves the Japanese level factor (first-stage F at most 1.3; Table A12). The effect of the Japanese risk factor on the US level and risk factors cannot currently be estimated, because of my construction of the Japanese FCI and weak instruments after December 2022.

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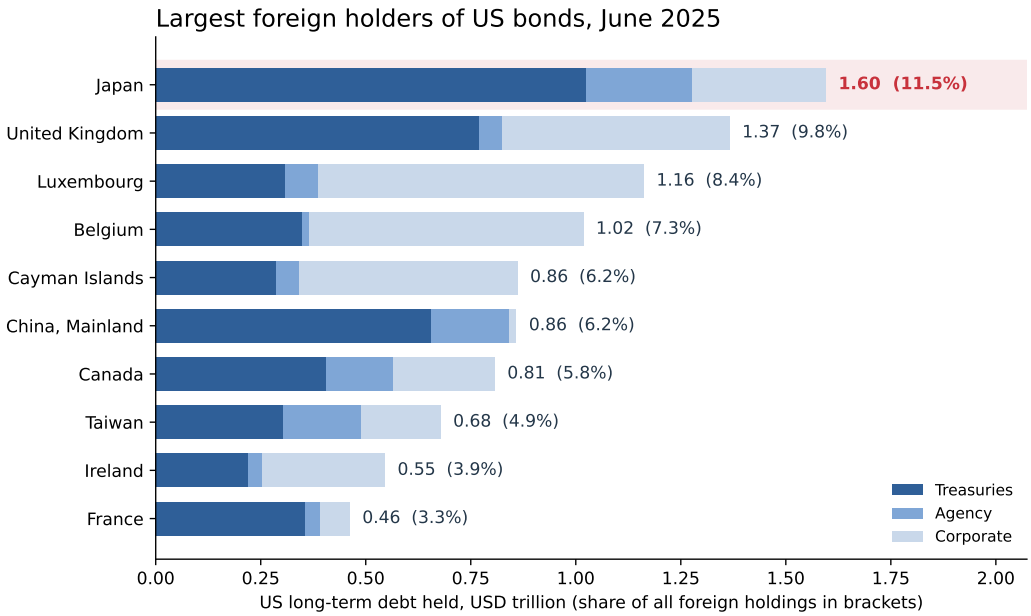


Figure 1: Largest foreign holders of US long-term bonds, June 2025. Bars show holdings of Treasury, agency and corporate bonds by country of foreign holder, in USD trillion; the share of all foreign holdings is in brackets. *Notes:* Holdings are attributed to the country of the foreign holder or its custodian, so bonds held through funds domiciled in Cayman, Luxembourg or Ireland are recorded against those countries and Japan's ultimate exposure is understated. All foreign holders, including international organizations, hold $13.9 trillion. Source: Federal Reserve Board CSLT, built on the Treasury International Capital (TIC) data.

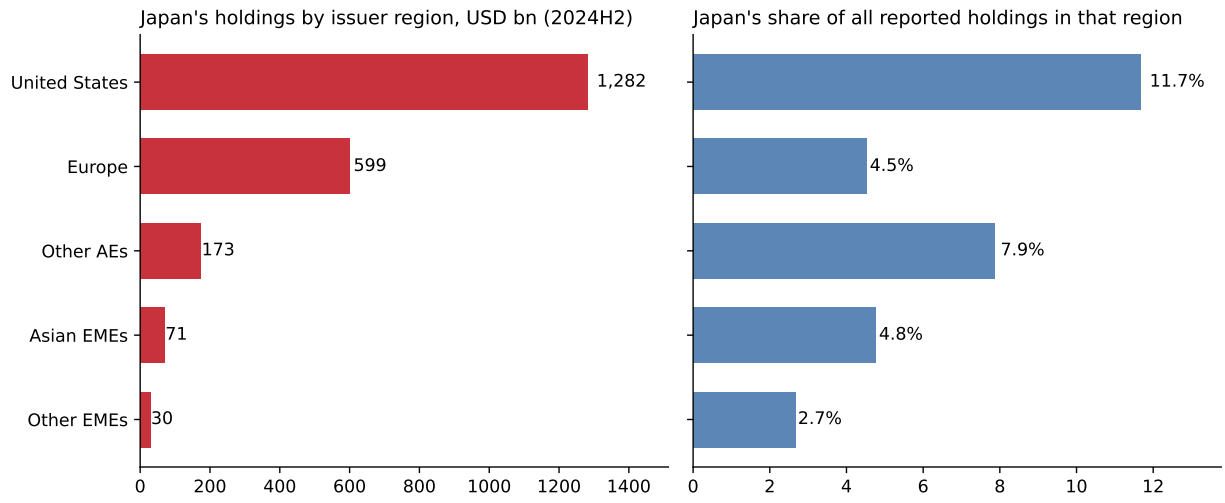


Figure 2: Japan's debt-security holdings by issuer region, December 2024. The left panel shows Japan's holdings in USD billion; the right panel shows Japan's share of all holdings reported by the 78 economies in the sample. *Notes:* Holdings are total debt securities (government, agency and corporate, long- and short-term); equities are excluded. Regions and the 78-economy sample follow Graph 4 of BIS Annual Economic Report (2025); the United States group includes Cayman Islands issuers, and official reserves are excluded. The share divides by holdings reported by the sampled economies and not by all foreign holders; against all foreign holders of US long-term bonds, Japan's share is 11.5–12% (Figure 1). Holdings are market-value positions, not transactions. Source: IMF Coordinated Portfolio Investment Survey (CPIS).

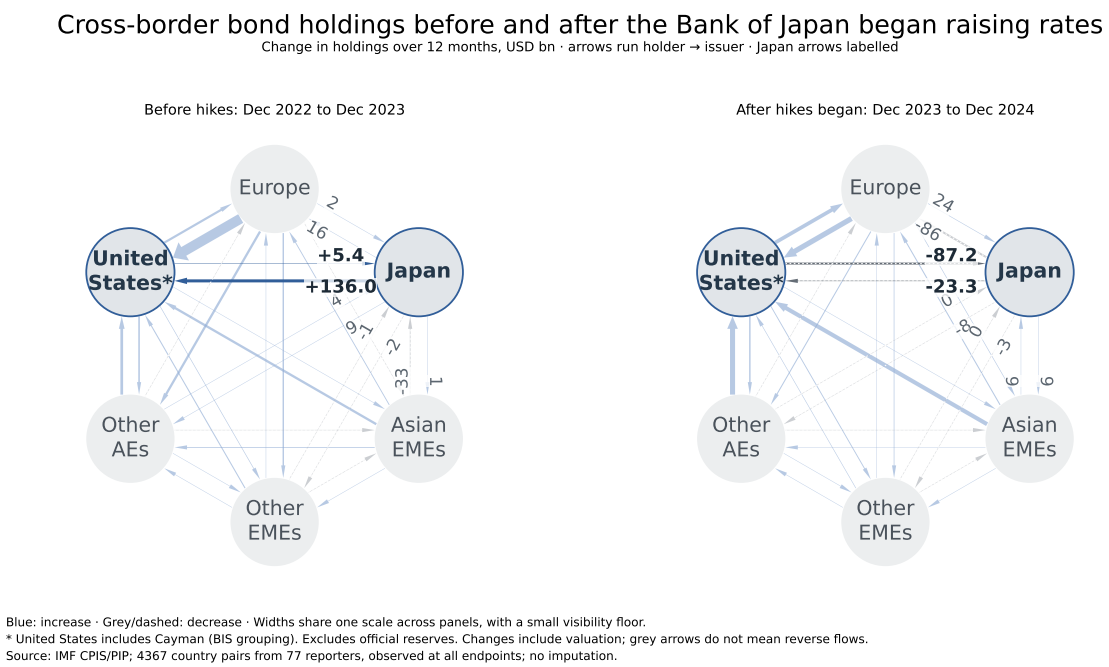


Figure 3: Change in cross-border bond holdings between regions in the 12 months before and after the Bank of Japan began raising rates. Left: December 2022 to December 2023, policy rate at −0.1%. Right: December 2023 to December 2024, including the first hikes in March and July 2024. Each arrow runs from the holder region to the issuer region and reports the change in holdings in USD billion; blue arrows are increases and grey dashed arrows are decreases. *Notes:* Follows Graph 4 of BIS Annual Economic Report (2025), using their regions and one arrow-width scale across panels. The United States group includes Cayman Islands issuers, and official reserves are excluded. Changes are differences in market-value positions and include valuation effects; a grey arrow is a fall in holdings, not a reverse flow. The sample is the 4,367 country pairs of 77 reporting economies observed at all endpoints, with no imputation. Source: IMF Coordinated Portfolio Investment Survey (CPIS).

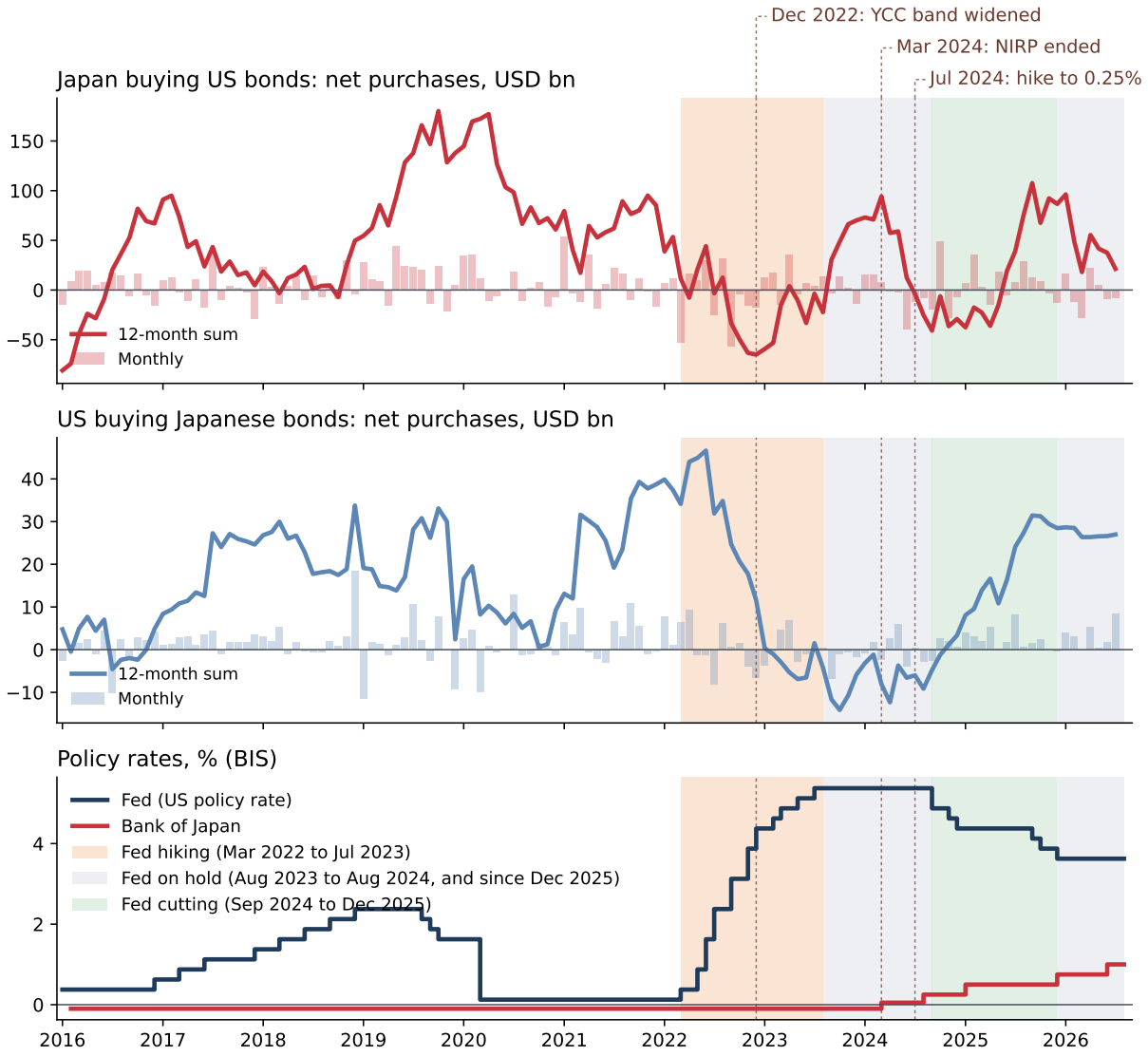


Figure 4: Net bond purchases between Japan and the United States, and the Fed and Bank of Japan policy rates. Top panel: Japan's monthly net purchases of US long-term Treasury, agency and corporate bonds. Middle panel: US residents' monthly net purchases of Japanese long-term bonds. Bottom panel: the Fed and BOJ policy rates. *Notes:* Bars are monthly net purchases in USD billion and the line is their 12-month sum. Net purchases are transactions: they exclude price and exchange-rate valuation, unlike the position changes in Figure 3. Shading marks the Fed's recent phases, dated by the first and last rate change: hiking (March 2022 to July 2023), on hold (August 2023 to August 2024, and again since December 2025) and cutting (September 2024 to December 2025). Dotted lines mark the BOJ's widening of the yield-curve-control band (December 2022), the end of the negative interest rate policy, NIRP (March 2024) and the hike to 0.25% (July 2024). The BIS reports the Japanese policy rate from September 2016; February to August 2016 is filled at −0.1%, the rate in force. Source: Federal Reserve Cross-border Securities holdings and transactions (CSLT), and BIS central bank policy rates; author's calculations.

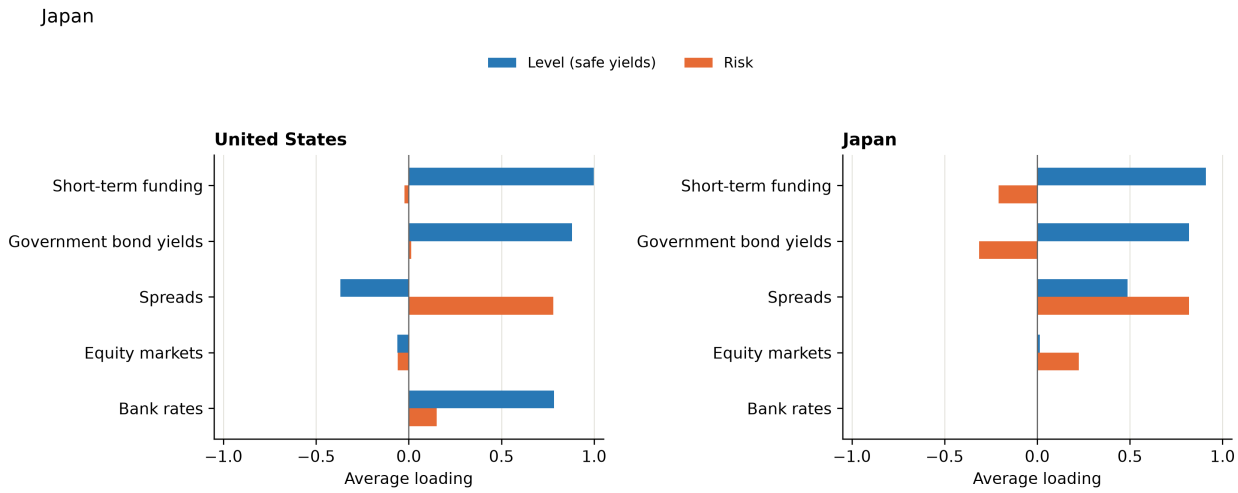


Figure 5: Average factor loadings by bloc for the US and Japanese FCIs. Bars show bloc averages of oriented series loadings from the baseline two-factor DFM. Blue bars are loadings on the level (safe-yield) factor; orange bars are loadings on the risk factor. Both panels use the same bloc order and horizontal scale. The bank-rates row is blank for Japan because its baseline FCI has no bank-rate inputs. *Notes:* Before estimation, each input series is standardized as a z-score by subtracting its sample mean and dividing by its sample standard deviation, giving the series mean zero and variance one. Each oriented factor is then scaled to standard deviation one (equivalently, variance one); a loading therefore measures the change in a standardized input associated with a one-standard-deviation increase in that factor. These are the normalization choices in our implementation. LMS label their factors as standardized in downstream tables and report composite FCI figures in standard deviations, but do not explicitly state in the paper that each DFM input is z-scored or that the raw factor estimates underlying their loading figure have unit standard deviation. Source: US and Japan DFM notebooks.

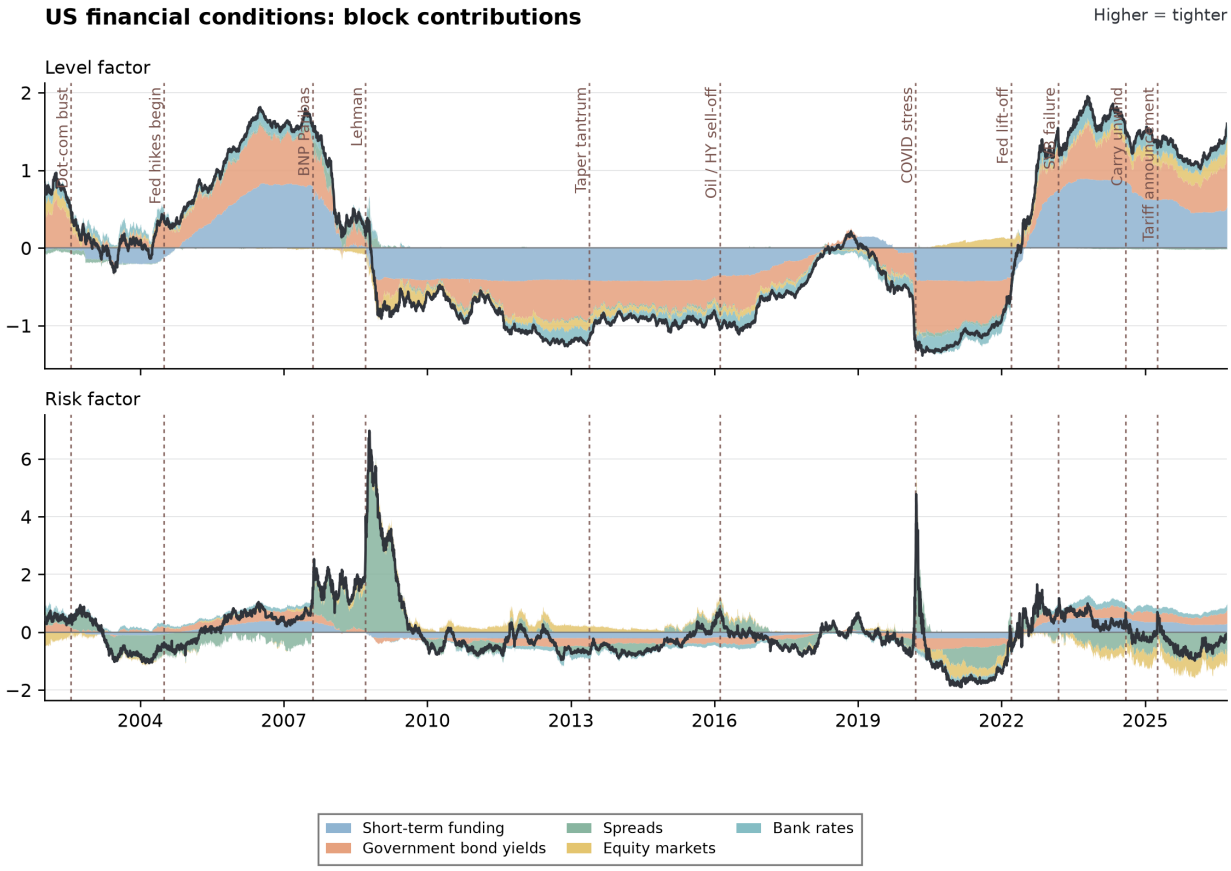


Figure 6: US filtered-factor decomposition by bloc. Colored areas show each bloc's contribution to the factor; the dark line is the sum of the contributions. The muted fills use the same bloc-to-color mapping as the Japan figure. Vertical dashed lines mark the dated events listed in the plot. *Notes:* Contributions are on the factor's unit-standard-deviation scale. The 'Initial state' component is the EM-estimated latent factor state at the sample start and its propagated contribution; it is kept separate from observed-input blocs so the components sum to the filtered factor. Event dates anchor the labelled policy actions, failures, or market-stress dates; they are point markers, not episode windows. The July 22, 2002 marker is the first US session after WorldCom filed for bankruptcy on Sunday, July 21, and identifies the closing phase of the dot-com bust. March 16, 2020 marks acute COVID-related market stress, not the outbreak date. Source: US DFM notebook, exact Kalman-filter bloc decomposition.

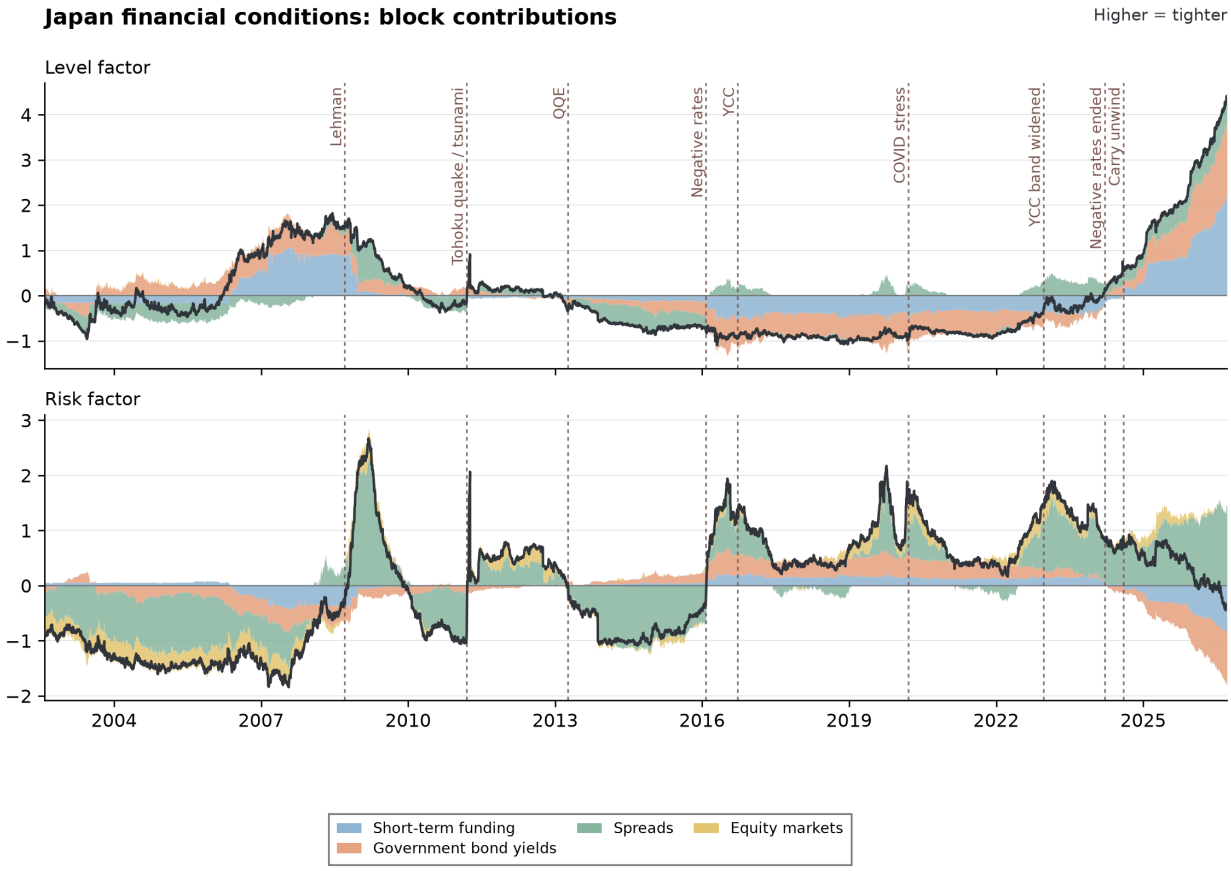


Figure 7: Japanese filtered-factor decomposition by bloc. Colored areas show each bloc's contribution to the factor; the dark line is the sum of the contributions. The muted fills use the same bloc-to-color mapping as the US figure. Vertical dashed lines mark the dated events listed in the plot. *Notes:* Contributions are on the factor's unit-standard-deviation scale. The 'Initial state' component is the EM-estimated latent factor state at the sample start and its propagated contribution; it is kept separate from observed-input blocs so the components sum to the filtered factor. Event dates anchor the labelled Bank of Japan policy decisions or identifiable market-stress dates; they are point markers, not episode windows. March 11, 2011 marks the Great East Japan (Tohoku) earthquake and tsunami, which led to the Fukushima Daiichi nuclear accident. March 16, 2020 marks acute COVID-related market stress. Source: Japan DFM notebook, exact Kalman-filter bloc decomposition.

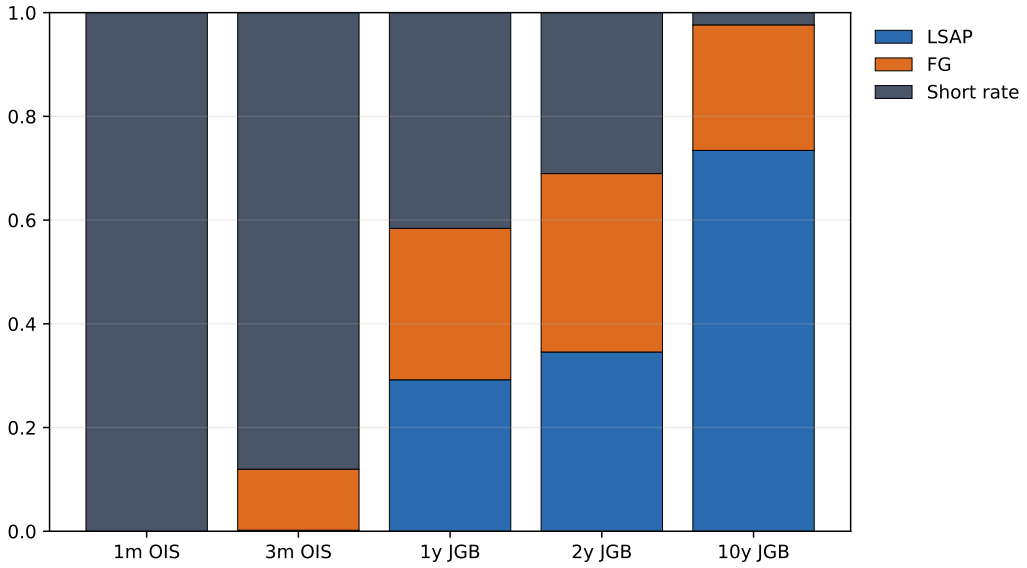


Figure 8: Shock contributions to the variance of announcement-day surprises. Each bar splits the common variance of one input, the part explained by the three rotated factors, into the LSAP, forward-guidance and short-rate shocks. *Notes:* One-day changes around 173 BOJ meetings, January 2010 to September 2026, six-series rotation. As a share of total variance, the three factors leave 9 to 19 percent of each series unexplained. The 1-year JGB bar splits equally between LSAP and forward guidance because the restriction that LSAP explain no more 1-year JGB variance than forward guidance binds. Compare Carrière-Swallow et al. (2025, Figure 5), where the third factor is labelled "Residual". Source: Ministry of Finance and Bank of Japan (via CEIC) and Refinitiv Eikon; author's calculations.

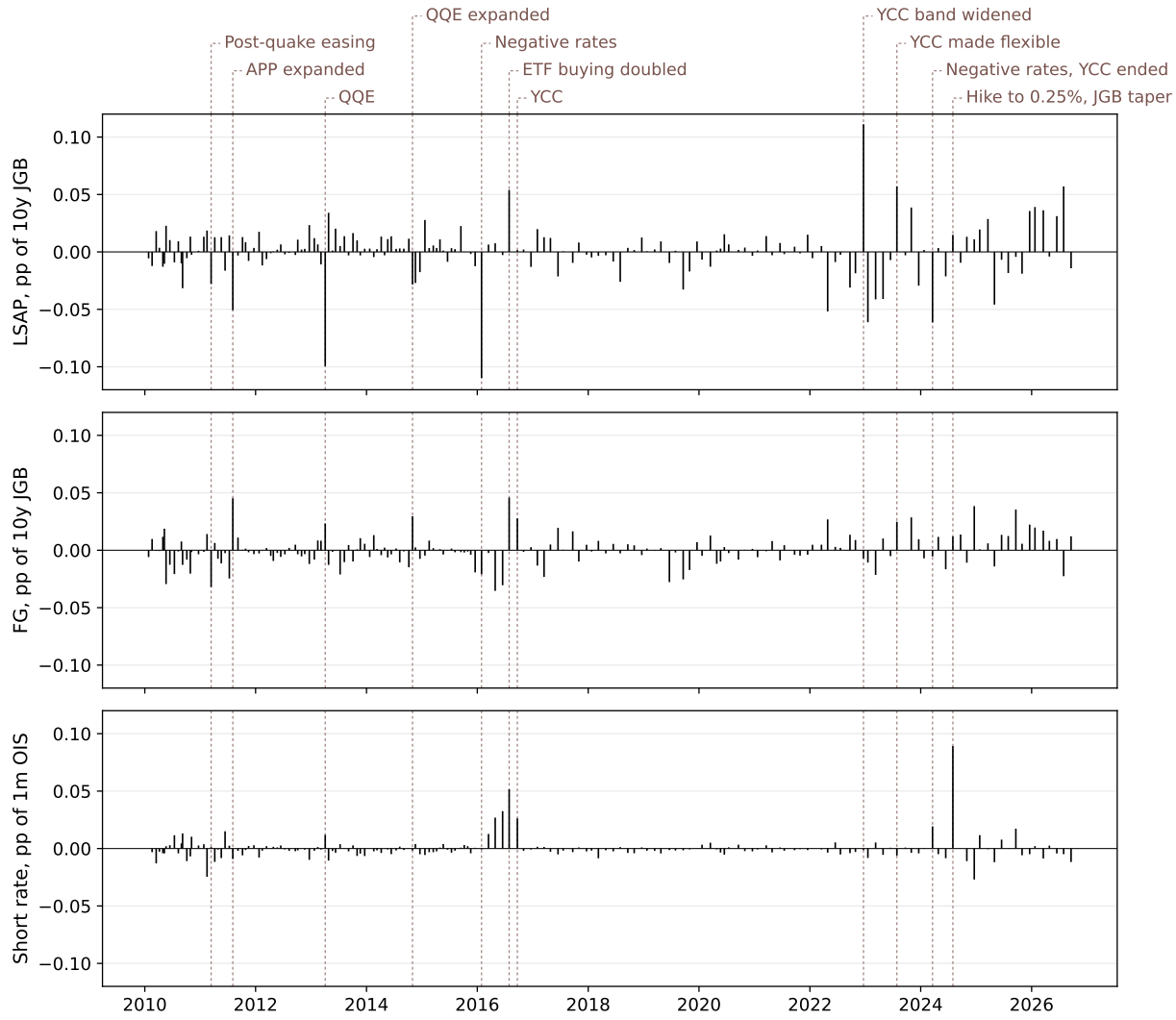


Figure 9: Identified BOJ monetary policy shocks. Top panel: LSAP shocks. Middle panel: forward-guidance shocks. Bottom panel: short-rate shocks. *Notes:* The LSAP and forward-guidance shocks are shown as their contribution to the 10-year JGB yield on the meeting day, in percentage points: the shock times its 10-year JGB loading. The short-rate shock is shown as its contribution to the overnight index swap (OIS) rate. All three panels share the same scale. Dashed lines mark the BOJ decisions behind the largest shocks. One-day changes around 173 BOJ meetings, January 2010 to September 2026, as in Table 3, with 1-month OIS as the short-rate anchor. Compare Carrière-Swallow et al. (2025, Figure 6), whose 30-minute-window shocks cover 2010 to December 2023. Source: Ministry of Finance and Bank of Japan (via CEIC) and Refinitiv Eikon; author's calculations.

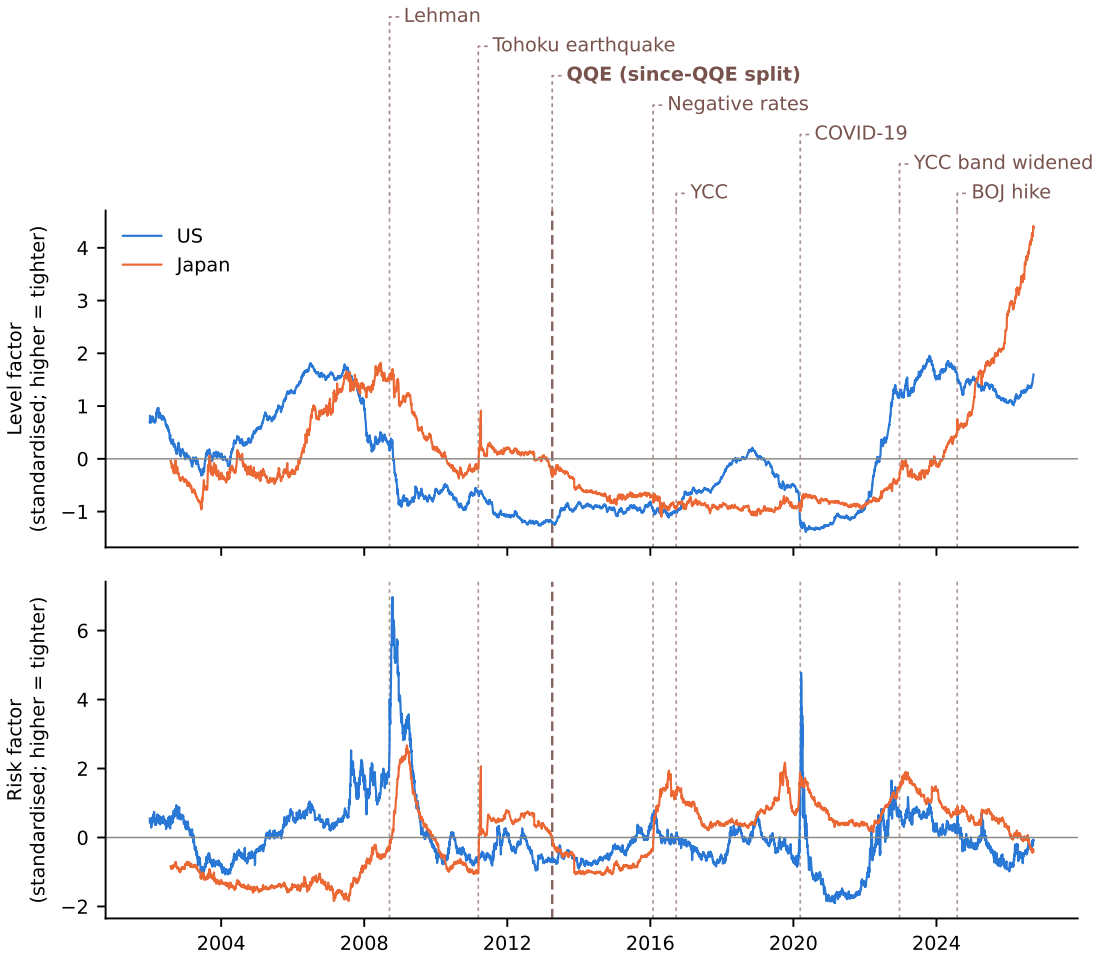


Figure 10: Japanese and US financial-conditions factors (standardised; higher = tighter): level factor (top) and risk factor (bottom). Vertical lines mark key dates; the dashed line is QQE (4 April 2013), the start of the first sample of Table 5.

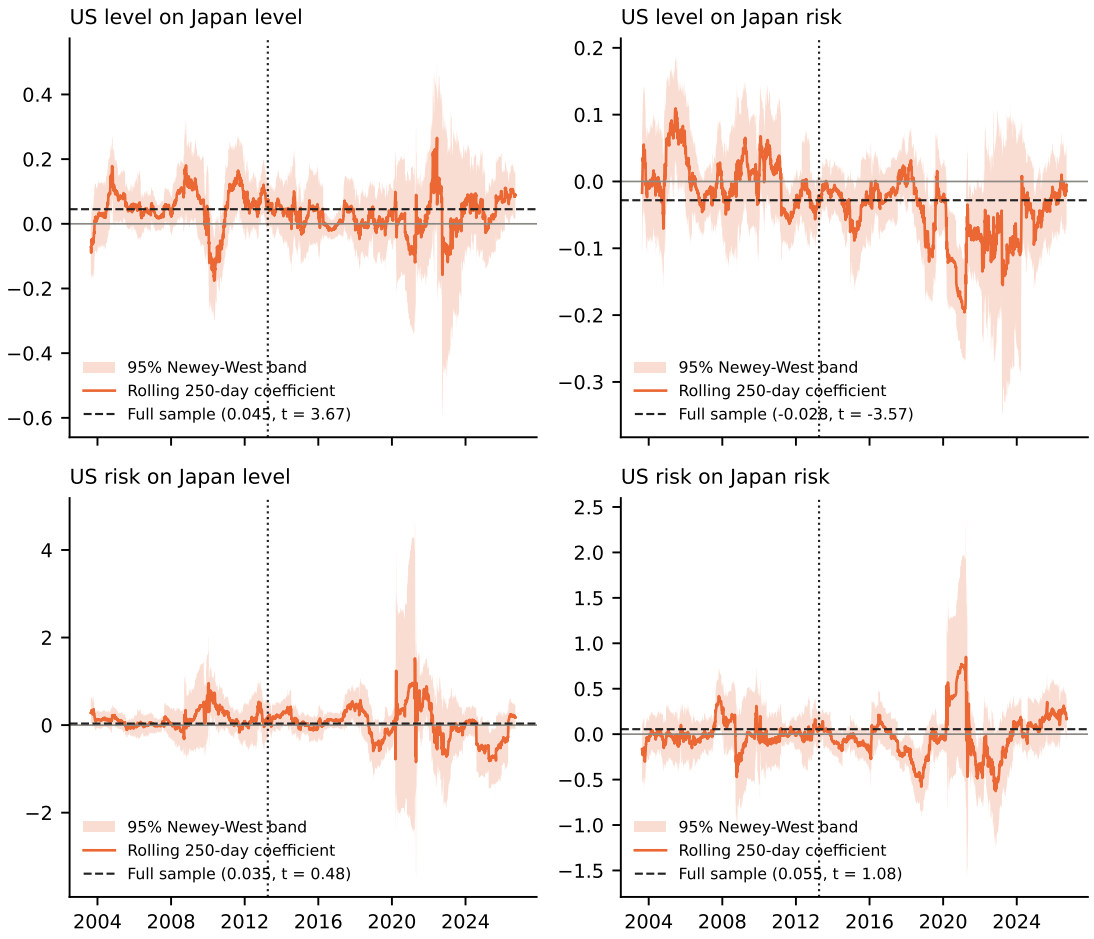


Figure 11: Rolling 250-day coefficients of Japan on US financial conditions, all four links (exploratory). Rows are the dependent variable (US level, US risk); columns are the regressor of interest (Japan level, Japan risk). Each panel is one coefficient of the regression $\Delta F_{k,t}^{US} = a_k + \gamma_k' \Delta F_t^{JP} + \rho_k' \Delta F_{t-1}^{US} + u_{k,t}$, $k \in \{\text{level}, \text{risk}\}$, where $\gamma_k = (\gamma_{k,\text{level}}, \gamma_{k,\text{risk}})'$. Shaded areas are 95% Newey–West bands (5 lags); the dashed line is the full-sample estimate (Table A5, first row, Panel A); the dotted line is 4 April 2013 (QQE). Each panel has its own vertical scale.

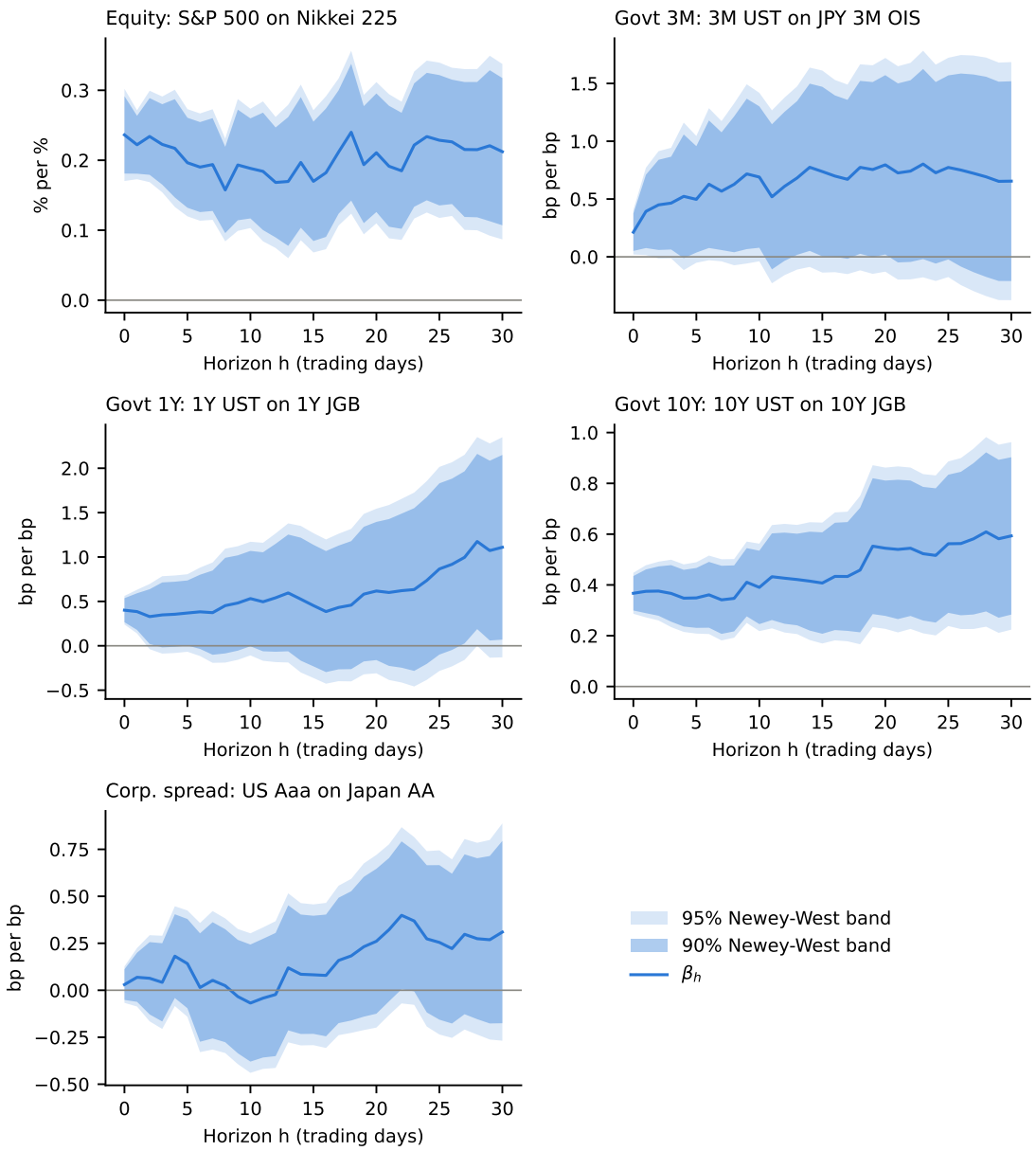


Figure 12: Local-projection coefficient β_h of the US level h trading days after a one-unit Japanese change on day t, $h = 0, \ldots, 30$, with 95% (light) and 90% (dark) Newey–West bands (30 lags). Specification: $y^{US}_{i,t+h} = a_h + \beta_h \, \Delta y^{JP}_{i,t} + \sum_{j=1}^{6} \gamma_{h,j} \, y^{US}_{i,t-j} + \epsilon_{i,t+h}$, estimated asset by asset; series and units as in Table 6.

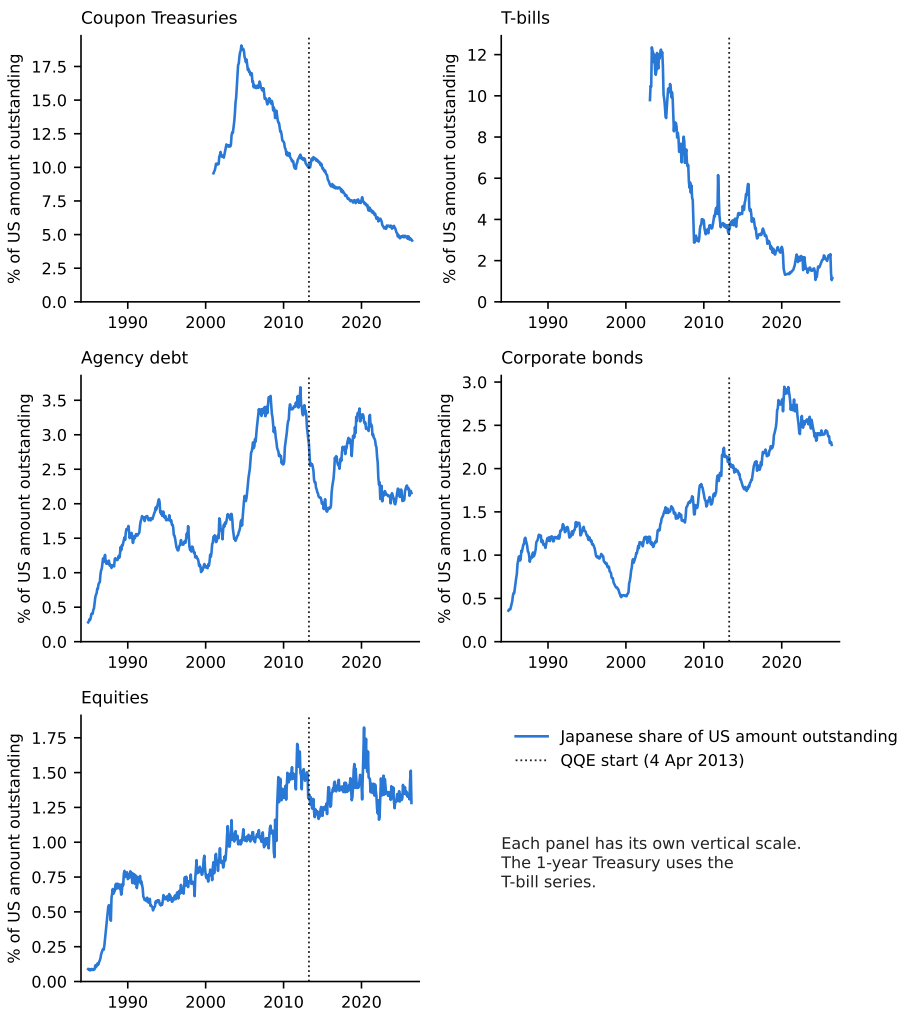


Figure 13: Japanese ownership of US asset classes. Each panel plots Japanese holdings of one US asset class as a percentage of its US amount outstanding, monthly. *Notes:* The vertical scales differ across panels: coupon Treasuries (peak 19%) and T-bills (peak 12%) are an order of magnitude larger than agency debt, corporate bonds and equities (1–4%), so each panel has its own axis, starting at zero. The dotted line marks the start of QQE (4 April 2013). Numerator: Japanese holdings, end of month, market value (Treasury International Capital, Cross-border Securities Long-Term survey). Denominators: T-bills, Treasury Monthly Statement of the Public Debt; coupon Treasuries, market value of marketable debt (Dallas Fed) less bills; corporate bonds, Financial Accounts of the United States (Z.1) nonfinancial plus financial corporate bonds; agency debt and equities, Z.1. Quarterly Z.1 denominators are carried forward from the latest quarter-end. The 1-year Treasury regression uses the T-bill share. Bills are valued at par and Z.1 bonds at book value, against market value in the numerator; Japanese equity holdings include US fund shares, the Z.1 denominator does not. Source: US Treasury (Treasury International Capital; Monthly Statement of the Public Debt), Federal Reserve Bank of Dallas and Federal Reserve Board (Financial Accounts of the United States); author's calculations.

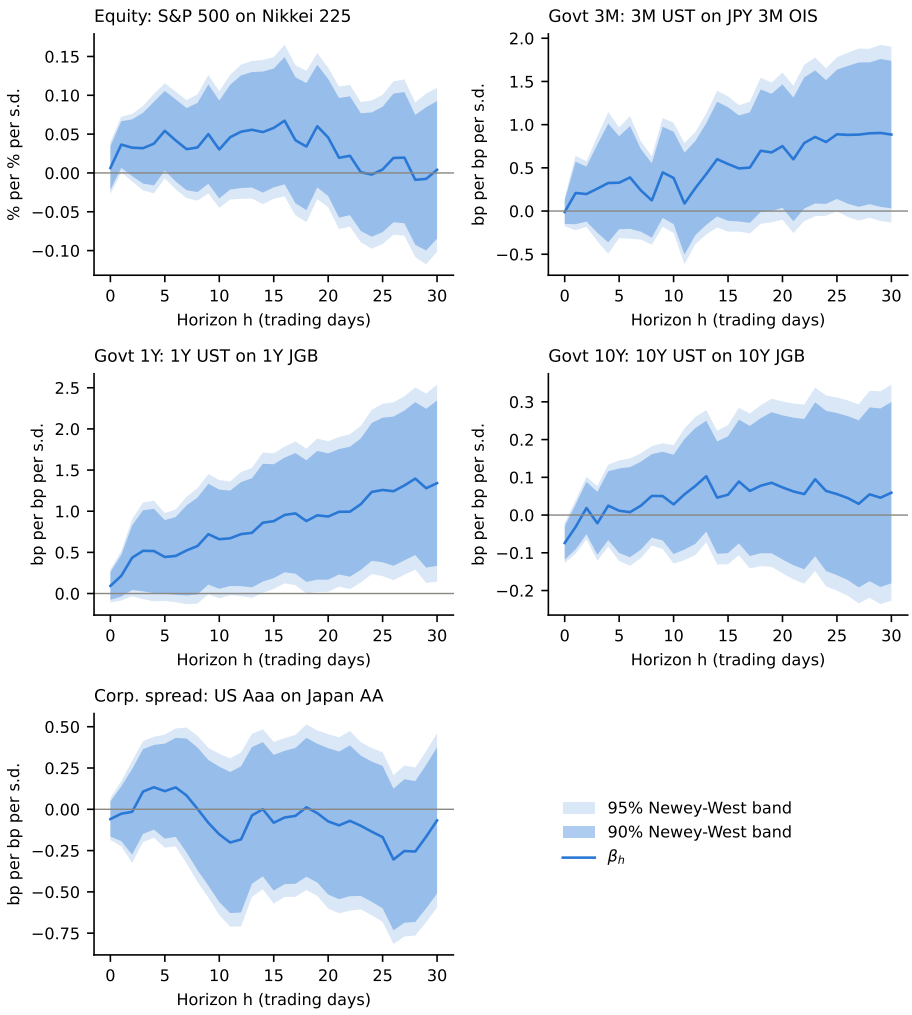


Figure 14: Interaction coefficient β_h, the extra response of the US level h trading days after a one-unit Japanese change on day t per one standard deviation more Japanese ownership of the US asset class, $h = 0, \ldots, 30$. Units: percent per percent per standard deviation of ownership (equity panel), basis points per basis point per standard deviation (all other panels). Specification:
$y^{US}_{i,t+h} = \alpha_h + \beta_h \left(\tilde{E}_{i,m-1} \times \Delta y^{JP}_{i,t}\right) + \theta_h \, \Delta y^{JP}_{i,t} + \kappa_h \, \tilde{E}_{i,m-1} + \sum_{j=1}^{6} \gamma_{h,j} \, y^{US}_{i,t-j} + \epsilon_{i,t+h}$
(Equation (10)), estimated asset by asset by local projections (`lpirf`) with no pooling and no fixed effects. $y^{US}_{i,t+h}$ is the US level (basis points for yields and the spread, 100 ln for the S&P 500) h trading days after day t, and $\Delta y^{JP}_{i,t}$ is the matched Japanese one-day change on day t (series and units as in Table 6). $\tilde{E}_{i,m-1}$ is Japanese ownership of the US asset class (the ownership share $E_{i,m}$) at the end of the previous month, standardised within asset class to mean zero and standard deviation one; the 1-year and 3-month Treasuries share the T-bill ownership series. The six lags of the US level are controls. Light and dark bands are 95% and 90% Newey–West confidence intervals (30 lags). Samples: equity 2000-01 to 2026-07; 3-month Treasury 2005-08 to 2026-08; 1-year Treasury 2003-03 to 2026-08; 10-year Treasury 2001-02 to 2026-08; corporate spread 2002-08 to 2026-07 (start dates set by the ownership data). Table A6 reports the same-day ($h = 0$) estimates of this specification.

Table 1: Predictive power of the US financial-conditions factors for economic activity (LMS Table 2)

	One quarter (h=0)		One year (h=3)	
	(1) F1	(2) F2	(3) F1	(4) F2
A. Credit to private non-financial sector				
F1 (level)	-0.055		-0.170	
	[-0.35]		[-0.85]	
F2 (risk)		-0.834***		-1.160***
		[-3.31]		[-5.79]
Partial R-squared	0.001	0.152	0.008	0.361
Quarters	96	96	93	93
B. Real business fixed investment				
F1 (level)	0.275		-0.336	
	[0.56]		[-0.67]	
F2 (risk)		-3.165***		-3.098***
		[-3.87]		[-3.97]
Partial R-squared	0.002	0.190	0.004	0.318
Quarters	98	98	95	95
C. Real GDP				
F1 (level)	0.315		-0.088	
	[0.69]		[-0.39]	
F2 (risk)		-2.252***		-1.237***
		[-5.62]		[-6.33]
Partial R-squared	0.004	0.192	0.002	0.352
Quarters	98	98	95	95
D. GDP deflator				
F1 (level)	0.009		-0.058	
	[0.07]		[-0.30]	
F2 (risk)		-0.474***		-0.591***
		[-3.56]		[-3.26]
Partial R-squared	0.000	0.158	0.003	0.304
Quarters	98	98	95	95
E. Core PCE prices				
F1 (level)	-0.003		-0.083	
	[-0.04]		[-0.64]	
F2 (risk)		-0.300***		-0.318*
		[-3.43]		[-1.98]
Partial R-squared	0.000	0.138	0.013	0.187
Quarters	98	98	96	96

Dependent variable: residual of a regression of annualised growth over quarters t to t+h on four of its own lags (LMS eq. 3), regressed on one factor at a time (eq. 4). Factors: quarterly averages of the daily filtered US factors, in s.d. Newey-West t-statistics (4 lags) in brackets. * p<0.10, ** p<0.05, *** p<0.01. Sample 2002Q1 onward.

Table 2: Predictive power of the Japanese financial-conditions factors for economic activity (LMS Table 2)

	One quarter (h=0)		One year (h=3)	
	(1)	(2)	(3)	(4)
	F1	F2	F1	F2
A. Credit to private non-financial sector				
F1 (level)	0.055		-0.482	
	[0.14]		[-1.18]	
F2 (risk)		0.363		0.220
		[1.14]		[0.67]
Partial R-squared	0.000	0.017	0.041	0.017
Quarters	93	93	90	90
B. Real private non-residential investment				
F1 (level)	-1.584*		-2.331*	
	[-1.83]		[-1.77]	
F2 (risk)		-1.602*		-1.076
		[-1.71]		[-1.60]
Partial R-squared	0.036	0.042	0.153	0.055
Quarters	95	95	92	92
C. Real GDP				
F1 (level)	-0.533		-0.858	
	[-0.84]		[-1.08]	
F2 (risk)		-1.328**		-0.636*
		[-2.10]		[-1.95]
Partial R-squared	0.010	0.068	0.071	0.067
Quarters	95	95	92	92
D. GDP deflator				
F1 (level)	-0.016		-0.149	
	[-0.11]		[-0.68]	
F2 (risk)		0.269		0.168
		[1.17]		[0.70]
Partial R-squared	0.000	0.018	0.008	0.017
Quarters	95	95	92	92
E. Core CPI (less fresh food and energy)				
F1 (level)	-0.069		-0.105	
	[-0.51]		[-0.49]	
F2 (risk)		0.015		0.029
		[0.09]		[0.17]
Partial R-squared	0.002	0.000	0.006	0.001
Quarters	95	95	92	92

Dependent variable: residual of a regression of annualised growth over quarters t to t+h on four of its own lags (LMS eq. 3), regressed on one factor at a time (eq. 4). Factors: quarterly averages of the daily filtered Japanese factors, in s.d. Credit and core CPI seasonally adjusted with stable quarterly factors. Newey-West t-statistics (4 lags) in brackets. * p<0.10, ** p<0.05, *** p<0.01. Sample 2002Q4 onward.

Table 3: Factor loadings of the identified BOJ policy shocks: daily rotation and Carrière-Swallow et al. (2025)

Shock	Estimate	10y JGB	2y JGB	1y JGB	3m OIS	1m OIS	Yen–dollar
Forward guidance	Daily, six series	1.93	1.22	1.00	0.51	0.00	0.76
	Daily, rates only	0.00	1.06	1.00	0.39	0.00	–
	CSKS, intraday	0.45	1.26	1.00	0.51	0.00	0.63
LSAP	Daily, six series	1.00	0.36	0.30	−0.02	0.00	−0.21
	Daily, rates only	1.00	0.30	0.22	0.01	0.00	–
	CSKS, intraday	1.00	0.21	0.40	−0.15	0.00	−1.64
Short rate	Daily, six series	0.40	0.76	0.78	0.92	1.00	−0.33
	Daily, rates only	0.70	0.61	0.62	0.86	1.00	–
	CSKS, intraday	−0.16	−0.17	0.02	0.75	1.00	−0.18

Notes: Each row is normalized to a loading of one on its anchor: the 10-year JGB for LSAP, the 1-year JGB for forward guidance and 1-month OIS for the short-rate factor. Both unconventional shocks have zero loading on 1-month OIS by construction. Daily rows use one-day changes around 173 BOJ meetings, January 2010 to September 2026; rates in basis points, yen–dollar in percent (positive = yen depreciation). The rates-only rotation drops the yen–dollar rate from the inputs. CSKS rows are from Carrière-Swallow et al. (2025, Table 1): 30-minute windows, 151 meetings, 2010–2023; their third factor, shown in the short-rate rows, is an uninterpreted residual. Source: Ministry of Finance and Bank of Japan (via CEIC), Refinitiv Eikon and Carrière-Swallow et al. (2025, Table 1); author's calculations.

Table 4: First stage: one-day change in Japanese financial-conditions factors on BOJ policy-news shocks

	Baseline FCI		FCI excluding shock inputs	
	(1) Level	(2) Risk	(3) Level	(4) Risk
Short-rate shock	0.0076**	-0.0174***	0.0068**	-0.0058*
	(0.0031)	(0.0048)	(0.0028)	(0.0035)
Forward-guidance shock	0.0019	-0.0200***	0.0015	-0.0227***
	(0.0030)	(0.0041)	(0.0028)	(0.0043)
LSAP/YCC shock	0.0088***	-0.0165***	0.0158***	-0.0015
	(0.0023)	(0.0030)	(0.0023)	(0.0050)
Constant	0.0004	0.0005	-0.0001	0.0013
	(0.0017)	(0.0025)	(0.0016)	(0.0029)
Joint F (3 shocks, robust)	5.82	11.53	17.04	9.28
p-value	0.001	0.000	0.000	0.000
R-squared	0.220	0.481	0.404	0.280
BOJ meetings	173	173	173	173

Notes. One observation per BOJ monetary-policy meeting (173 meetings, January 2010 to September 2026). Dependent variable: change in the standardised factor from the previous Tokyo trading day to the meeting day, in standard deviations of the factor level; higher values mean tighter financial conditions. Regressors: the three daily BOJ policy-news shocks (short rate, forward guidance, LSAP/YCC), in standard-deviation units and signed so that a positive value is hawkish. Robust (HC1) standard errors in parentheses; the joint F tests that all three shock coefficients are zero. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Specification, for meeting e and factor $j \in \{\text{level}, \text{risk}\}$, estimated separately in each column:

$$\Delta F^{JP}_{j,e} = \pi_{0,j} + \pi_{1,j}\, s^{rate}_e + \pi_{2,j}\, s^{fg}_e + \pi_{3,j}\, s^{\text{LSAP}}_e + v_{j,e} \tag{17}$$

where $\Delta F^{JP}_{j,e}$ is the change in factor j and s^k_e are the three BOJ shocks. The table reports $\pi_{0,j}$, $\pi_{1,j}$, $\pi_{2,j}$ and $\pi_{3,j}$.

Columns (1)-(2), baseline FCI: the loading-weighted index of a two-factor (level and risk) dynamic factor model estimated on the 14 daily Japanese series listed in Table A3, August 2002 to September 2026.

Columns (3)-(4), FCI excluding shock inputs: the same model and loading-weighted index, re-estimated on a panel without any series the BOJ shocks are built from (JGB 1-, 2- and 10-year yields, 1- and 3-month JPY OIS, USD/JPY) or any spread made from them. Relative to the baseline it drops the 3-month OIS, the 2- and 10-year JGB yields, the 1-, 2- and 10-year AA-JGB spreads, and adds the 1-, 2- and 10-year AA corporate yields in levels. The 11 series are: short-term funding (overnight call rate TONA, 3-month T-bill); the 30-year JGB yield; AA corporate yields (1, 2 and 10 years); the 5-year AA-JGB spread (the 5-year JGB is not a shock input); and equity (TOPIX and Nikkei 225 daily returns, TOPIX banks daily return, TOPIX dividend yield). Its index correlates 0.995 (level) and 0.967 (risk) with the baseline index.

Table 5: Daily pass-through between Japanese and US financial conditions

	QQE to exit (Apr 2013–Mar 2024)		Since exit (Mar 2024)	
	(1)	(2)	(3)	(4)
Panel A: Japan → US, same-day New York change $\Delta F^{US}_{k,t}$				
	US level	US risk	US level	US risk
Japan level, day t	0.0066	0.1118	0.0689**	-0.2224
	[0.30]	[0.80]	[2.08]	[-1.19]
Japan risk, day t	-0.0608***	0.0868	-0.0256	0.1754*
	[-3.45]	[0.71]	[-1.25]	[1.68]
Controls				
US level, day $t-1$	-0.0104	0.3560**	-0.0257	-0.1851
	[-0.29]	[2.03]	[-0.53]	[-1.03]
US risk, day $t-1$	-0.0008	-0.2946***	-0.0114	-0.1870***
	[-0.13]	[-4.73]	[-1.23]	[-3.81]
Joint F: Japan coefs. $= 0$	5.96	1.11	3.03	1.49
p-value of joint F	0.003	0.329	0.049	0.227
R^2	0.015	0.096	0.021	0.058
Days	2582	2582	588	588
Panel B: US → Japan, next-day Tokyo change $\Delta F^{JP}_{j,t+1}$				
	JP level t+1	JP risk t+1	JP level t+1	JP risk t+1
US level, day t	0.1711***	-0.2076***	0.4401***	-0.1847*
	[5.29]	[-3.34]	[5.48]	[-1.94]
US risk, day t	-0.0001	0.0136	0.0057	0.0170
	[-0.03]	[1.01]	[0.24]	[0.86]
Controls				
Japan level, day t	-0.1299***	-0.0082	-0.0173	-0.0155
	[-3.19]	[-0.17]	[-0.42]	[-0.30]
Japan risk, day t	-0.0164	0.0207	-0.1130**	-0.1078**
	[-0.88]	[0.50]	[-2.24]	[-2.21]
Joint F: US coefs. $= 0$	14.61	5.93	16.76	1.95
p-value of joint F	0.000	0.003	0.000	0.144
R^2	0.044	0.014	0.083	0.019
Days	2582	2582	588	588

Specification. $F^c_t = (F^{c,\text{level}}_t, F^{c,\text{risk}}_t)'$ is the standardised FCI index of country c (Japan or US), and Δ is its change between consecutive common trading days. Tokyo closes before New York on the same calendar day. Panel A regresses the same-day US change on the Tokyo change, controlling for the previous US change: $\Delta F^{US}_{k,t} = a_k + \gamma_k' \Delta F^{JP}_t + \rho_k' \Delta F^{US}_{t-1} + u_{k,t}$. Panel B regresses the next-day Tokyo change on the New York change, controlling for the same-day Tokyo change: $\Delta F^{JP}_{j,t+1} = b_j + \theta_j' \Delta F^{US}_t + \phi_j' \Delta F^{JP}_t + v_{j,t+1}$, with $k, j \in \{\text{level}, \text{risk}\}$. Each column is one OLS regression. Joint F tests that both cross-country coefficients (γ_k or θ_j) are zero. Newey–West t-statistics (5 lags) in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Columns (1)–(2): 4 April 2013 (QQE) to 18 March 2024. Columns (3)–(4): from 19 March 2024, when the BOJ ended negative interest rates and yield-curve control, to 17 September 2026. Table A5 reports five other samples. The association is not causal: global news arriving in Tokyo hours can move both indexes.

Table 6: Same-day pass-through from Japanese to US asset prices, by asset class

	(1) Equity	(2) Govt 3M	(3) Govt 1Y	(4) Govt 10Y	(5) Corp. spread
US series y^{US} (dependent)	S&P 500	3M UST	1Y UST	10Y UST	Aaa − UST10Y
Japanese series y^{JP} (regressor)	Nikkei 225	JPY 3M OIS	1Y JGB	10Y JGB	AA − JGB10Y
Unit of y and Δy	100 ln	bp	bp	bp	bp
Japanese change, day t (β_1)	0.236***	0.205*	0.383***	0.366***	0.029
	(0.024)	(0.106)	(0.081)	(0.038)	(0.048)
Observations	6322	4926	6303	6303	5683
R-squared	0.078	0.026	0.009	0.024	0.003
Sample start (year-month)	2000-01	2005-08	2000-01	2000-01	2002-08

Specification. One OLS regression per column (asset class i): $\Delta y^{US}_{i,t} = \beta_0 + \beta_1 \Delta y^{JP}_{i,t} + \sum_{j=1}^{5} \rho_j \Delta y^{US}_{i,t-j} + \epsilon_{i,t}$. $y^{US}_{i,t}$ is the US series and $y^{JP}_{i,t}$ the matched Japanese series named in the header; Δ is the change between consecutive dates on which both markets quote (a Japanese holiday folds that day's US move into the next observation). Equity is 100 ln of the index, so its change is a percent return and β_1 is percent per percent; yields and spreads are in basis points, so β_1 is bp per bp. *Series.* US: S&P 500; 3-month, 1-year and 10-year constant-maturity Treasury yields; corporate spread = Moody's Aaa yield minus the 10-year Treasury yield (FRED AAA10Y). Japan: Nikkei 225; JPY 3-month OIS rate (Eikon); 1-year and 10-year JGB yields; corporate spread = JSDA R&I AA 10-year yield minus the 10-year JGB yield. *Timing.* Tokyo closes before New York on the same calendar day, so the Japanese change on day t already contains the US session of day $t-1$; β_1 is a correlation, not a causal effect, and the five lags of the US change control for what the US did before Tokyo's day t (coefficients not shown; with one or ten lags β_1 changes by at most 0.01). All samples end in 2026-09. Newey–West standard errors (5 lags) in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: BOJ policy news and Japanese financial conditions: reduced form with Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
Japanese level FCI (s.d.)						
Short-rate shock	0.005	0.025**	0.022**	0.021*	0.025**	0.024**
	(0.005)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Forward-guidance shock	0.003	-0.003	-0.002	-0.002	-0.003	-0.004
	(0.003)	(0.005)	(0.006)	(0.007)	(0.008)	(0.008)
LSAP/YCC shock	0.007***	0.011**	0.007	0.008	0.008	0.010
	(0.003)	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)
R-squared	0.252	0.293	0.289	0.265	0.243	0.200
Japanese risk FCI (s.d.)						
Short-rate shock	-0.022***	0.008	-0.003	-0.001	0.006	0.012
	(0.007)	(0.029)	(0.029)	(0.029)	(0.028)	(0.027)
Forward-guidance shock	-0.018***	-0.038***	-0.048***	-0.052***	-0.055***	-0.056***
	(0.005)	(0.012)	(0.015)	(0.017)	(0.019)	(0.019)
LSAP/YCC shock	-0.018***	-0.027***	-0.034**	-0.032*	-0.037**	-0.038*
	(0.003)	(0.010)	(0.014)	(0.017)	(0.018)	(0.021)
R-squared	0.511	0.345	0.358	0.320	0.299	0.300
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Specification, for $j \in \{\text{level}, \text{risk}\}$ and $h = 0, \ldots, 5$ (the Japanese version of Equation (11)):

$$F^{JP,j}_{t+h} - F^{JP,j}_{t-1} = a^j_h + \sum_k \beta^{j,k}_h \, s^k_t + \sum_{l=1}^{4} \big(\phi^j_{l,h} \, \Delta F^{JP,\text{level}}_{t-l} + \psi^j_{l,h} \, \Delta F^{JP,\text{risk}}_{t-l} \big) + \delta^{j\prime}_h z_{t,h} + \varepsilon^j_{t+h}$$

$F^{JP,j}_t$ is the Japanese financial-conditions index of type j in standard deviations of its level (higher is tighter); the outcome is its cumulative change from the close before the BOJ meeting on day t to the close h common Tokyo/New York trading days after it. The four lags control for the daily changes of both Japanese indexes. The shocks s^k_t, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, are the BOJ short-rate, forward-guidance and LSAP/YCC shocks, entered jointly, each in standard deviations of its daily policy-news factor (positive is hawkish). $z_{t,h}$ collects the Fed (USMPD $MP1$, $MP2$) and ECB (monetary-policy and central-bank-information) surprises summed over the response window $t, \ldots, t+h$. Each column is a separate OLS regression, one per horizon $h = 0, \ldots, 5$, on BOJ meeting days 2010–2026, excluding the 31 July 2024 meeting; the ECB series ends on 30 October 2025, so later windows drop out (163–164 meetings remain). The table reports $\beta^{j,k}_h$; the R^2 row belongs to the panel above it; the control rows and the meeting counts are shared by all two panels.HC1 robust standard errors in parentheses; $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. The Japanese responses come from shocks built with Japanese yields that also enter the index, so part of them can be mechanical.

Table 8: BOJ policy news and US financial conditions: reduced form with Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
US level FCI (s.d.)						
Short-rate shock	-0.002	-0.002	-0.003	-0.004	-0.003	-0.003
	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Forward-guidance shock	0.003	0.004	0.006*	0.004	0.002	0.003
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
LSAP/YCC shock	0.004*	0.003	0.002	0.002	0.004	0.006
	(0.002)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)
R-squared	0.135	0.140	0.116	0.122	0.181	0.151
US risk FCI (s.d.)						
Short-rate shock	0.004	0.016**	0.014	0.036***	0.020*	0.023*
	(0.007)	(0.007)	(0.010)	(0.010)	(0.012)	(0.013)
Forward-guidance shock	-0.011*	-0.004	-0.003	-0.008	-0.004	-0.004
	(0.006)	(0.008)	(0.010)	(0.010)	(0.012)	(0.011)
LSAP/YCC shock	0.001	-0.007	-0.008	-0.005	-0.004	-0.006
	(0.006)	(0.008)	(0.009)	(0.010)	(0.011)	(0.011)
R-squared	0.418	0.521	0.699	0.678	0.708	0.613
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Specification, for $j \in \{\text{level}, \text{risk}\}$ and $h = 0, \ldots, 5$ (the US version of Equation (11)):

$$F^{US,j}_{t+h} - F^{US,j}_{t-1} = a^j_h + \sum_k \beta^{j,k}_h \, s^k_t + \sum_{l=1}^{4} \left(\phi^j_{l,h} \, \Delta F^{US,\text{level}}_{t-l} + \psi^j_{l,h} \, \Delta F^{US,\text{risk}}_{t-l} \right) + \delta^{j\prime}_h z_{t,h} + \varepsilon^j_{t+h}$$

$F^{US,j}_t$ is the US financial-conditions index of type j in standard deviations of its level (higher is tighter); the outcome is its cumulative change from the close before the BOJ meeting on day t to the close h common Tokyo/New York trading days after it. The four lags control for the daily changes of both US indexes. The shocks s^k_t, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, are the BOJ short-rate, forward-guidance and LSAP/YCC shocks, entered jointly, each in standard deviations of its daily policy-news factor (positive is hawkish). $z_{t,h}$ collects the Fed (USMPD $MP1$, $MP2$) and ECB (monetary-policy and central-bank-information) surprises summed over the response window $t, \ldots, t+h$. Each column is a separate OLS regression, one per horizon $h = 0, \ldots, 5$, on BOJ meeting days 2010–2026, excluding the 31 July 2024 meeting; the ECB series ends on 30 October 2025, so later windows drop out (163–164 meetings remain). The table reports $\beta^{j,k}_h$; the R^2 row belongs to the panel above it; the control rows and the meeting counts are shared by all two panels.HC1 robust standard errors in parentheses; $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 9: BOJ policy news and US Treasury yields: reduced form with Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
3-month Treasury (bp)						
Short-rate shock	0.349***	-0.162	-0.450	-0.626	-0.192	0.051
	(0.116)	(0.353)	(0.421)	(0.431)	(0.327)	(0.421)
Forward-guidance shock	0.239	0.327	0.528	0.572	0.206	-0.113
	(0.163)	(0.305)	(0.335)	(0.361)	(0.359)	(0.444)
LSAP/YCC shock	0.337*	0.052	0.026	0.255	0.880**	1.305**
	(0.181)	(0.262)	(0.316)	(0.387)	(0.416)	(0.540)
R-squared	0.193	0.203	0.084	0.053	0.197	0.258
1-year Treasury (bp)						
Short-rate shock	-0.190	-0.798*	-0.860**	-0.606	-0.463	-0.211
	(0.252)	(0.420)	(0.391)	(0.437)	(0.513)	(0.570)
Forward-guidance shock	-0.131	0.052	0.002	-0.201	-0.534	-0.379
	(0.229)	(0.474)	(0.470)	(0.556)	(0.804)	(0.921)
LSAP/YCC shock	0.277	0.908	0.885	1.103	1.250	1.599
	(0.331)	(1.004)	(0.913)	(1.094)	(0.799)	(1.026)
R-squared	0.200	0.268	0.231	0.251	0.311	0.344
10-year Treasury (bp)						
Short-rate shock	-0.889	-0.590	-0.394	-0.533	-0.284	-0.488
	(0.734)	(0.723)	(0.868)	(1.016)	(1.134)	(1.372)
Forward-guidance shock	1.336**	1.386*	1.959**	1.069	0.067	0.626
	(0.565)	(0.779)	(0.925)	(0.965)	(1.222)	(1.262)
LSAP/YCC shock	1.300**	0.683	0.488	0.761	1.725	2.123
	(0.616)	(0.837)	(0.934)	(1.016)	(1.246)	(1.373)
R-squared	0.168	0.132	0.108	0.091	0.055	0.062
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of dependent variable	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Specification, for each outcome i in the panels below and $h = 0, \ldots, 5$ (the asset version of Equation (12)):

$$y^i_{t+h} - y^i_{t-1} = a^i_h + \sum_k \beta^{i,k}_h \, s^k_t + \sum_{l=1}^{4} \gamma^i_{l,h}\big(y^i_{t-l} - y^i_{t-l-1}\big) + \delta^{i\prime}_h z_{t,h} + \varepsilon^i_{t+h}$$

y^i_t is the daily close of the 3-month, 1-year and 10-year US Treasury yields; the outcome is its cumulative change from the close before the BOJ meeting on day t to the close h common Tokyo/New York trading days after it, in basis points. The four lags control for the outcome's own daily changes. The shocks s^k_t, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, are the BOJ short-rate, forward-guidance and LSAP/YCC shocks, entered jointly, each in standard deviations of its daily policy-news factor (positive is hawkish). $z_{t,h}$ collects the Fed (USMPD $MP1$, $MP2$) and ECB (monetary-policy and central-bank-information) surprises summed over the response window $t, \ldots, t+h$. Each column is a separate OLS regression, one per horizon $h = 0, \ldots, 5$, on BOJ meeting days 2010–2026, excluding the 31 July 2024 meeting; the ECB series ends on 30 October 2025, so later windows drop out (163–164 meetings remain). The table reports $\beta^{i,k}_h$; the R^2 row belongs to the panel above it; the control rows and the meeting counts are shared by all three panels. HC1 robust standard errors in parentheses; $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 10: BOJ policy news, US equity prices and corporate spreads: reduced form with Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
Equity (S&P 500, %)						
Short-rate shock	-0.038	-0.142	-0.103	-0.162	0.018	0.022
	(0.092)	(0.106)	(0.124)	(0.135)	(0.149)	(0.171)
Forward-guidance shock	0.122	0.079	0.111	0.139	-0.002	-0.030
	(0.090)	(0.094)	(0.131)	(0.125)	(0.166)	(0.163)
LSAP/YCC shock	-0.077	0.091	0.024	-0.024	0.006	0.023
	(0.111)	(0.152)	(0.124)	(0.145)	(0.190)	(0.194)
R-squared	0.317	0.173	0.364	0.301	0.377	0.193
Corporate spread, Aaa - 10y UST (bp)						
Short-rate shock	0.001	0.379	0.413	1.141	0.787	0.586
	(0.399)	(0.493)	(0.648)	(0.729)	(0.781)	(0.775)
Forward-guidance shock	-0.537*	-0.412	-0.047	0.296	0.462	0.120
	(0.288)	(0.461)	(0.654)	(0.716)	(0.790)	(0.776)
LSAP/YCC shock	-0.234	-0.333	-0.913	-0.842	-0.799	-0.866
	(0.290)	(0.507)	(0.589)	(0.711)	(0.759)	(0.821)
R-squared	0.099	0.143	0.192	0.194	0.166	0.105
Aaa corporate yield (bp)						
Short-rate shock	-0.744	0.011	0.461	1.148	1.032	0.668
	(0.596)	(0.664)	(1.038)	(1.215)	(1.070)	(1.223)
Forward-guidance shock	0.411	0.683	1.403	0.906	0.123	0.177
	(0.521)	(0.621)	(0.976)	(1.008)	(1.078)	(1.124)
LSAP/YCC shock	1.057	0.400	-0.427	-0.063	0.959	1.266
	(0.641)	(0.788)	(1.022)	(1.116)	(1.253)	(1.290)
R-squared	0.118	0.157	0.118	0.074	0.049	0.045
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of dependent variable	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Specification, for each outcome i in the panels below and $h = 0, \ldots, 5$ (the asset version of Equation (12)):

$$y^i_{t+h} - y^i_{t-1} = a^i_h + \sum_k \beta^{i,k}_h \, s^k_t + \sum_{l=1}^{4} \gamma^i_{l,h}\big(y^i_{t-l} - y^i_{t-l-1}\big) + \delta^{i\prime}_h z_{t,h} + \varepsilon^i_{t+h}$$

y^i_t is the daily close of the S&P 500, the Aaa-minus-10-year Treasury spread and the Aaa corporate yield (the yield's dates match the spread); the outcome is its cumulative change from the close before the BOJ meeting on day t to the close h common Tokyo/New York trading days after it, in percent (log change times 100) for the S&P 500 and in basis points for the two corporate measures. The four lags control for the outcome's own daily changes. The shocks s^k_t, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, are the BOJ short-rate, forward-guidance and LSAP/YCC shocks, entered jointly, each in standard deviations of its daily policy-news factor (positive is hawkish). $z_{t,h}$ collects the Fed (USMPD $MP1$, $MP2$) and ECB (monetary-policy and central-bank-information) surprises summed over the response window $t, \ldots, t+h$. Each column is a separate OLS regression, one per horizon $h = 0, \ldots, 5$, on BOJ meeting days 2010–2026, excluding the 31 July 2024 meeting; the ECB series ends on 30 October 2025, so later windows drop out (163–164 meetings remain). The table reports $\beta^{i,k}_h$; the R^2 row belongs to the panel above it; the control rows and the meeting counts are shared by all three panels. HC1 robust standard errors in parentheses; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 11: US financial conditions on the Japanese level index since the December 2022 YCC widening, short-rate or LSAP/YCC shock as the instrument, excluding 31 July 2024

	h = 0	h = 1	h = 2	h = 3	h = 4	h = 5
A. Short-rate instrument; outcome: US risk FCI						
IV estimate	0.042	0.656	2.408	5.276**	2.983	3.632
	(0.691)	(0.773)	(1.427)	(2.219)	(2.068)	(2.188)
95% AR set	[-1.75, 2.01]	[-0.91, 3.08]	[0.10, 7.68]	[1.72, 12.98]	[-0.44, 9.93]	[-0.04, 10.89]
First-stage F	11.2	15.3	19.1	26.7	26.5	26.5
B. LSAP/YCC instrument; outcome: US level FCI						
IV estimate	0.421*	0.392	0.704**	1.057*	0.936**	1.050**
	(0.220)	(0.435)	(0.313)	(0.535)	(0.341)	(0.425)
95% AR set	[0.01, 1.19]	[-0.50, 1.75]	[0.06, 1.72]	[-0.24, 2.26]	[0.30, 2.00]	[0.26, 2.38]
First-stage F	14.5	15.1	14.2	29.9	21.8	21.8
C. Short-rate instrument; outcome: US level FCI						
IV estimate	-0.121	-0.655	-0.551	-0.981	-0.745	-0.757
	(0.310)	(0.828)	(0.613)	(1.185)	(0.775)	(0.865)
95% AR set	[-1.23, 0.52]	[-3.17, 1.08]	[-2.41, 0.65]	[-4.66, 1.14]	[-2.92, 0.80]	[-3.34, 0.86]
First-stage F	11.2	15.3	19.1	26.7	26.5	26.5
D. LSAP/YCC instrument; outcome: US risk FCI						
IV estimate	0.050	-0.814	-0.401	-0.869	-0.658	-0.525
	(0.430)	(0.525)	(0.757)	(0.898)	(1.050)	(1.228)
95% AR set	[-0.75, 1.53]	[-1.95, 0.73]	[-1.77, 2.39]	[-2.99, 1.20]	[-2.95, 2.15]	[-3.33, 2.61]
First-stage F	14.5	15.1	14.2	29.9	21.8	21.8
Meetings	23	22	22	22	22	22

Notes: Each row and horizon h is one just-identified 2SLS regression across BOJ meetings t. One shock s_t^m, $m \in \{\text{rate}, \text{LSAP}\}$, named in the panel title, is the single excluded instrument; the other two shocks, s_t^{-m}, enter both stages as controls (unlike Tables A10 and A11, which omit them):

$$\text{First stage:} \quad \Delta F_t^{JP,L} = \pi_h + \gamma_h\, s_t^m + \kappa_h' s_t^{-m} + \delta_h' G_{t,h} + v_{t,h},$$

$$\text{Second stage:} \quad F_{t+h}^{US,k} - F_{t-1}^{US,k} = \alpha_h + \beta_h\, \widehat{\Delta F}_t^{JP,L} + \lambda_h' s_t^{-m} + \theta_h' G_{t,h} + u_{t,h},$$

where $F^{US,k}$ is the US risk index ($k = R$, panels A and D) or level index ($k = L$, panels B and C), in standard deviations of the index level (higher is tighter), and $\Delta F_t^{JP,L} = F_t^{JP,L} - F_{t-1}^{JP,L}$ is the meeting-day change in the Japanese level index. The outcome runs from the close on the day before the meeting to h common trading days after it. The other two shocks are controls because the three shocks are not orthogonal within these meetings (without them the short-rate first-stage F falls to about 3) and may move US conditions directly; only the instrument must act through the Japanese index. Panels A and B are the two channels, each shock with the US index it moves; panels C and D are the cross cells. $G_{t,h} = \big(\sum_{\tau=t}^{t+h} \text{MP1}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP2}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP}_\tau^{ECB},\ \sum_{\tau=t}^{t+h} \text{CBI}_\tau^{ECB}\big)'$ holds the Fed and ECB surprises summed over the response window. Without $G_{t,h}$ the results are similar: the short-rate estimate for the US risk index at $h = 3$ is 3.83 (AR set $[0.12, 18.84]$), and the LSAP/YCC estimates for the US level index are 0.42 to 1.13. The US lag controls of Tables A8–A11 are dropped to save degrees of freedom. Sample: BOJ meetings from 20 December 2022 to 30 October 2025 whose window is covered by both the Fed and the ECB surprise series, with 31 July 2024 excluded (23 at $h = 0$; 22 at $h \geq 1$). Not reported, for weak first stages: the forward-guidance shock as instrument (F below 8) and the Japanese risk index as regressor (F at most 4.4). First-stage F is the squared robust t-statistic of s_t^m in the first stage at each h. The 95% Anderson–Rubin set, which is valid however weak the first stage, is every coefficient value that the robust AR test does not reject at 5%, solved exactly from the quadratic inequality in that value. HC1 robust standard errors in parentheses; p-values and AR critical values use the t and F distributions with $N - K$ degrees of freedom; $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

A Additional Details

A.1 Estimation of the financial conditions indices

Estimation. I standardize each input series by its full-sample mean and standard deviation. I then estimate the parameters $\Theta = (\Lambda, A, R, Q)$ of the two-factor model with the EM algorithm of Bańbura and Modugno (2014). The Kalman smoother inside the EM algorithm skips unobserved values, so a series with gaps or a late start is used on the days it exists, and the weekly US mortgage rate enters in the same way. The two factors follow uncorrelated AR(1) processes.

I impose a floor of 0.05 on each idiosyncratic variance R_{kk}, in standardized units. Without it, the EM algorithm drives the idiosyncratic variance of a series that the factors fit almost exactly towards zero; the likelihood then rises without bound, and that series takes over the factor. With a floor of 10^{-4}, one or two series absorbed almost all of the bloc decomposition, and the US estimation did not converge. The floor caps the share of any series' variance explained by the factors at about 95%. Lombardi et al. (2025) do not report such a floor.

Identification and sign. The estimation identifies the two factors only up to their sign and scale, and does not tell which factor is which. I scale each factor to unit standard deviation and rescale its loadings so that ΛF_t is unchanged. I call the level factor the one more correlated, in absolute value, with the average standardized government bond yield, and the risk factor the other one. I sign the level factor so that it is positively correlated with government bond yields, and the risk factor so that it is positively correlated with the average corporate spread. Higher values of both factors therefore mean tighter financial conditions.

Index construction. I use the dynamic factor model only to estimate the loadings. Each day, I compute the two indices as the cross-sectional least-squares fit of the standardized inputs z_t on the loadings,

$$\hat{F}_t = (\Lambda'\Lambda)^{-1}\Lambda' z_t, \tag{18}$$

and rescale each index to unit standard deviation. Equation (18) is the factor-score formula with all idiosyncratic variances set equal, so I do not weight the series by R^{-1}. The Kalman filter used by Lombardi et al. (2025) weights each series by the inverse of its idiosyncratic variance and also carries information from past days through the factor dynamics. In my index, the value on day t depends only on the data of day t: it is a filtered measure, not a smoothed one, and uses no future observations. The contribution of each series, $W_k z_{kt}$, where $W = (\Lambda'\Lambda)^{-1}\Lambda'$, adds up exactly to the index, which gives the bloc decompositions in Figures 6 and 7.

Why loading weights. Several strands of the literature support aggregating the inputs with the loadings alone. First, in principal component analysis, loadings and weights are the same object, and the IMF's FCIs, for example, set their weights by principal components (Lombardi et al., 2025, Table 1). Second, Hartigan and Wright (2021), who estimate a dynamic factor model FCI for Australia with the same EM algorithm, read the estimated loadings directly as the weights of each series in their FCI. They also show that an FCI built from a static factor model estimated by principal components tracks their dynamic factor model FCI closely, and is only less smooth. Finally, weighting by R^{-1} makes the index

sensitive to the estimated idiosyncratic variances: in my panels, without a variance floor, one or two series with R_{kk} close to zero took almost all of the weight. The loading-weighted index does not depend on R, and hence not on the floor.

Missing and discontinued series. I fill gaps of up to five trading days with the last observed value, for example in the weekly mortgage rate. On days with longer gaps, I re-solve the weights over the observed series only, $(\Lambda_o'\Lambda_o)^{-1}\Lambda_o'$. A discontinued series therefore drops out of the index, and the index can jump on the day its input set changes. This matters mainly in the US, where the TED spread ends on 21 January 2022 with LIBOR and the commercial paper–OIS spread has long gaps from 2022.

A.2 Macro variables in the predictive regressions

Table A1: Macro variables in the predictive regressions of Tables 1 and 2: definitions, sources and construction.

Panel	United States	Japan
A. Credit	BIS total credit to the private non-financial sector, all lending sectors, adjusted for breaks; USD bn, end of quarter, NSA (FRED `CRDQUSAPABIS`). Used unadjusted: its quarterly growth shows no seasonality (quarter-dummy $p = 0.45$, 2001–2026).	BIS total credit to the private non-financial sector, all lending sectors, adjusted for breaks; JPY bn, end of quarter, NSA (FRED `CRDQJPAPABIS`). Seasonal (quarter-dummy $p = 0.0007$), so adjusted with stable quarterly factors[a]. Ends 2025Q4.
B. Investment	Real business fixed investment: private nonresidential fixed investment, USD bn, SAAR (FRED `PNFI`), divided by its implicit price deflator, 2017=100, SA (FRED `A008RD3Q086SBEA`).	Real private non-residential investment, JPY bn, chained 2020 prices, SA (Cabinet Office ESRI, Quarterly GDP Estimates, QE 26-2 2nd release, `gaku-jk2622`, column 6).
C. Real GDP	Real GDP, USD bn, chained 2017 dollars, SAAR (FRED `GDPC1`).	Real GDP (expenditure approach), JPY bn, chained 2020 prices, SA (ESRI QE 26-2 2nd, `gaku-jk2622`, column 1).
D. GDP deflator	GDP implicit price deflator, 2017=100, SA (FRED `GDPDEF`).	Nominal SA GDP divided by real SA GDP $\times 100$ (ESRI `gaku-mk2622` / `gaku-jk2622`, column 1), ESRI's own definition at full precision; within 0.05 of the published deflator (`def-qk2622`).
E. Core prices	Core PCE price index (PCE excluding food and energy, chain-type), 2017=100, monthly, SA (FRED `PCEPILFE`); quarterly average of the months.	Core CPI: all items less fresh food and energy, 2020=100, monthly, NSA (Statistics Bureau, e-Stat `statInfId=000032103842`, item `0178`); average of complete quarters, then adjusted with stable quarterly factors[a]. Correlation of its q/q inflation with the official SA index (item `0906`, from 2010) is 0.991.
Sample	2002Q1 onward; 93–98 quarters by panel and horizon.	2002Q4 onward; 90–95 quarters by panel and horizon.

Notes: Every variable enters in logs. The dependent variable is annualised growth over quarters t to $t+h$, $\Delta^h Y_{t+h} = \frac{400}{h+1} \ln(Y_{t+h}/Y_{t-1})$, with $h = 0$ (one quarter) and $h = 3$ (one year); the controls are four lags of annualised quarterly growth, $400 \ln(Y_{t-i}/Y_{t-i-1})$. The factors FC_t are quarterly averages of the daily standardised level and risk indices. The US variables follow Lombardi et al. (2025); the Japanese variables are their closest public equivalents. [a]Stable quarterly factors: from each quarter's log growth, subtract the mean growth of that calendar quarter minus the overall mean growth, with both means over 1995 onward and excluding the consumption-tax quarters 1997Q2, 2014Q2 and 2019Q4. The April 2014 and October 2019 consumption-tax increases remain in the Japanese GDP deflator and core CPI, as in the official SA series; adding a dummy for each does not change the results materially.

A.3 Supporting exhibits for the financial-conditions indexes and the BOJ shocks

Table A2: US FCI baseline inputs by bloc, with oriented factor loadings and idiosyncratic variances (R_{kk} in bold is at the 0.05 floor).

Bloc	Series	Definition / source	Level ld.	Risk ld.	R_{kk}
Short-term funding	DFF	Effective fed funds (FRED)	0.994	−0.019	**0.050**
	DTB3	3m T-bill (FRED)	1.004	−0.039	**0.050**
	OIS3M	USD 3m OIS (Eikon `USD3MOIS=`)	0.998	−0.013	**0.050**
Government yields	DGS2	Treasury 2y	0.980	0.010	**0.050**
	DGS5	Treasury 5y	0.903	0.013	0.176
	DGS10	Treasury 10y	0.759	0.017	0.415
Spreads	AAA30Y	Moody's Aaa − Treasury 30y	−0.583	0.946	0.113
	BAA30Y	Moody's Baa − Treasury 30y	−0.585	1.003	**0.050**
	CPN_OIS	3m non-fin. CP − 3m OIS	−0.340	0.504	0.745
	TEDRATE	3m LIBOR − T-bill (ends Jan 2022)	0.035	0.665	0.475
Equity	SPXTR_d	S&P 500 total return, daily log return (Eikon)	0.010	−0.039	0.998
	XLF_d	Financials ETF, daily log return (Eikon)	0.010	−0.043	0.998
	SPX_FWD_PE	I/B/E/S forward P/E (Eikon)	0.396	−0.486	0.729
	SPX_DY	Trailing dividend yield (TR − price)	−0.666	0.331	0.588
Bank rates	MORTGAGE30US	30y fixed mortgage (weekly, FRED)	0.784	0.151	0.285

Table A3: Japanese FCI baseline inputs by bloc, with oriented factor loadings and idiosyncratic variances (R_{kk} in bold is at the 0.05 floor).

Bloc	Series	Definition / source	Level ld.	Risk ld.	R_{kk}
Short-term funding	ois_3m	JPY 3m OIS (CEIC/Eikon)	0.885	−0.213	**0.050**
	tona	Overnight call rate (Eikon `JPONMU=RR`)	0.945	−0.146	0.064
	tbill_3m	3m T-bill (Eikon `JP3MT=RR`)	0.898	−0.269	**0.050**
Government yields	jgb_2y	JGB 2y (CEIC, Eikon tail)	0.937	−0.222	**0.050**
	jgb_10y	JGB 10y	0.758	−0.378	0.230
	jgb_30y	JGB 30y	0.762	−0.339	0.261
Spreads	cs_aa_1y	JSDA R&I AA 1y − JGB 1y	0.382	0.859	0.172
	cs_aa_2y	AA 2y − JGB 2y	0.619	0.734	0.156
	cs_aa_5y	AA 5y − JGB 5y	0.496	0.890	**0.050**
	cs_aa_10y	AA 10y − JGB 10y	0.449	0.797	0.223
Equity	topix_tr_d	TOPIX total return, daily log return	−0.008	0.012	1.000
	nikkei_d	Nikkei 225, daily log return (CEIC)	−0.004	0.014	1.000
	banks_d	TOPIX banks, daily log return	0.002	0.015	1.000
	topix_div_yield	TOPIX dividend yield (trailing 12m dividends / price)	0.062	0.856	0.271

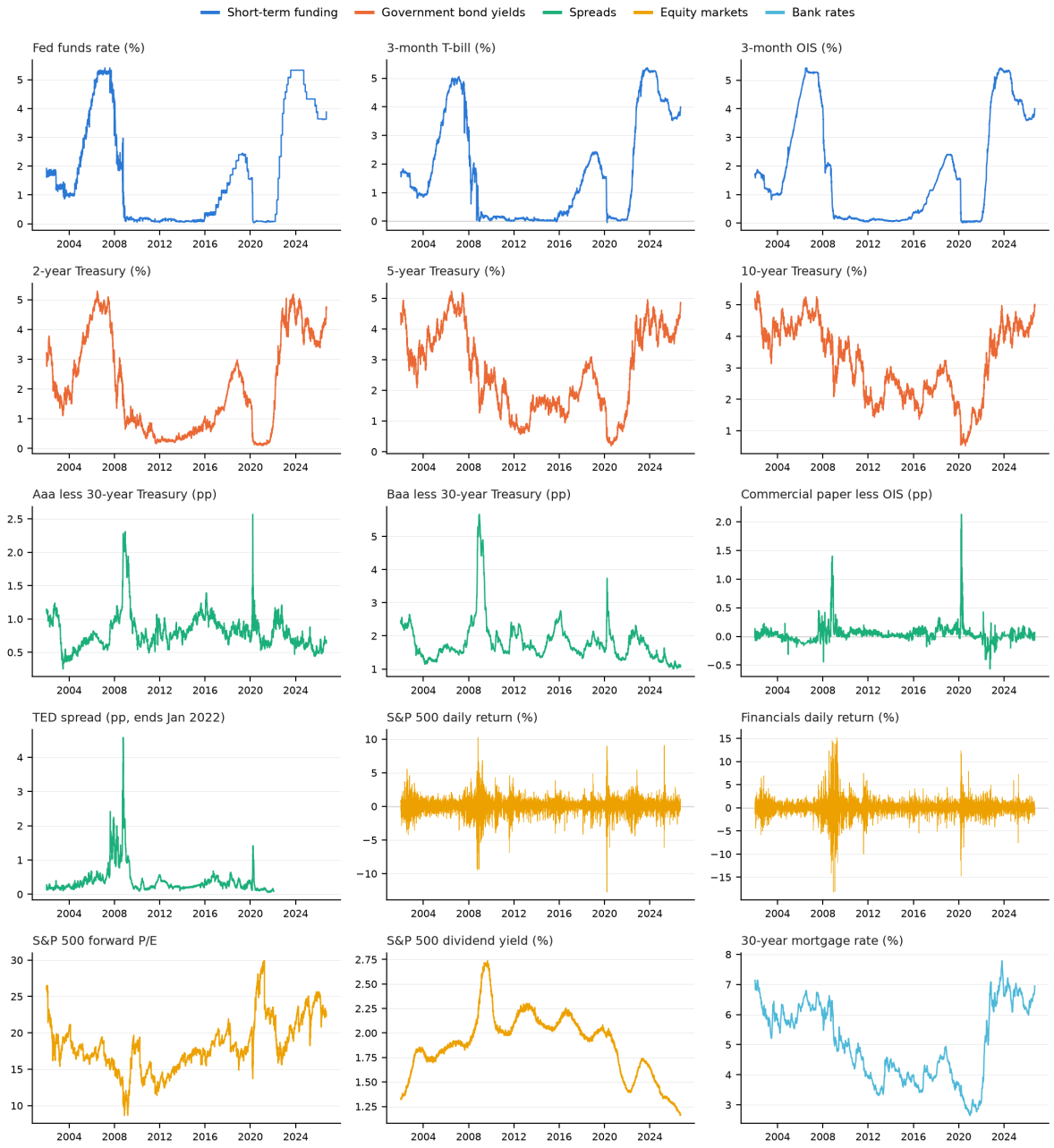


Figure 15: US FCI input series by bloc. Each panel shows one of the 15 baseline inputs in raw units on its own vertical axis, colored by bloc; the DFM standardizes each series before estimation. *Notes:* `DFF` is the effective federal funds rate; `DTB3`, the 3-month Treasury bill rate; `OIS3M`, 3-month USD OIS; `DGS2`, `DGS5`, and `DGS10` are 2-, 5-, and 10-year Treasury yields; `AAA30Y` and `BAA30Y` are Moody's Aaa and Baa corporate yields less the 30-year Treasury yield; `CPN_OIS` is 3-month nonfinancial commercial paper less 3-month OIS; `TEDRATE` is 3-month LIBOR less the 3-month Treasury-bill rate (ends January 2022); `SPXTR_d` and `XLF_d` are daily log returns on the S&P 500 total-return index and Financial Select Sector SPDR Fund; `SPX_FWD_PE` is the I/B/E/S forward price-to-earnings ratio; `SPX_DY` is the trailing S&P 500 dividend yield; and `MORTGAGE30US` is the weekly 30-year fixed mortgage rate. Source: US DFM input panel.

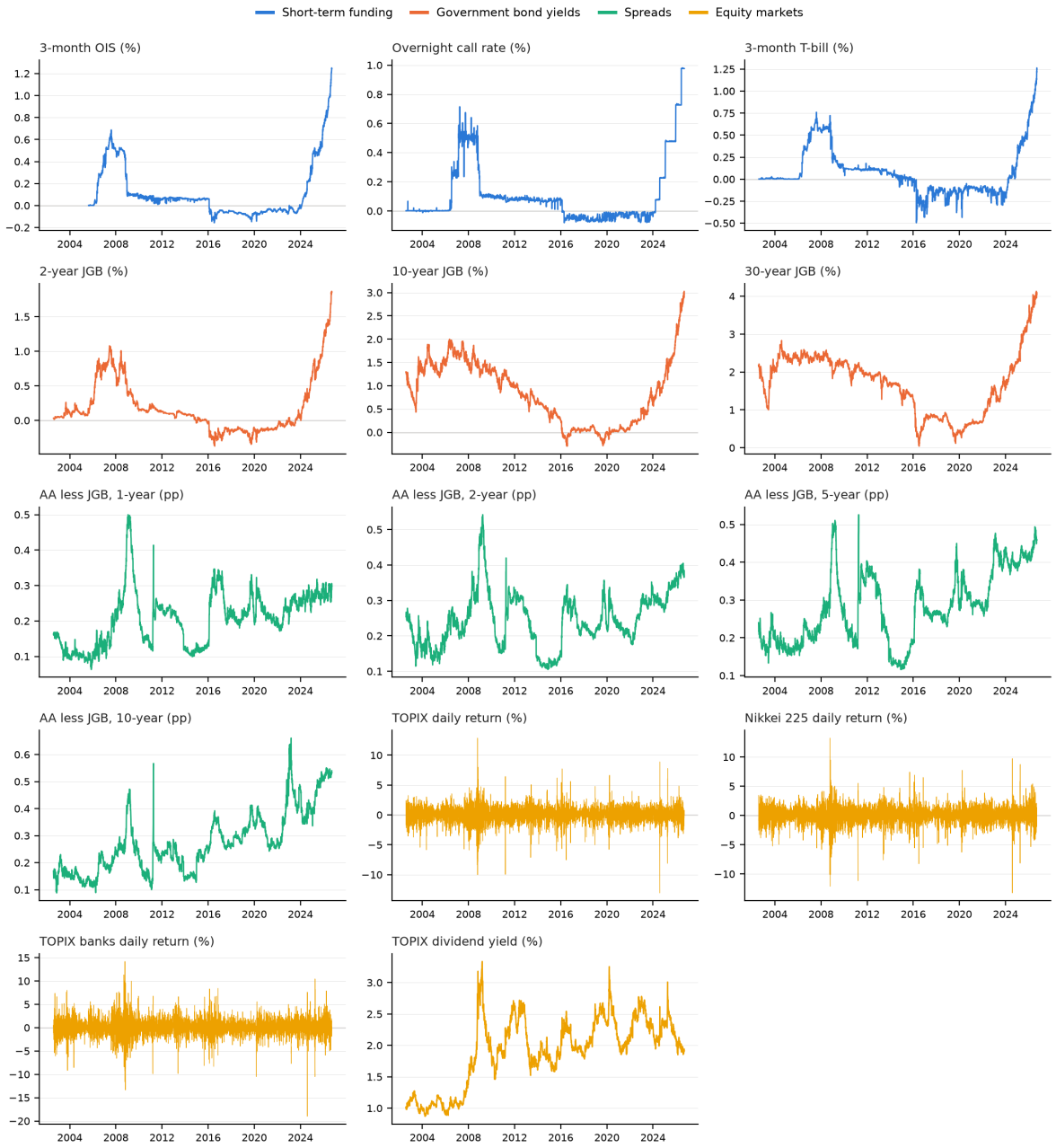


Figure 16: Japan FCI input series by bloc. Each panel shows one of the 14 baseline inputs from 2 August 2002 to 18 September 2026 in raw units on its own vertical axis, colored by bloc; the DFM standardizes each series before estimation. *Notes:* `ois_3m` is the 3-month JPY overnight-indexed swap rate; `tona`, the overnight call rate; `tbill_3m`, the 3-month Japanese Treasury-bill rate; `jgb_2y`, `jgb_10y`, and `jgb_30y` are 2-, 10-, and 30-year Japanese government-bond yields; `cs_aa_1y`, `cs_aa_2y`, `cs_aa_5y`, and `cs_aa_10y` are JSDA R&I AA corporate-bond yields less same-maturity JGB yields; `topix_tr_d`, `nikkei_d`, and `banks_d` are daily log returns on the TOPIX total-return index, Nikkei 225, and TOPIX banks index; and `topix_div_yield` is the TOPIX dividend yield, trailing 12-month dividends over the current TOPIX price. Source: Japanese DFM input panel.

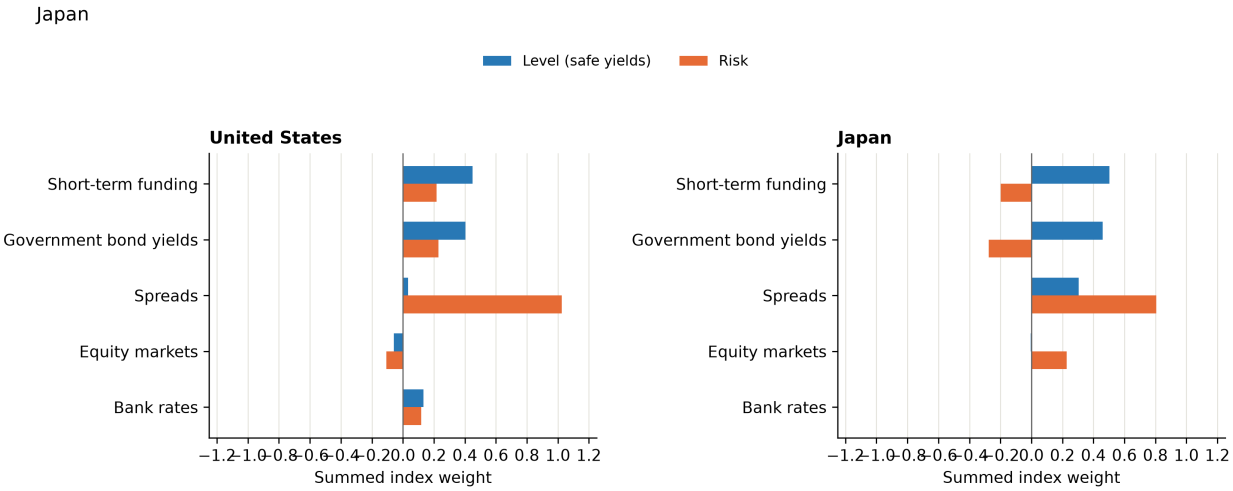


Figure 17: FCI weights by bloc for the US and Japanese FCIs. Each index is the weighted sum of the standardized inputs, $F_t = (\Lambda'\Lambda)^{-1}\Lambda' z_t$, with Λ the oriented loadings in Figure 5. Bars sum the weights of the series in each bloc. Blue bars are weights in the level index; orange bars are weights in the risk index. The bank-rates row is blank for Japan. Source: authors' calculations from the US and Japan DFM estimates.

Table A4: Correlation between the BOJ shocks and Kubota–Shintani intraday surprises

		Ours / CSKS		Kubota–Shintani		
	10y JGB	LSAP	FG	Path	Target	JGB futures
A. Daily rotation, six series (118 meetings, 2010–2020)						
10y JGB surprise	1.00	0.70	0.44	−0.20	0.54	0.68
LSAP shock		1.00	−0.12	−0.22	0.51	0.58
FG shock			1.00	−0.04	0.13	0.21
K–S path factor				1.00	−0.39	−0.14
K–S target factor					1.00	0.49
K–S JGB futures surprise						1.00
B. Daily rotation, rates only (118 meetings)						
10y JGB surprise	1.00	0.96	−0.01	−0.20	0.54	0.68
LSAP shock		1.00	−0.01	−0.21	0.46	0.63
FG shock			1.00	−0.06	0.24	0.11
K–S path factor				1.00	−0.39	−0.14
K–S target factor					1.00	0.49
K–S JGB futures surprise						1.00
C. Carrière-Swallow et al. (2025), intraday (their Table 2)						
10y JGB surprise	1.00	0.82	0.63	−0.10	0.48	0.77
LSAP shock		1.00	0.58	−0.18	0.69	0.64
FG shock			1.00	−0.16	0.55	0.54
K–S path factor				1.00	−0.39	−0.14
K–S target factor					1.00	0.49
K–S JGB futures surprise						1.00

Notes: Panels A and B correlate our one-day 10-year JGB change and daily LSAP and forward-guidance shocks with the Kubota and Shintani (2022) path factor, target factor and 10-year JGB futures surprise, all measured in 30-minute windows, on the BOJ meetings both series cover (January 2010 to January 2020). Our LSAP and FG shocks are orthogonal over the full 2010–2026 sample by construction. Panel C reproduces Carrière-Swallow et al. (2025, Table 2). The LSAP and FG columns are our shocks in Panels A and B and the Carrière-Swallow et al. (2025) shocks in Panel C; the Path, Target and JGB futures columns are from Kubota and Shintani (2022). Source: Ministry of Finance and Bank of Japan (via CEIC), Refinitiv Eikon, Kubota and Shintani (2022) and Carrière-Swallow et al. (2025, Table 2); author's calculations.

A.4 Supporting exhibits for the spillover regressions

Table A5: Daily pass-through between Japanese and US financial conditions: other samples

Panel A: Japan → US, same-day New York change							
	US level, day t			US risk, day t			
Sample	JP level	JP risk	p	JP level	JP risk	p	Days
Full sample	0.0452***	-0.0281***	0.000	0.0352	0.0547	0.202	5692
Aug 2002–Sep 2026	[3.67]	[-3.57]		[0.48]	[1.08]		
Since Fed liftoff	0.0341	-0.0458*	0.149	-0.2127	0.0872	0.364	1063
16 Mar 2022–Sep 2026	[1.09]	[-1.67]		[-1.38]	[1.00]		
Since YCC band widening	0.0564*	-0.0571**	0.022	-0.1692	0.1715*	0.146	883
20 Dec 2022–Sep 2026	[1.95]	[-1.98]		[-1.07]	[1.95]		
Fed hikes, tight band	-0.1236	-0.0350	0.658	-0.6258	-0.5881	0.066	180
16 Mar–19 Dec 2022	[-0.57]	[-0.39]		[-0.92]	[-1.64]		
Wider band, before exit	0.0731	-0.1024	0.357	0.0736	0.0855	0.474	295
20 Dec 2022–18 Mar 2024	[0.99]	[-1.42]		[0.48]	[0.82]		
Panel B: US → Japan, next-day Tokyo change							
	JP level, day t+1			JP risk, day t+1			
Sample	US level	US risk	p	US level	US risk	p	Days
Full sample	0.2403***	0.0120**	0.000	-0.1509***	0.0241***	0.000	5692
Aug 2002–Sep 2026	[9.37]	[2.25]		[-3.96]	[2.71]		
Since Fed liftoff	0.2134***	0.0050	0.000	-0.0514	0.0162	0.219	1063
16 Mar 2022–Sep 2026	[4.99]	[0.47]		[-0.82]	[1.48]		
Since YCC band widening	0.2589***	0.0068	0.000	-0.1246	0.0139	0.212	883
20 Dec 2022–Sep 2026	[4.28]	[0.37]		[-1.46]	[0.77]		
Fed hikes, tight band	0.1500***	0.0086	0.000	0.0236	0.0190	0.259	180
16 Mar–19 Dec 2022	[5.03]	[1.23]		[0.37]	[1.55]		
Wider band, before exit	0.1258	-0.0109	0.302	-0.0703	0.0082	0.742	295
20 Dec 2022–18 Mar 2024	[1.48]	[-0.48]		[-0.52]	[0.21]		

Specification. Each row re-estimates the regressions of Table 5 on one sample and reports only the cross-country coefficients; the controls (the previous US change in Panel A, the same-day Tokyo change in Panel B) are included but not shown. Panel A: $\Delta F^{US}_{k,t} = a_k + \gamma_k' \Delta F^{JP}_t + \rho_k' \Delta F^{US}_{t-1} + u_{k,t}$; Panel B: $\Delta F^{JP}_{j,t+1} = b_j + \theta_j' \Delta F^{US}_t + \phi_j' \Delta F^{JP}_t + v_{j,t+1}$. p is the p-value of the joint F test that both cross-country coefficients of that regression are zero. Newey–West t-statistics (5 lags) in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Dates: 16 March 2022, first increase in the federal funds target range of the cycle; 20 December 2022, the BOJ widens the band for the 10-year JGB yield from ±0.25 to ±0.5 percentage points; 18 March 2024, last day before the BOJ ends negative interest rates and yield-curve control. The data end on 17 September 2026.

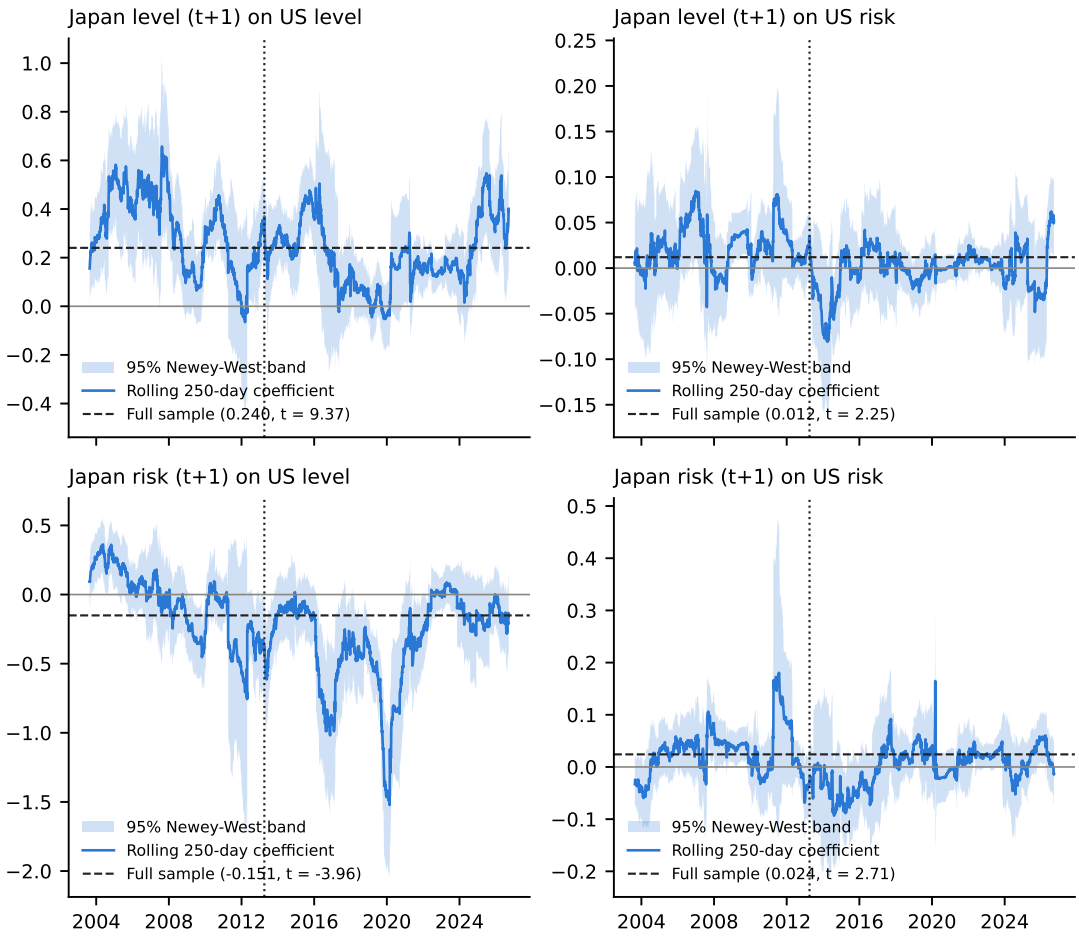


Figure 18: Rolling 250-day coefficients of US on Japanese financial conditions, all four links (exploratory). Rows are the next-day dependent variable (Japan level, Japan risk); columns are the regressor of interest (US level, US risk). Each panel is one coefficient of the regression $\Delta F^{JP}_{j,t+1} = b_j + \theta_j' \Delta F^{US}_t + \phi_j' \Delta F^{JP}_t + v_{j,t+1}$, $j \in \{\text{level}, \text{risk}\}$, where $\theta_j = (\theta_{j,\text{level}}, \theta_{j,\text{risk}})'$. Shaded areas are 95% Newey–West bands (5 lags); the dashed line is the full-sample estimate (Table A5, first row, Panel B); the dotted line is 4 April 2013 (QQE). Each panel has its own vertical scale.

Table A6: Same-day pass-through from Japanese to US asset prices, by Japanese ownership of the US asset class

	(1) Equity	(2) Govt 3M	(3) Govt 1Y	(4) Govt 10Y	(5) Corp. spread
US series y^{US} (dependent)	S&P 500	3M UST	1Y UST	10Y UST	Aaa − UST10Y
Japanese series y^{JP} (regressor)	Nikkei 225	JPY 3M OIS	1Y JGB	10Y JGB	AA − JGB10Y
Unit of y and Δy	100 ln	bp	bp	bp	bp
Exposure × Japanese change (β_i)	0.010	0.020	0.094	-0.068**	-0.061
	(0.017)	(0.119)	(0.090)	(0.027)	(0.065)
Japanese change, day t (θ_i)	0.153***	0.232**	0.386***	0.360***	0.025
	(0.018)	(0.094)	(0.086)	(0.036)	(0.052)
Exposure, s.d. (κ_i)	0.032**	-0.071	0.061	-0.044	0.006
	(0.014)	(0.105)	(0.055)	(0.068)	(0.051)
Observations	6293	4918	5548	6038	5656

Notes. Each column is a separate daily OLS regression for one US asset class i:

$$\Delta y^{US}_{i,t} = \alpha_i + \beta_i \left(\tilde{E}_{i,m-1} \times \Delta y^{JP}_{i,t}\right) + \theta_i \, \Delta y^{JP}_{i,t} + \kappa_i \, \tilde{E}_{i,m-1} + \epsilon_{i,t},$$

the same-day case ($h = 0$) of Equation (10). $\Delta y^{US}_{i,t}$ is the one-day change in the US series and $\Delta y^{JP}_{i,t}$ is the matched Japanese one-day change; the series and units named in the header rows are those of Table 6. $\tilde{E}_{i,m-1}$ is the previous month's Japanese ownership of the asset class (the ownership share $E_{i,m}$), standardised within asset class. The rows report β_i, the extra pass-through per standard deviation more ownership; θ_i, the pass-through at average ownership; and κ_i, the direct effect of ownership. Newey–West standard errors (5 lags) are in parentheses: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Samples: equity 2000-01 to 2026-07; 3-month Treasury 2005-08 to 2026-08; 1-year Treasury 2003-03 to 2026-08; 10-year Treasury 2001-02 to 2026-08; corporate spread 2002-08 to 2026-07.

A.5 Reduced-form responses over 30 trading days

Figures 19, 20 and 21 extend the reduced form of Tables 8–10 to 30 trading days after the meeting, on the same sample and with the same controls. At $h \leq 5$ the coefficients equal those of the tables; the bands are Newey–West because the windows of neighbouring meetings overlap beyond $h \approx 10$. Beyond $h \approx 5$ the paths also absorb US macro news and Fed and ECB news that the window controls do not capture.

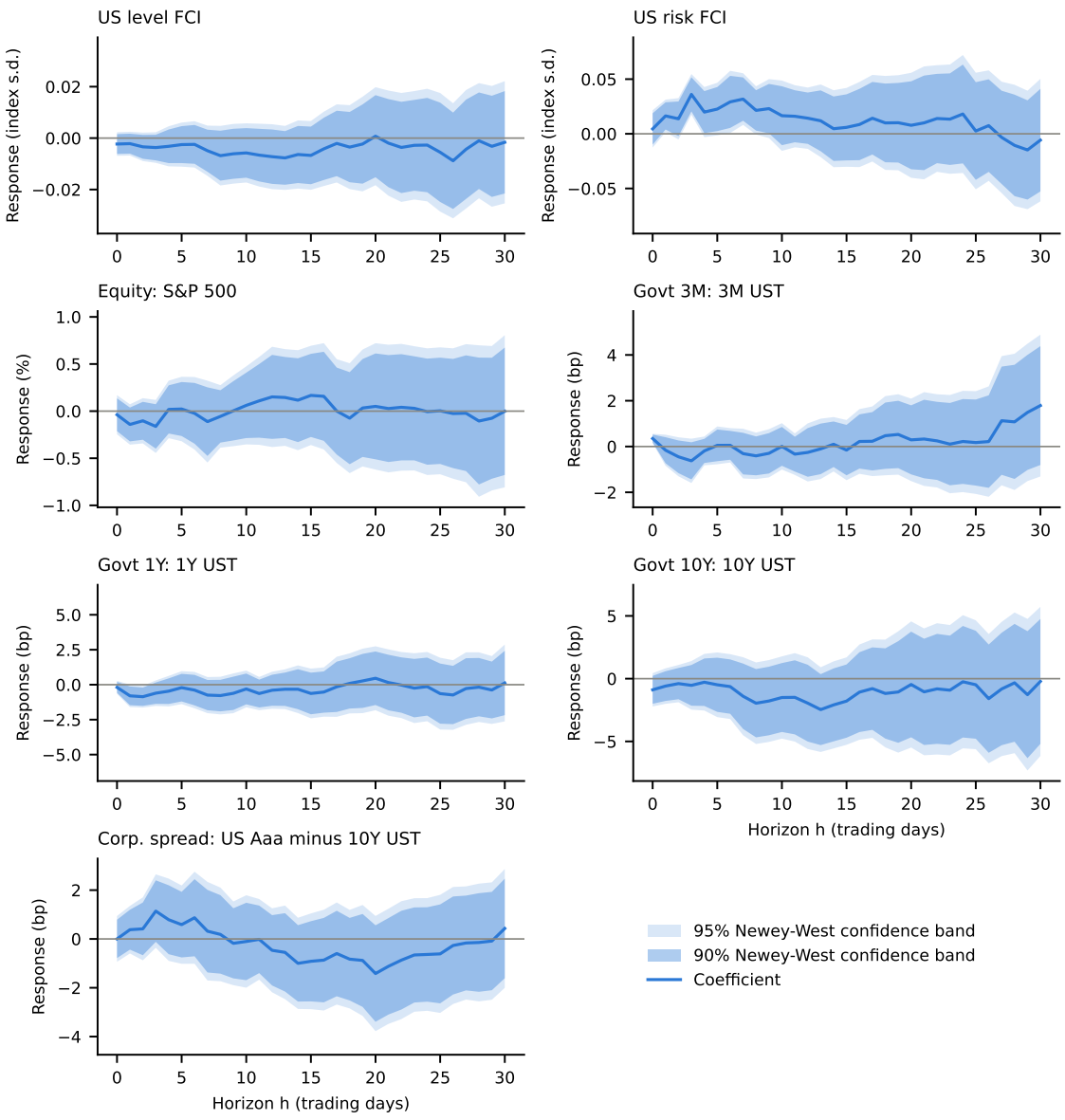


Figure 19: Reduced-form US responses to a one-standard-deviation BOJ short-rate shock, 30 trading days: coefficient b_h^{rate}. *Notes:* The outcome $y_{t+h} - y_{t-1}$ is the cumulative change from the last US close before the announcement. Units: index standard deviations (top row; higher is tighter), 100 times log change (S&P 500) and basis points (Treasury yields, Aaa-minus-10-year spread). Specification, for each outcome and $h = 0, \ldots, 30$, by OLS on BOJ meeting days t: $y_{t+h} - y_{t-1} = a_h + \sum_k b_h^k \, s_t^k + \sum_{l=1}^{4} c_{l,h}' x_{t-l} + \delta_h' z_{t,h} + e_{t+h}$ (Equations (11) and (12)). The shocks s_t^k, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, enter jointly (standard deviations; positive is hawkish). The lag controls x_t are the daily changes of the two US indexes (index outcomes) or of the outcome itself (asset outcomes); $z_{t,h}$ is the Fed and ECB policy shocks summed over $t, \ldots, t+h$. There is no separate US 10-year control. Sample: BOJ meetings, 26 January 2010 to 30 October 2025, excluding 31 July 2024, as in Tables 8–10. Bands are 95% (light) and 90% (dark) Newey–West intervals, three lags on the meetings in time order.

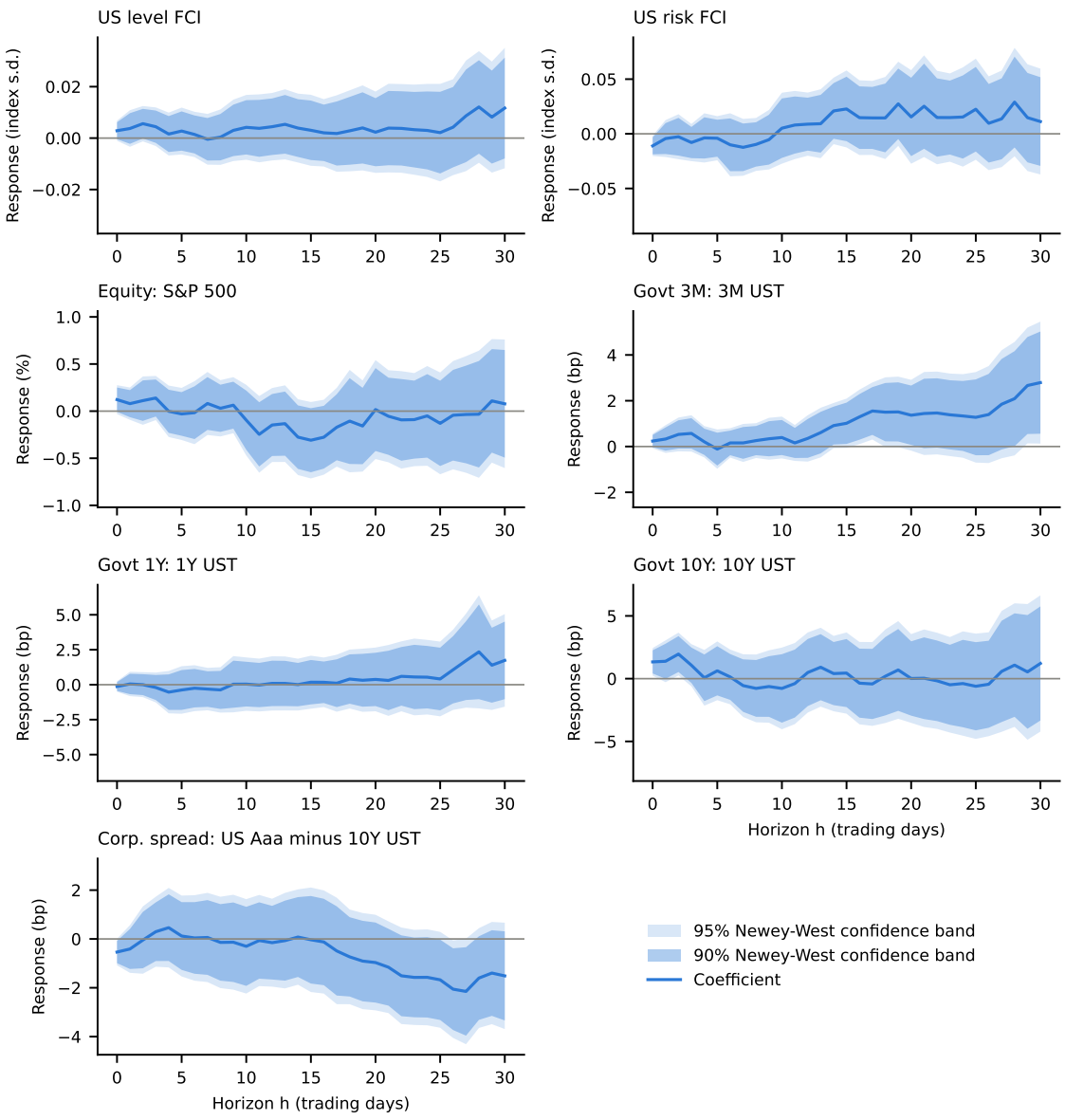


Figure 20: Reduced-form US responses to a one-standard-deviation BOJ forward-guidance shock, 30 trading days: coefficient b_h^{fg}. *Notes:* Specification, for each outcome and $h = 0, \ldots, 30$, by OLS on BOJ meeting days t: $y_{t+h} - y_{t-1} = a_h + \sum_k b_h^k \, s_t^k + \sum_{l=1}^{4} c_{l,h}' x_{t-l} + \delta_h' z_{t,h} + e_{t+h}$ (Equations (11) and (12)). The shocks s_t^k, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, enter jointly (standard deviations; positive is hawkish). The lag controls x_t are the daily changes of the two US indexes (index outcomes) or of the outcome itself (asset outcomes); $z_{t,h}$ is the Fed and ECB policy shocks summed over $t, \ldots, t+h$. There is no separate US 10-year control. Sample: BOJ meetings, 26 January 2010 to 30 October 2025, excluding 31 July 2024, as in Tables 8–10. Units and bands as in Figure 19.

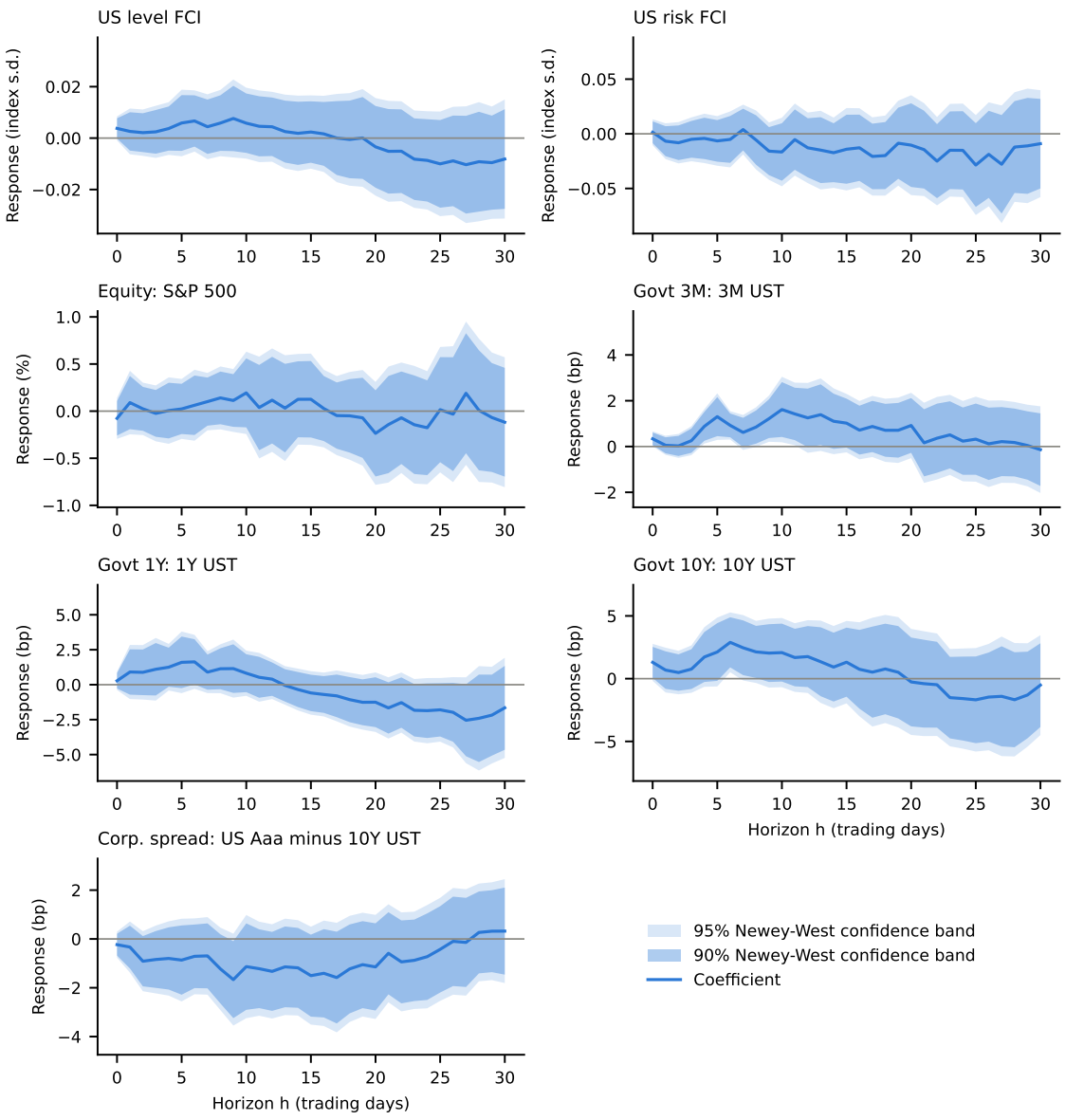


Figure 21: Reduced-form US responses to a one-standard-deviation BOJ LSAP/YCC shock, 30 trading days: coefficient b_h^{lsap}. *Notes:* Specification, for each outcome and $h = 0, \ldots, 30$, by OLS on BOJ meeting days t: $y_{t+h} - y_{t-1} = a_h + \sum_k b_h^k \, s_t^k + \sum_{l=1}^{4} c_{l,h}' x_{t-l} + \delta_h' z_{t,h} + e_{t+h}$ (Equations (11) and (12)). The shocks s_t^k, $k \in \{\text{rate}, \text{fg}, \text{lsap}\}$, enter jointly (standard deviations; positive is hawkish). The lag controls x_t are the daily changes of the two US indexes (index outcomes) or of the outcome itself (asset outcomes); $z_{t,h}$ is the Fed and ECB policy shocks summed over $t, \ldots, t+h$. There is no separate US 10-year control. Sample: BOJ meetings, 26 January 2010 to 30 October 2025, excluding 31 July 2024, as in Tables 8–10. Units and bands as in Figure 19.

A.6 IV estimates with Fed and ECB controls, excluding 31 July 2024

Tables A7–A11 rescale the reduced form of Table 8 by the move in the Japanese index: on BOJ meeting days, the cumulative change in a US index from the close before the meeting to h days after it is regressed on the meeting-day change in one Japanese index, instrumented by the BOJ shocks. The sample and the Fed and ECB window controls are those of the reduced form. Tables A8 and A9 use the three shocks together; Tables A10 and A11 use one shock at a time.

Table A7: First stage: Japanese financial conditions on the three BOJ shocks

	No Fed/ECB controls		Fed/ECB controls, excl. 31 July 2024	
	(1) Japan level	(2) Japan risk	(3) Japan level	(4) Japan risk
Short-rate shock	0.008**	-0.018***	0.006	-0.022***
	(0.003)	(0.005)	(0.005)	(0.007)
Forward-guidance shock	0.002	-0.020***	0.001	-0.020***
	(0.003)	(0.004)	(0.004)	(0.005)
LSAP/YCC shock	0.008***	-0.017***	0.007***	-0.019***
	(0.002)	(0.003)	(0.002)	(0.004)
Robust F, 3 shocks	5.6	11.1	2.7	10.3
Fed policy shocks			Yes	Yes
ECB policy shocks			Yes	Yes
Meetings	171	171	164	164

Notes: Each column is one OLS regression, estimated across BOJ meetings t,

$$\Delta F_t^{JP,j} = \pi_j + \gamma_{1j}\, s_t^{\text{rate}} + \gamma_{2j}\, s_t^{\text{FG}} + \gamma_{3j}\, s_t^{\text{LSAP}} + \sum_{\ell=1}^{4} \left(\phi_{j\ell}\, \Delta F_{t-\ell}^{US,L} + \psi_{j\ell}\, \Delta F_{t-\ell}^{US,R} \right) + \delta_j' G_{t,0} + v_{jt},$$

where $\Delta F_t^{JP,j} = F_t^{JP,j} - F_{t-1}^{JP,j}$ is the meeting-day change in the Japanese level index ($j = L$; columns 1 and 3) or risk index ($j = R$; columns 2 and 4), s_t are the three BOJ shocks of meeting day t, and $\Delta F_{t-\ell}^{US,k}$ are the daily changes in the US indices on the four trading days before the meeting.
$G_{t,0} = (\text{MP1}_t^{Fed}, \text{MP2}_t^{Fed}, \text{MP}_t^{ECB}, \text{CBI}_t^{ECB})'$ holds the Fed and ECB surprises on day t (the $h = 0$ window of Tables A8–A11). Columns 1–2: $\delta_j = 0$; all 171 BOJ meetings with shocks, 26 January 2010 to 31 July 2026. Columns 3–4: $G_{t,0}$ included; the 164 meetings of the $h = 0$ sample of Tables A8–A11, 26 January 2010 to 30 October 2025, with 31 July 2024 excluded and every meeting covered by both the Fed and the ECB surprise series. "Robust F, 3 shocks" is the HC1 Wald test of $\gamma_{1j} = \gamma_{2j} = \gamma_{3j} = 0$. HC1 robust standard errors in parentheses; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A8: US level index on Japanese financial conditions, three BOJ shocks as instruments: Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
OLS: Japan level	0.006	-0.063	-0.021	0.045	0.019	0.098
	(0.135)	(0.206)	(0.209)	(0.202)	(0.208)	(0.248)
OLS: Japan risk	-0.021	-0.024	-0.061	-0.068	-0.072	-0.118
	(0.052)	(0.065)	(0.072)	(0.074)	(0.085)	(0.084)
IV, 3 shocks: Japan level	0.304	0.230	0.132	0.109	0.198	0.448
	(0.249)	(0.413)	(0.434)	(0.509)	(0.531)	(0.636)
Hansen J, p-value	0.053	0.348	0.173	0.371	0.383	0.395
IV, 3 shocks: Japan risk	-0.094	-0.085	-0.092	-0.071	-0.046	-0.110
	(0.099)	(0.113)	(0.112)	(0.130)	(0.116)	(0.123)
Hansen J, p-value	0.097	0.340	0.143	0.298	0.384	0.360
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of US FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Each IV row and horizon h is one 2SLS regression across BOJ meetings t:

$$\text{First stage:} \quad \Delta F_t^{JP,j} = \pi_h + \gamma_{1h}\, s_t^{\text{rate}} + \gamma_{2h}\, s_t^{\text{FG}} + \gamma_{3h}\, s_t^{\text{LSAP}} + \delta_h' W_{t,h} + v_{t,h},$$

$$\text{Second stage:} \quad F_{t+h}^{US,L} - F_{t-1}^{US,L} = \alpha_h + \beta_h\, \widehat{\Delta F}_t^{JP,j} + \theta_h' W_{t,h} + u_{t,h},$$

where $F^{US,L}$ is the US level index, in standard deviations of the index level (higher is tighter); $\Delta F_t^{JP,j} = F_t^{JP,j} - F_{t-1}^{JP,j}$ is the meeting-day change in the Japanese index named in the row ($j = L$ level, $j = R$ risk); and s_t are the short-rate, forward-guidance and LSAP/YCC shocks of meeting day t. Day t is the BOJ announcement day, so the outcome runs from the close on the day before the meeting to h common trading days after it, $h = 0, \ldots, 5$. The controls are

$$W_{t,h} = \Big(\{\Delta F_{t-\ell}^{US,L},\, \Delta F_{t-\ell}^{US,R}\}_{\ell=1}^{4},\ \textstyle\sum_{\tau=t}^{t+h} \text{MP1}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP2}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP}_\tau^{ECB},\ \sum_{\tau=t}^{t+h} \text{CBI}_\tau^{ECB} \Big)',$$

four lags of the daily change in each US index and the Fed MP1/MP2 and ECB policy and information surprises summed over the response window, both ends included. Each IV row has one Japanese index as its single endogenous regressor and is overidentified by two. OLS rows: one regression per h of the same outcome on $\Delta F_t^{JP,L}$ and $\Delta F_t^{JP,R}$ together plus $W_{t,h}$, without instruments. Sample: BOJ meetings from 26 January 2010 to 30 October 2025 (164 at $h = 0$; 163 at $h \geq 1$, as the data end before day $t + 1$ of the 30 October 2025 meeting), with 31 July 2024 excluded and every window covered by both the Fed and the ECB surprise series; this is the sample of Table 8. The first stage at $h = 0$ is columns 3–4 of Table A7; Table A9 reports the US risk index. "Hansen J, p-value" is the heteroskedasticity-robust overidentification test of the IV row above it: under the null the three shocks identify the same coefficient (χ_2^2). HC1 robust standard errors in parentheses; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A9: US risk index on Japanese financial conditions, three BOJ shocks as instruments: Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
OLS: Japan level	0.276	0.051	0.298	0.289	0.179	0.113
	(0.286)	(0.323)	(0.422)	(0.428)	(0.621)	(0.516)
OLS: Japan risk	-0.061	-0.054	-0.137	-0.276	-0.125	-0.091
	(0.127)	(0.173)	(0.172)	(0.188)	(0.211)	(0.202)
IV, 3 shocks: Japan level	0.196	0.087	-0.034	1.410	0.605	0.514
	(0.657)	(0.889)	(0.907)	(1.271)	(1.188)	(1.052)
Hansen J, p-value	0.163	0.067	0.308	0.036	0.323	0.189
IV, 3 shocks: Japan risk	0.118	-0.012	0.003	-0.248	-0.130	-0.125
	(0.173)	(0.203)	(0.213)	(0.223)	(0.278)	(0.261)
Hansen J, p-value	0.226	0.069	0.312	0.024	0.326	0.206
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of US FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Each IV row and horizon h is one 2SLS regression across BOJ meetings t:

$$\text{First stage:} \quad \Delta F_t^{JP,j} = \pi_h + \gamma_{1h}\, s_t^{\text{rate}} + \gamma_{2h}\, s_t^{\text{FG}} + \gamma_{3h}\, s_t^{\text{LSAP}} + \delta_h' W_{t,h} + v_{t,h},$$

$$\text{Second stage:} \quad F_{t+h}^{US,R} - F_{t-1}^{US,R} = \alpha_h + \beta_h\, \widehat{\Delta F}_t^{JP,j} + \theta_h' W_{t,h} + u_{t,h},$$

where $F^{US,R}$ is the US risk index, in standard deviations of the index level (higher is tighter); $\Delta F_t^{JP,j} = F_t^{JP,j} - F_{t-1}^{JP,j}$ is the meeting-day change in the Japanese index named in the row ($j = L$ level, $j = R$ risk); and s_t are the short-rate, forward-guidance and LSAP/YCC shocks of meeting day t. Day t is the BOJ announcement day, so the outcome runs from the close on the day before the meeting to h common trading days after it, $h = 0, \ldots, 5$. The controls are

$$W_{t,h} = \Big(\{\Delta F_{t-\ell}^{US,L},\, \Delta F_{t-\ell}^{US,R}\}_{\ell=1}^{4},\ \textstyle\sum_{\tau=t}^{t+h} \text{MP1}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP2}_\tau^{Fed},\ \sum_{\tau=t}^{t+h} \text{MP}_\tau^{ECB},\ \sum_{\tau=t}^{t+h} \text{CBI}_\tau^{ECB} \Big)',$$

four lags of the daily change in each US index and the Fed MP1/MP2 and ECB policy and information surprises summed over the response window, both ends included. Each IV row has one Japanese index as its single endogenous regressor and is overidentified by two. OLS rows: one regression per h of the same outcome on $\Delta F_t^{JP,L}$ and $\Delta F_t^{JP,R}$ together plus $W_{t,h}$, without instruments. Sample: BOJ meetings from 26 January 2010 to 30 October 2025 (164 at $h = 0$; 163 at $h \geq 1$, as the data end before day $t + 1$ of the 30 October 2025 meeting), with 31 July 2024 excluded and every window covered by both the Fed and the ECB surprise series; this is the sample of Table 8. The first stage at $h = 0$ is columns 3–4 of Table A7; Table A8 reports the US level index. "Hansen J, p-value" is the heteroskedasticity-robust overidentification test of the IV row above it: under the null the three shocks identify the same coefficient (χ_2^2). HC1 robust standard errors in parentheses; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A10: US level index on Japanese financial conditions, one BOJ shock at a time: Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
IV, short-rate: Japan level (F = 1.6)	-0.512	-0.462	-0.645	-0.720	-0.614	-0.531
	(0.522)	(0.533)	(0.514)	(0.641)	(0.720)	(0.716)
95% AR set	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$
IV, forward-guidance: Japan level (F = 0.1)	2.644	2.265	3.414	3.428	3.495	5.009
	(7.277)	(4.442)	(6.865)	(8.623)	(26.354)	(31.459)
95% AR set	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$
IV, LSAP/YCC: Japan level (F = 8.5)	0.631*	0.435	0.399	0.427	0.563	0.870
	(0.352)	(0.591)	(0.641)	(0.730)	(0.676)	(0.819)
95% AR set	[-0.04, 2.09]	[-1.00, 2.20]	[-1.31, 2.28]	[-1.57, 2.40]	[-1.02, 2.52]	[-0.93, 3.39]
IV, short-rate: Japan risk (F = 2.0)	0.139	0.115	0.172	0.186	0.162	0.139
	(0.095)	(0.118)	(0.179)	(0.183)	(0.187)	(0.240)
95% AR set	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)$	$[-\infty, \infty)^{\dagger}$
IV, forward-guidance: Japan risk (F = 5.5)	-0.158	-0.184	-0.270	-0.218	-0.074	-0.127
	(0.130)	(0.166)	(0.184)	(0.199)	(0.206)	(0.221)
95% AR set	[-1.50, 0.03]	[-1.14, 0.12]	[-1.37, 0.04]	[-1.31, 0.16]	[-0.89, 0.51]	[-0.93, 0.56]
IV, LSAP/YCC: Japan risk (F = 8.8)	-0.212	-0.149	-0.137	-0.149	-0.226	-0.351
	(0.136)	(0.209)	(0.224)	(0.264)	(0.286)	(0.348)
95% AR set	[-0.85, 0.01]	[-0.85, 0.31]	[-0.88, 0.43]	[-1.07, 0.50]	[-1.50, 0.39]	[-1.96, 0.37]
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of US FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Each row and horizon h is one just-identified 2SLS regression across BOJ meetings t, with the single shock s_t^m named in the row, $m \in \{\text{rate}, \text{FG}, \text{LSAP}\}$, as the instrument:

$$\text{First stage:} \quad \Delta F_t^{JP,j} = \pi_h + \gamma_h \, s_t^m + \delta_h' W_{t,h} + v_{t,h},$$

$$\text{Second stage:} \quad F_{t+h}^{US,L} - F_{t-1}^{US,L} = \alpha_h + \beta_h \, \widehat{\Delta F}_t^{JP,j} + \theta_h' W_{t,h} + u_{t,h},$$

so β_h equals the reduced-form coefficient of the outcome on s_t^m divided by γ_h. $F^{US,L}$ is the US level index, in standard deviations of the index level (higher is tighter); $\Delta F_t^{JP,j} = F_t^{JP,j} - F_{t-1}^{JP,j}$ is the meeting-day change in the Japanese index named in the row ($j = L$ level, $j = R$ risk). Day t is the BOJ announcement day, so the outcome runs from the close on the day before the meeting to h common trading days after it, $h = 0, \ldots, 5$. The controls are

$$W_{t,h} = \Big(\{\Delta F_{t-\ell}^{US,L}, \, \Delta F_{t-\ell}^{US,R}\}_{\ell=1}^{4}, \; \textstyle\sum_{\tau=t}^{t+h} \text{MP1}_\tau^{Fed}, \; \sum_{\tau=t}^{t+h} \text{MP2}_\tau^{Fed}, \; \sum_{\tau=t}^{t+h} \text{MP}_\tau^{ECB}, \; \sum_{\tau=t}^{t+h} \text{CBI}_\tau^{ECB} \Big)',$$

four lags of the daily change in each US index and the Fed MP1/MP2 and ECB policy and information surprises summed over the response window, both ends included. Sample: BOJ meetings from 26 January 2010 to 30 October 2025 (164 at $h = 0$; 163 at $h \geq 1$, as the data end before day $t + 1$ of the 30 October 2025 meeting), with 31 July 2024 excluded and every window covered by both the Fed and the ECB surprise series; this is the sample of Table 8. Table A11 reports the US risk index. F is the robust first-stage F of the single instrument at $h = 0$. The line under each estimate is the 95% Anderson–Rubin set, which is valid however weak the first stage: every coefficient value the robust AR test does not reject at 5%, on a grid of ±40 standard errors in steps of one fiftieth. A set reaching either grid edge is unbounded on that side and printed with ∞; † marks sets that are not one interval (the printed limits are the smallest and largest accepted values). HC1 robust standard errors in parentheses; stars use the normal distribution; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A11: US risk index on Japanese financial conditions, one BOJ shock at a time: Fed and ECB controls, excluding 31 July 2024

	(1) h = 0	(2) h = 1	(3) h = 2	(4) h = 3	(5) h = 4	(6) h = 5
IV, short-rate: Japan level (F = 1.6)	0.947	3.200	2.534	6.618	3.557	4.089
	(1.292)	(2.570)	(2.024)	(4.571)	(3.054)	(2.893)
95% AR set	$[-\infty, \infty)$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)$
IV, forward-guidance: Japan level (F = 0.1)	-9.513	-2.916	-1.900	-6.581	-9.097	-8.073
	(27.273)	(6.913)	(6.792)	(17.543)	(69.515)	(53.635)
95% AR set	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$	$[-\infty, \infty)$
IV, LSAP/YCC: Japan level (F = 8.5)	0.138	-1.167	-1.440	-1.134	-0.737	-1.091
	(0.885)	(1.228)	(1.490)	(1.567)	(1.659)	(1.614)
95% AR set	[-2.64, 2.35]	[-5.71, 1.22]	[-7.46, 1.42]	[-6.40, 2.34]	[-6.11, 2.75]	[-6.64, 2.10]
IV, short-rate: Japan risk (F = 2.0)	-0.257	-0.797	-0.675	-1.706	-0.938	-1.072
	(0.461)	(0.629)	(0.728)	(1.305)	(0.845)	(1.079)
95% AR set	$[-\infty, \infty)$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$	$[-\infty, \infty)^{\dagger}$
IV, forward-guidance: Japan risk (F = 5.5)	0.568	0.237	0.150	0.419	0.191	0.205
	(0.424)	(0.410)	(0.473)	(0.580)	(0.596)	(0.527)
95% AR set	[-0.04, 4.95]	[-0.53, 2.52]	[-0.96, 2.21]	[-0.54, 4.10]	[-1.12, 3.22]	[-1.16, 2.51]
IV, LSAP/YCC: Japan risk (F = 8.8)	-0.047	0.400	0.496	0.397	0.297	0.440
	(0.301)	(0.422)	(0.502)	(0.563)	(0.655)	(0.607)
95% AR set	[-0.94, 0.72]	[-0.42, 2.01]	[-0.54, 2.53]	[-0.78, 2.74]	[-1.42, 2.69]	[-1.28, 2.49]
Fed policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
ECB policy shocks	Yes	Yes	Yes	Yes	Yes	Yes
Lags of US FCI factors	Yes	Yes	Yes	Yes	Yes	Yes
Meetings	164	163	163	163	163	163

Notes: Each row and horizon h is one just-identified 2SLS regression across BOJ meetings t, with the single shock s_t^m named in the row, $m \in \{\text{rate}, \text{FG}, \text{LSAP}\}$, as the instrument:

$$\text{First stage:} \quad \Delta F_t^{JP,j} = \pi_h + \gamma_h \, s_t^m + \delta_h' W_{t,h} + v_{t,h},$$
$$\text{Second stage:} \quad F_{t+h}^{US,R} - F_{t-1}^{US,R} = \alpha_h + \beta_h \, \widehat{\Delta F}_t^{JP,j} + \theta_h' W_{t,h} + u_{t,h},$$

so β_h equals the reduced-form coefficient of the outcome on s_t^m divided by γ_h. $F^{US,R}$ is the US risk index, in standard deviations of the index level (higher is tighter); $\Delta F_t^{JP,j} = F_t^{JP,j} - F_{t-1}^{JP,j}$ is the meeting-day change in the Japanese index named in the row ($j = L$ level, $j = R$ risk). Day t is the BOJ announcement day, so the outcome runs from the close on the day before the meeting to h common trading days after it, $h = 0, \ldots, 5$. The controls are

$$W_{t,h} = \Big(\{\Delta F_{t-\ell}^{US,L}, \, \Delta F_{t-\ell}^{US,R}\}_{\ell=1}^{4}, \; \textstyle\sum_{\tau=t}^{t+h} \text{MP1}_{\tau}^{Fed}, \; \sum_{\tau=t}^{t+h} \text{MP2}_{\tau}^{Fed}, \; \sum_{\tau=t}^{t+h} \text{MP}_{\tau}^{ECB}, \; \sum_{\tau=t}^{t+h} \text{CBI}_{\tau}^{ECB} \Big)',$$

four lags of the daily change in each US index and the Fed MP1/MP2 and ECB policy and information surprises summed over the response window, both ends included. Sample: BOJ meetings from 26 January 2010 to 30 October 2025 (164 at $h = 0$; 163 at $h \geq 1$, as the data end before day $t + 1$ of the 30 October 2025 meeting), with 31 July 2024 excluded and every window covered by both the Fed and the ECB surprise series; this is the sample of Table 8. Table A10 reports the US level index. F is the robust first-stage F of the single instrument at $h = 0$. The line under each estimate is the 95% Anderson–Rubin set, which is valid however weak the first stage: every coefficient value the robust AR test does not reject at 5%, on a grid of ±40 standard errors in steps of one fiftieth. A set reaching either grid edge is unbounded on that side and printed with ∞; † marks sets that are not one interval (the printed limits are the smallest and largest accepted values). HC1 robust standard errors in parentheses; stars use the normal distribution; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

A.7 IV estimates before the December 2022 YCC widening

Table A12 runs the specification of Table 11 on the 141 meetings before the BOJ widened the YCC band on 20 December 2022. Neither shock moves the Japanese level index in that period, so the IV is uninformative.

Table A12: US financial conditions on the Japanese level index before the December 2022 YCC widening, short-rate or LSAP/YCC shock as the instrument

	h = 0	h = 1	h = 2	h = 3	h = 4	h = 5
A. Short-rate instrument; outcome: US risk FCI						
IV estimate	2.799	5.880	5.576	9.390	7.780	6.027
	(2.671)	(5.315)	(4.407)	(6.897)	(5.984)	(4.053)
95% AR set	$\mathbb{R}$	$\mathbb{R} \setminus (-0.7, 0.5)$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$
First-stage F	0.9	0.9	1.2	1.3	1.3	1.3
B. LSAP/YCC instrument; outcome: US level FCI						
IV estimate	0.361	-0.731	-0.984	-0.465	-0.544	-0.586
	(0.873)	(1.269)	(1.884)	(1.425)	(1.665)	(1.620)
95% AR set	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$
First-stage F	0.7	0.9	0.7	0.7	0.7	0.7
C. Short-rate instrument; outcome: US level FCI						
IV estimate	-0.690	-0.411	-0.563	-0.395	-0.469	-0.232
	(1.120)	(0.829)	(0.827)	(0.728)	(0.979)	(0.804)
95% AR set	$\mathbb{R} \setminus (0.2, 1.0)$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$
First-stage F	0.9	0.9	1.2	1.3	1.3	1.3
D. LSAP/YCC instrument; outcome: US risk FCI						
IV estimate	0.404	-3.372	-5.168	-1.084	-1.250	-3.824
	(2.696)	(6.264)	(9.418)	(5.356)	(7.310)	(8.417)
95% AR set	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$	$\mathbb{R}$
First-stage F	0.7	0.9	0.7	0.7	0.7	0.7
Meetings	141	141	141	141	141	141

Notes: The specification of Table 11 (see its notes): each row and horizon h is one just-identified 2SLS regression across BOJ meetings of the cumulative change in the US index named in the panel title on the meeting-day change in the Japanese level index, with the shock named in the panel title as the single excluded instrument and the other two BOJ shocks and the Fed and ECB window surprises $G_{t,h}$ as controls in both stages. Sample: the 141 BOJ meetings from 26 January 2010 to 19 December 2022, every one covered by the Fed and the ECB surprise series. Under yield curve control neither instrument moves the Japanese level index (first-stage F at most 1.3), so the IV carries no information: $\mathbb{R}$ means that the 95% Anderson–Rubin set rejects no value, and $\mathbb{R} \setminus (a, b)$ is the union of the two rays $(-\infty, a]$ and $[b, \infty)$. First-stage F is the squared robust t-statistic of the instrument at each h. HC1 robust standard errors in parentheses; p-values and AR critical values use the t and F distributions with $N - K$ degrees of freedom; $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

A.8 Local-projection detail

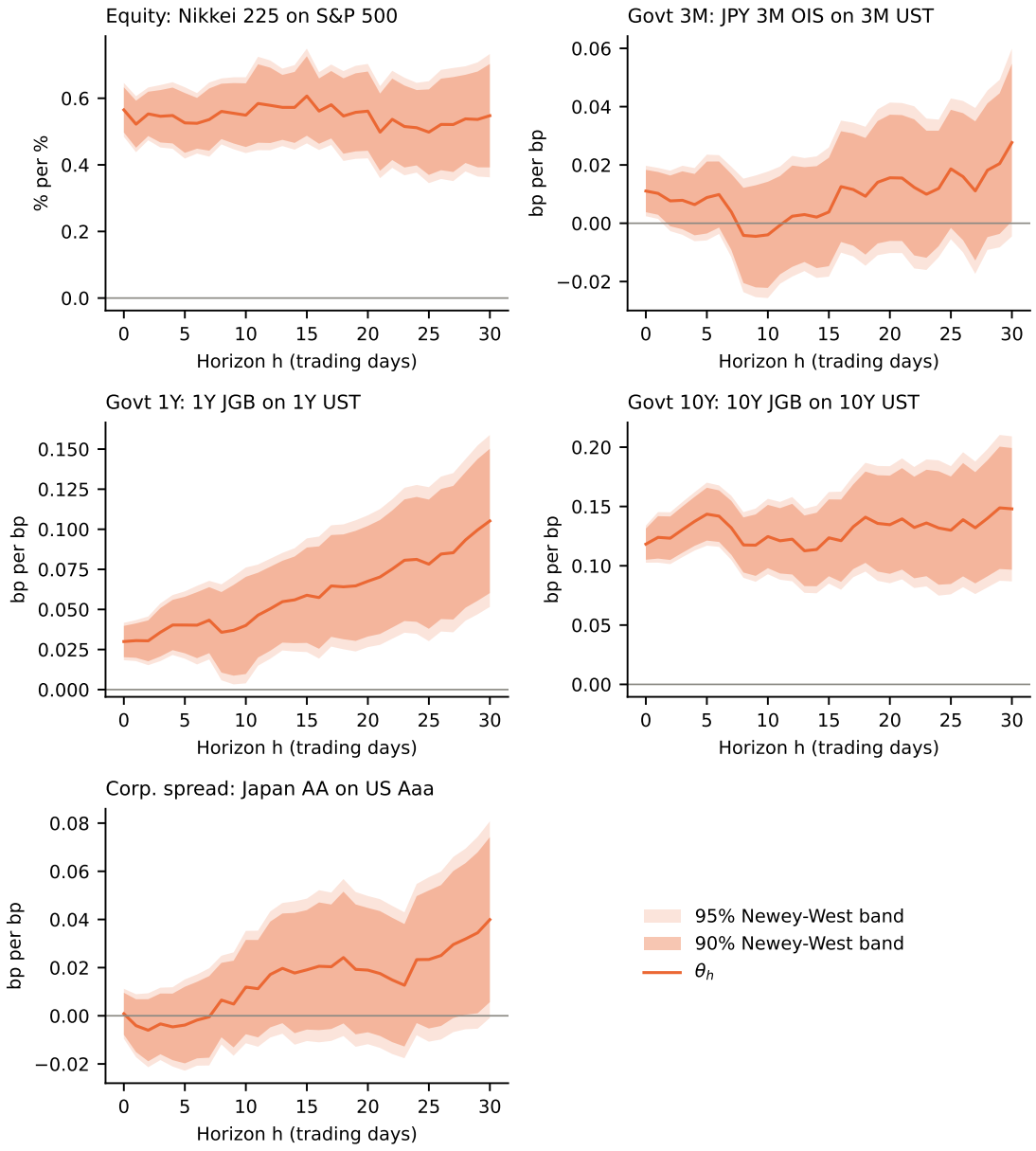


Figure 22: Reverse direction: local-projection coefficient θ_h of the Japanese level h trading days after a one-unit US change on day t, $h = 0, \ldots, 30$, with 95% (light) and 90% (dark) Newey–West bands (30 lags). Tokyo closes before New York on the same calendar day, so the US change of day t first reaches Tokyo on day $t+1$; $h = 0$ is the next-day Tokyo change. Specification: $y^{JP}_{i,t+1+h} = a_h + \theta_h \, \Delta y^{US}_{i,t} + \sum_{j=0}^{5} \gamma_{h,j} \, y^{JP}_{i,t-j} + \epsilon_{i,t+1+h}$, estimated asset by asset; series and units as in Table 6.