

### Online Box 1.1. Financial Conditions in Asia<sup>1</sup>

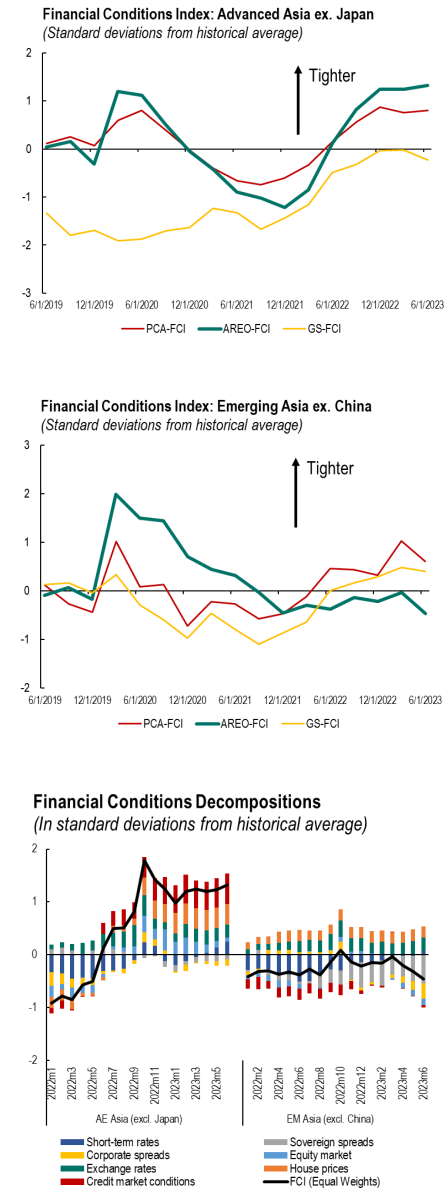
Financial conditions in Asia have shown a divergence between advanced and emerging economies since early 2022, in response to the policy rate hiking cycle across major central banks and within the region. This box introduces a parsimonious and high-frequency financial conditions index (FCI) for Asia, which is derived from a list of price and quantity indicators from financial markets. Growth-at-Risk analysis based on this FCI indicates significant downside risks to growth following financial tightening, and the result is particularly persistent for emerging market economies in Asia.

Financial conditions have tightened more significantly in Asia’s advanced economies (excluding Japan) than in the region’s emerging markets in the recent cycle. This divergence is reflected by the steeper increases in price indicators such as long-term local currency sovereign yields in advanced Asia since early 2022. Moreover, quantity indicators such as credit growth and lending standards also indicate a greater degree of financial tightening in advanced Asia.

Financial conditions index (FCI) is a composite indicator that reflects the overall state of the financial markets in an economy. It is often constructed and published by central banks or financial institutions using various financial market price indicators. However, most of the existing FCIs have two main limitations. First, they focus on price of risk variables but exclude credit market quantity indicators that are important for bank-based emerging markets. Second, they rely on data-reduction techniques that are agnostic and model-driven, such as regression-based approach or factor-model-based approach.<sup>23</sup>

This box presents a monthly financial conditions index (AREO-FCI) that is derived from a simple average of 12 financial market price and quantity indicators.<sup>4</sup> This approach is more parsimonious than other data-reduction methods and has been shown to be equally or more effective in capturing tail risk for economic activity and predicting banking and currency crises (Arrigoni, Bobasu, and Venditti, 2022).

Box Figure 1.1.1. AREO-FCI



Source: Bloomberg Finance L.P.; BIS; Datastream; Haver Analytics; and IMF staff calculations.  
 Note: AE Asia (excl. Japan) includes Australia, Hong Kong SAR, Korea, and Singapore. EM Asia (excl. China) includes India, Indonesia, Malaysia, and Philippines. FCI for each region is calculated as a simple average across economies.

<sup>1</sup> This box was prepared by Yizhi Xu.

<sup>2</sup> The regression-based approach includes indicators constructed based on Ordinary Least Square regressions (Gauthier, Graham, and Liu, 2004) and vector autoregressions (Batini and Turnbull, 2022; Gauthier, Graham, and Liu, 2004; Swiston, 2008).

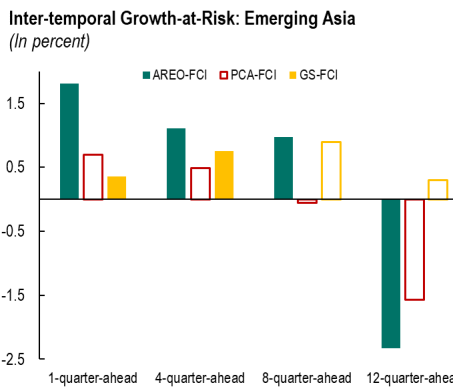
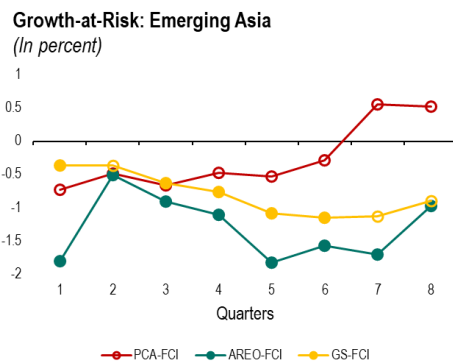
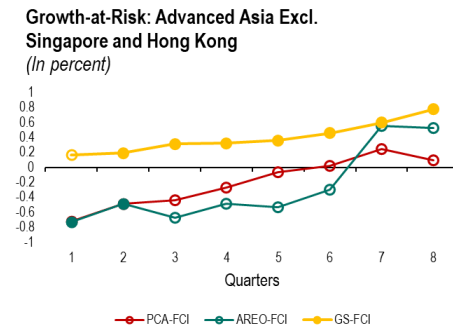
<sup>3</sup> The factor-model-based approach includes financial condition index constructed by Goldman Sachs (Hatzius et al., 2010), Chicago Fed (Brave and Kelly, 2017), European Central Bank (Angelopolou, et al., 2012), and IMF’s Global Financial Stability Report (2017).

<sup>4</sup> These include real short-term interest rates, interbank spreads, sovereign bond spreads (currency-denominated and US dollar-denominated), corporate bond spreads (both local-currency-denominated and US dollar-denominated), equity prices, equity volatility, exchange rates, real house price, real credit growth, and lending standards based on senior loan officer surveys.

The new index exhibits a stronger performance in capturing not only episodes of sharp tightening during the onset of the pandemic (Box Figure 1.1.1., panel 1 and 2), but also the recent loosening of financial conditions in emerging markets of Asia, compared with FCI constructed by Goldman Sachs (GS-FCI) and one based on principal components analysis (PCA-FCI).<sup>5</sup> Decompositions of Asia’s AREO-FCI reveal that the muted financial tightening cycle in emerging Asia has been mainly driven by less declines in asset valuations—more compressed sovereign and corporate spreads, relatively unchanged equity and house prices—and slightly eased lending standards, in contrast to rapidly tightened credit market conditions in advanced Asia (Box Figure 1.1.1., panel 3).

The AREO-FCI captures the significant downside risk to growth stemming from abrupt financial tightening, particularly for Asia’s emerging markets. Unlike other FCI measures, which rely solely on market price indicators, the AREO-FCI is more robust in explaining increased Growth-at-Risk following financial tightening across both advanced Asia and emerging Asia (Box Figure 1.1.2.). Furthermore, for Asia’s emerging economies, estimates indicate that rising AREO-FCI is associated with increased downside risk to growth for a more prolonged period, suggesting the region’s higher susceptibility to financial tightening. Finally, AREO-FCI could also forecast significant inter-temporal growth-at-risk relations associated with loosening financial conditions in emerging markets of Asia. A one-standard-deviation easing of financial conditions, indicated by a decline in AREO-FCI, leads to a substantial reduction in near-term downside risks, but also a commensurate increase in the growth-at-risk over the medium-term (Box Figure 1.1.2., panel 3).

**Box Figure 1.1.2. Growth-at-Risk**



Source: Bloomberg; BIS; Datastream; Haver; and IMF staff calculations.

Note: Negative values indicate increased growth-at-risk. In panel 1 and 2, the impact is associated with one-standard-deviation increase in FCI. Solid dots indicate statistically significant with 90 percent confidence. In panel 3, the impact is associated with one-standard-deviation decrease in FCI. Solid bars indicate statistically significant with 90 percent confidence. PCA-FCI is principal-component-analysis-based financial conditions index, and GS-FCI is the financial conditions index from Goldman Sachs.

<sup>5</sup> The Goldman Sachs FCI is a composite indicator of five market price indicators, weighted by their estimated impact on real GDP growth over the next four quarters using a stylized macro model. The PCA-based FCI is based on nine market price indicators, weighted by the first component of principal component analysis (PCA).

## Online Box 1.2. Spillovers to Asia from Japan's Monetary Policy Normalization<sup>6</sup>

Amid a strong economic recovery and accelerating inflation that has risen above its target for the first time in decades, the Bank of Japan (BoJ) has recently made two adjustments to its yield curve control policy. At its meetings in December 2022 and July 2023, the BoJ announced changes to its policy that allowed the yield on 10-year government bonds to rise. As further normalization of the BoJ's policy settings is possible in coming months, this box provides estimates of the cross-border spillovers on asset prices in other Asian economies.

While markets have long speculated that the BoJ may need to modify its unconventional policy settings, both recent policy announcements appear to have surprised markets, and were followed within minutes by a significant repricing of Japanese government bonds across all maturities (Box Figure 1.2.1, panel 1).<sup>7</sup> Both announcements also led to a transitory strengthening of the yen against the US dollar as the interest rate differential narrowed.

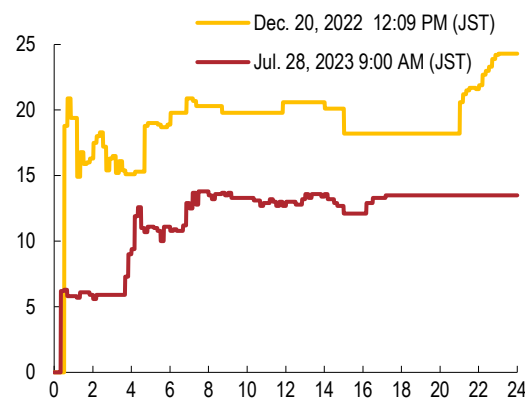
These unanticipated monetary policy announcements offer natural experiments to study the cross-border financial spillovers from the BoJ's policy.<sup>8</sup> Within minutes of the BoJ announcement, 10-year Treasury yields increased immediately in several other countries with highly liquid markets, including the United States, Australia, Korea, and several European economies. Within a day, yields had increased significantly in Hong Kong SAR, Singapore, and Indonesia as well, while yields in China and India were less impacted (Box Figure 1.2.1., panel 2).

The strength of spillovers varied across countries and appears higher in countries with closer financial and trade linkages to Japan (Box Figure 1.2.2). Japan is the largest net creditor country and held portfolio and direct investment gross assets of about US \$6 trillion globally as of end-2022, of which about \$1 trillion is invested in Asia. This accumulation of foreign assets has been supported by years of very low domestic interest rates that drove Japanese investment abroad in search of higher yields. Within Asia, Japanese investors hold a significant market share of sovereign debt in Australia and Singapore, followed by lesser but notable shares in Hong Kong SAR, Malaysia, and Indonesia, among others.

### Box Figure 1.2.1. Surprise! Reaction of asset prices in Japan and across Asia to BoJ announcements

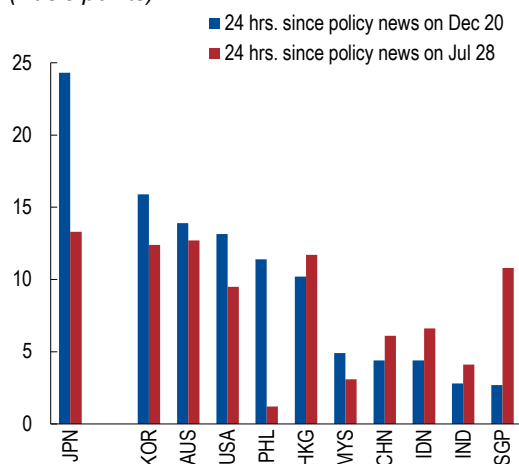
#### Change in 10Y JGB Yield After News of YCC Changes

(Basis points [y-axis]; hours from Nikkei's first news on YCC [x-axis])



#### Change in sovereign bond yields

(Basis points)



Sources: Refinitiv Eikon & IMF staff calculations.

Note: For the July 28 move, news broke at 2:02 am but data is only available from 9:20 am.

<sup>6</sup> This box was prepared by Yan Carrière-Swallow, Purva Khera, Kaustubh Chahande, with help from MCM's Monetary Modeling Unit.

<sup>7</sup> In the case of the July policy change, Nikkei's reporting of the expected policy change released overnight, prior to the actual policy announcement, is used as the timing of the policy surprise.

<sup>8</sup> See Kuttner (2001) and Gertler and Karadi (2015) for details on the use of high-frequency data to measure US monetary policy surprises. Past estimates reporting significant spillovers from Japan's earlier unconventional monetary policy to other economies include Dekle and Hamada (2015) for impacts on the US, and Ganelli and Tawk (2016) for impacts on Asian emerging market and developing economies.

In trade, close to 56 percent of Japan’s exports in 2022 were to Asia and 45 percent of its imports came from Asia, with China, Australia, Thailand, and Indonesia among its top trading partners. To better understand the mechanisms through which withdrawal of BoJ’s exceptional policy support spills over to the rest of Asia, we consider a two-country New Keynesian model that incorporates both the short-term policy rate and quantitative easing as policy instruments for the central bank (Erceg and others, forthcoming). The model is calibrated to fit Japan and its Asian peers, differentiating between advanced versus emerging economies.<sup>9</sup> We simulate a scenario where unanticipated positive demand and cost-push shocks create a positive output gap and raise inflation well above target. The BoJ responds by raising the 10-year yield through gradual quantitative and policy rate tightening. This monetary tightening affects economies abroad through several channels, including the rebalancing of investor portfolios as described by Caldara, Ferrante, and Queralto (2022).

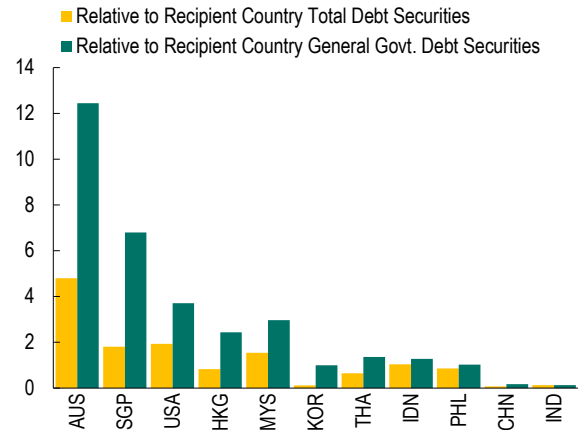
An increase in domestic yields in Japan prompts capital outflows from its foreign counterparts in search of higher yield at home. This translates into a fall in foreign long-term bond prices and an increase in long-term premiums, thus leading to an increase in the foreign long-term rates. Specifically, the model suggests that a 100 basis point increase in Japan’s long-term rate would increase the same maturity advanced and emerging economy rates in Asia by about 40 basis points and 20 basis points, respectively.

The magnitude of this modeled spillover response is closely aligned with the experience from recent events described above. Indeed, Japanese investors reduced their holdings of foreign assets amid both actual and expected rise in JGB yields and US dollar hedging/funding costs (April 2023 GFSR).

With room for further increases in Japanese interest rates in the near future, this could continue to have significant implications for the rest of Asia. If Japan’s inflation were to continue to rise significantly in the near term, a much stronger monetary tightening response including raising the short-term policy rate and allowing further increases in long-term rates will be needed to get inflation back in control (IMF 2023 Japan Article IV Staff Report).

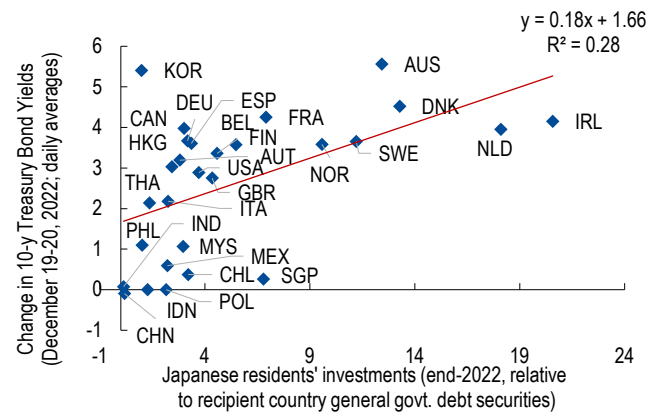
**Box Figure 1.2.2. Financial interlinkages with Japan**

**Debt securities held by Japanese investors**  
(Percent; end-2022)



**Higher spillovers to markets with stronger Japanese footprint**

(Percent [x-axis]; basis points [y-axis])



Sources: MOF Japan; BIS; Haver Analytics; and IMF staff calculations.

<sup>9</sup> The model is calibrated to capture the relative economic sizes of Japan’s advanced versus emerging economy neighbors, as well as their respective degree of openness.

## References

---

- Angelopoulou, Eleni, Hiona Balfousia, and Heather D. Gibson. 2014. “Building a Financial Conditions Index for the Euro Area and Selected Euro Area Countries: What Does It Tell Us about the Crisis?” *Economic Modelling* 38 (February): 392–403.
- Arrigoni, Simone, Alina Bobasu, and Fabrizio Venditti. 2022. “Measuring Financial Conditions Using Equal Weights Combination.” *IMF Economic Review* 70: 668–97.
- Batini, Nicoletta, and Kenny Turnbull. 2002. “A Dynamic Monetary Conditions Index for the UK.” *Journal of Policy Modeling* 24 (3): 257–81.
- Brave, Scott, and David Kelly. 2017. “Introducing the Chicago Fed’s New Adjusted National Financial Conditions Index.” Chicago Fed Letter 386, Federal Reserve Bank of Chicago, Chicago.
- Caldara, Dario, Francesco Ferrante, and Albert Queralto. 2022. “International Spillovers of Tighter Monetary Policy.” FEDS Notes, December 22, 2022.
- Dekle, Robert, and Koichi Hamada. 2015. “Japanese Monetary Policy and International Spillovers.” *Journal of International Money and Finance* 52 (April): 175–99.
- Erceg, C., Kolasa, M., Linde, J., and P. Zabczyk (2023). Central Bank Exit Strategies: Domestic Transmission and International Spillovers. IMF Working Paper (forthcoming).
- Ganelli, Giovanni, and Nour Tawk. 2016. “Spillovers from Japan’s Unconventional Monetary Policy to Emerging Asia: A Global VAR Approach.” IMF Working Paper 16/99, International Monetary Fund, Washington, DC.
- Gauthier, Céline, Christopher Graham, and Ying Liu. 2004. “Financial Conditions Indexes for Canada.” Working Paper 2004–22, Bank of Canada, Ottawa.
- Gertler, Mark, and Peter Karadi. 2015. “Monetary Policy Surprises, Credit Costs, and Economic Activity.” *American Economic Journal: Macroeconomics* 7 (1): 44–76.
- Hatzius, Jan, Peter Hooper, Frederic S. Mishkin, Kermit L. Schoenholtz, and Mark W. Watson. 2010. “Financial Condition Indexes: A Fresh Look after the Financial Crisis.” NBER Working Paper 16150, National Bureau of Economic Research, Cambridge, MA.
- Kuttner, Kenneth N. 2001. “Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market.” *Journal of Monetary Economics* 47 (3): 523–44.
- Swiston, Andrew. 2008. “A US Financial Conditions Index: Putting Credit Where Credit Is Due.” IMF Working Paper 08/161, International Monetary Fund, Washington, DC.