# Monetary Trends without Stars*

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[Incomplete and preliminary.]

**Abstract**

We document that monetary policy announcements can induce secular variations in interest rates without the "long-run Fed guidance" channel emphasized by Hillenbrand (2025). During the Fed's and three other foreign central banks' monetary policy announcement windows, China's Treasury yields exhibit secular trends that deviate substantially from the actual interest rate trend in China, enabling us to rule out the $r^*$ channel. Moreover, the trends closely track those in the announcement countries, indicating a one-to-one monetary spillover. We discuss challenges confronting standard models in explaining these facts and propose an explanation based on rational inattention.

**Keywords:** Monetary policy, global financial cycle, yield curve.
**JEL Codes:** E43, E52, F42

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# 1 Introduction

Recent studies demonstrate that U.S. monetary policy announcement windows account for a significant share of global interest rate trends. For example, Hillenbrand (2025) documents that the secular decline in the U.S. 10-year yield since the late 1980s occurred almost entirely during the three-day windows around FOMC announcements, and Hofmann et al. (2025) show that the same event windows can also explain over 70% of the secular interest rate trends in G10 countries. A key question, however, is whether the observed interest rate dynamics during FOMC windows reflect pure monetary policy shocks or the $r^*$ implied by the policy decisions? This challenge stems from the close alignment between long-run interest rate trends and FOMC-window dynamics in advanced economies, coupled with the fact that monetary policy inherently responds to macroeconomic fundamentals. Indeed, Hillenbrand (2025) highlights the $r^*$ channel as a potential explanation for the downward FOMC trend, labeling it as "long-run Fed guidance". In this paper, we present a case where a country's yield curve responses to monetary policy announcements are unlikely to be related to the $r^*$, yet highly resemble the patterns documented by Hillenbrand (2025) and Hofmann et al. (2025). These findings suggest the presence of previously unexplored channels for the transmission of monetary policy trends.

Figure 1 illustrates our main findings and the identification strategy. We sum up the daily yield changes in the U.S. and China over the three days around FOMC announcements. The panel "USD 10Y" replicates Figure 1 of Hillenbrand (2025): the FOMC windows can explain almost the entire secular decline in the U.S. 10-year yield over the past three decades. We find that China's 10-year yield has also declined persistently during the FOMC windows over the past two decades.[1] Moreover, the yields in China and the U.S. are highly correlated during the FOMC windows. In contrast, the yield dynamics outside the FOMC windows are starkly different. The U.S. yield exhibits a flat trend outside FOMC windows, making the FOMC series resemble the actual long-run interest rate trend.[2] The Chinese yield increases persistently outside FOMC windows, making the actual long-run trend flat and departing from the FOMC series. Such a divergence suggests that the FOMC series in China is unlikely to be driven by the Chinese natural rate $r^*_{CN,t}$ revealed by the FOMC announcements, but

[1] The Chinese sample is shorter because daily yield curve data only became available from March 1, 2006.

[2] Hofmann et al. (2025) document similar patterns for G10 countries.

the Chinese yield has nonetheless constantly followed the yield decline in the U.S. over the past two decades. We further show that macroeconomic data releases also fail to generate persistent declines in China's interest rates. Therefore, the "long-run Fed guidance" channel is unlikely to explain the effects of U.S. monetary policy announcements on China's interest rates. To be clear, we do not dispute that the FOMC announcements reveal the $r^*$ in the U.S. or other G10 countries; however, the $r^*$ pertinent to Chinese interest rates is not revealed by FOMC announcements.

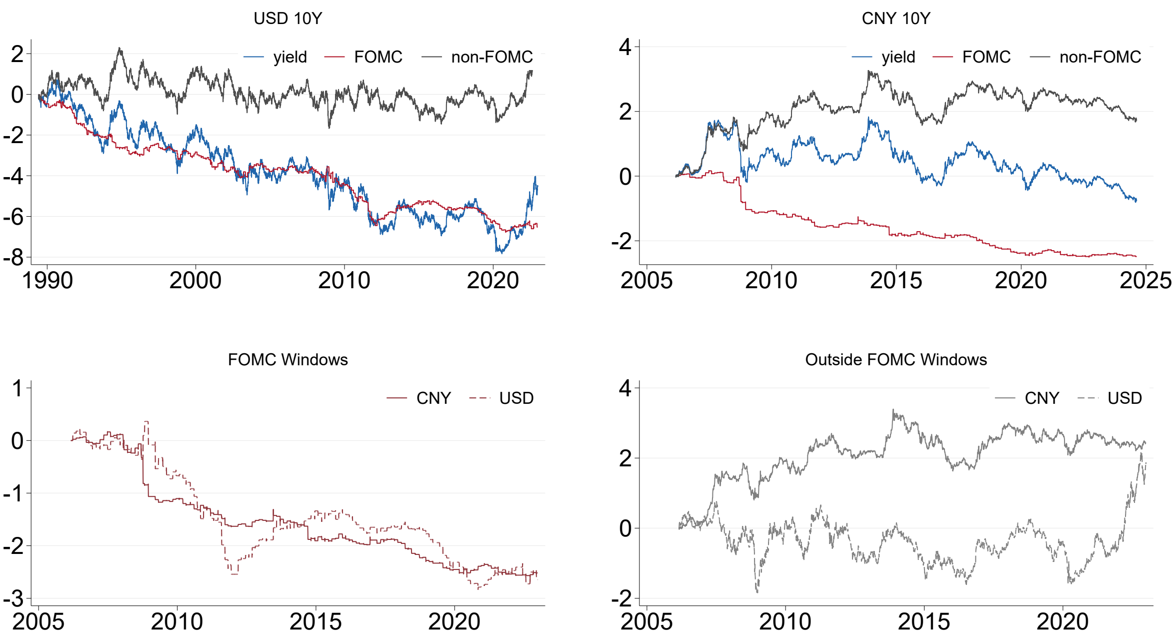



Figure 1: Cumulative effects of FOMC announcements on U.S. and Chinese 10-year yields.

*Notes.* In the top panels, the "yield" series is the actual yield relative to its initial value, and the "FOMC" series is the sum of daily yield changes during three-day windows around FOMC announcements. The "USD 10Y" panel replicates Hillenbrand (2025), and the "CNY 10Y" panel does the same to Chinese yields. In the bottom panels, "CNY" and "USD" denote the sums of daily yield changes in China and the U.S. over the respective event windows.

Furthermore, China's Treasury yields also exhibit "Hillenbrand-type" cumulative responses to monetary policy announcements from a group of other globally important central banks, including the Bank of Japan (BOJ), the European Central Bank (ECB), and the Bank of England (BOE), all departing from the actual long-run trends in China. These persistent cumulative responses are observed across all segments of the yield curve. Given that China maintains tight capital controls and a domestically oriented monetary policy, it is intriguing that its interest rates are significantly influenced by foreign monetary policy announcements.[3] Again, it's hard to argue that $r^*_{CN,t}$ is revealed by these announcements, so the cumulative responses are likely to be purely monetary. We summarize our findings into two puzzles.

1. **Response puzzle.** China's Treasury yields changed constantly with monotonic trends during foreign monetary policy announcement windows over the past two decades. These trends diverge from the actual interest rate trends.

2. **Comovement puzzle.** China's Treasury yields are synchronized with the yields in the announcement countries almost one-to-one during foreign monetary policy announcements, with a stronger correlation than that between many developed open economies and the announcement country. However, such synchronization disappears outside monetary policy announcement windows. The dichotomy is a unique feature of China's interest rates, while the yields in advanced economies are highly correlated at all times.

We adopt a high-frequency approach similar to Kuttner (2001), Bernanke and Kuttner (2005), Gürkaynak et al. (2005), Hanson and Stein (2015), Nakamura and Steinsson (2018), Albagli et al. (2019), Bu et al. (2021), and Bauer and Swanson (2023). Instead of regressing high-frequency yield changes on monetary policy shocks, we accumulate daily changes in China's Treasury yields over three-day windows surrounding foreign central banks' monetary policy announcements. Another key difference from the literature is that most papers only study what happens *during* the monetary policy announcement windows, but we also emphasize the yield dynamics *outside* the windows.

The contrast between the windows and non-windows is the key to ruling out the $r^*$ channel, and this identification strategy is our contribution to the literature. For instance, suppose FOMC announcements signal the U.S. natural rate $r^*_{US,t}$, and China's natural rate

[3] China receives a normalized Chinn-Ito index of 0.16 (Chinn and Ito (2006)), lower than 75% of other countries in the Chinn-Ito dataset, indicating limited capital account openness. The PBoC governors emphasize that China's monetary policy focuses on domestic issues, and its interest rates do not follow those of other countries.

$r^*_{CN,t}$ closely follows $r^*_{US,t}$ because of, e.g., strong trade linkages, then China's interest rates should also exhibit a stable trend between FOMC announcement windows like the U.S. counterparts. Consequently, interest rate trends in the two countries should not deviate outside FOMC windows. Indeed, the U.S. and EU yields are strongly correlated all the time, regardless of whether it is during monetary policy announcement windows.

Deepening our puzzle, we further investigate some potential channels through which foreign shocks affect China's yields. One channel is that investors actively arbitrage away the yield gaps when foreign yields respond to the shocks. The People's Bank of China may also pay close attention to the yield gaps during the monetary policy announcement days to stabilize the exchange rate. We examine whether trading activities in China's Treasury bond market spike during foreign monetary policy announcement windows. Surprisingly, the result is negative, and trading during the monetary policy windows was even less active than outside the windows before 2015. Therefore, the intensity of trading does not seem to explain the responses of China's Treasury yields to foreign monetary policy shocks.

Second, we find no evidence that macroeconomic news announcements explain the systematic yield responses to monetary policy announcements. According to standard monetary theories, monetary policy is a function of macroeconomic fundamentals such as the output gap and inflation. China's interest rates may respond to foreign monetary policy announcements because of the implied macroeconomic shocks. If this is true, then foreign macroeconomic news announcements such as the U.S. CPI or GDP data releases should also significantly affect China's interest rates. However, China's interest rates are almost constant during U.S. macroeconomic news announcement windows and equally inactive during Chinese macroeconomic news announcement windows, clearly dominated by the responses to monetary policy announcements.

The distinct comovement patterns during and outside monetary policy announcement windows are challenging for standard explanations. On one hand, the standard arbitrage mechanism can explain the strong cointegration pattern during the announcement windows, but struggles to explain why the investors do not exploit the yield gaps outside these periods. On the other hand, capital controls and independent monetary policy can explain why Chinese yields diverge from world interest rates most of the time, but it's puzzling why foreign monetary policy shocks are passed nearly 100% to Chinese yields.

We propose a model to rationalize the responses of Chinese yields to foreign monetary policy announcements. The model highlights an information channel. Home investors believe that the home bond price depends on domestic and foreign factors. Home investors observe a signal about the foreign factor only during foreign monetary policy announcements, which is highly informative about the foreign bond pricing factor. The reduction in uncertainty makes home investors weigh heavily on the foreign signal, leading to a strong correlation between home and foreign bond prices during monetary policy announcement windows.

Our model implies that investors should pay more attention to monetary policy announcements than other macroeconomic announcements for interest rate news. We validate this implication using Chinese news articles. The Chinese word "interest rate" is 20% more likely to appear in articles during FOMC announcement windows than on days without monetary or macroeconomic news announcements. More interestingly, "interest rate" is 10% *less* likely to be mentioned in news articles during U.S. macroeconomic announcement windows than on non-announcement days. Therefore, interest rate news indeed attracts disproportionately more attention during monetary policy announcement windows in China.

Finally, we show that the responses of China's long-term yields to foreign monetary policy announcements do not primarily reflect expected changes in China's short-term rate. This corroborates China's monetary policy independence and disfavors the $r^*$ channel. We estimate an affine term structure model and study the dynamics of the model-implied term premia during the foreign monetary policy announcements. The risk-neutral rates have changed little during foreign monetary policy announcement windows, and the risk premia explain most of the responses of the long-term yields.

This paper contributes to the ongoing discussion regarding whether U.S. monetary policy has caused the secular decline in interest rates worldwide (see, for example, Borio (2024), Borio et al. (2022)). A recent strand of literature links the downward trend of long-term yields specifically to U.S. monetary policy. For instance, Hillenbrand (2025), Bianchi et al. (2022a), and Bianchi et al. (2022b) focus on U.S. yields, while Hofmann et al. (2025) examine yields in G10 countries. We contribute to the literature by demonstrating that monetary policy announcements in financial hub countries can spill over worldwide persistently without signaling the natural rate of the recipient country.

This paper is also related to the global financial cycle literature, such as Bruno and Shin (2015), Rey (2015), Rey (2016), Gerko and Rey (2017), Dedola et al. (2017), Gilchrist et al. (2019), Albagli et al. (2019), Brusa et al. (2020), Miranda-Agrippino and Rey (2020), Miranda-Agrippino and Rey (2022), Miranda-Agrippino and Nenova (2022), and Kearns et al. (2023). The literature provides compelling evidence that monetary policies of financial hub countries have significant spillover effects on the world financial market and macroeconomic conditions. Our findings regarding China are consistent with the literature and strengthen the notion of the global financial cycle. With a tightly regulated capital account and foreign investors holding less than 10% of China's total outstanding Treasury bonds, one might expect limited sensitivity of interest rates to external monetary policy shocks, as Han and Wei (2018) find using monthly data. Nevertheless, our findings imply an "impossible unity": despite the floating exchange rate and capital control, China's Treasury yields of all maturities are highly sensitive to financial hub countries' monetary policy shocks and are pegged to their yields during the monetary policy announcement windows. To be clear, China's monetary policy has substantial degrees of independence in the sense that China's interest rates are disconnected from foreign ones most of the time, but the monetary policy announcement windows of hub countries constitute a few yet important exceptions.

The rest of the paper is organized as follows. Section 2 introduces the institutional background of China's Treasury bond market. Section 3 presents the cumulative effects of foreign monetary policy announcements on China's Treasury yields and the yield comovements during and between announcement windows. Section 4 investigates the spillover effects in detail. Section 5 explores whether trading volume or macroeconomic news can explain the systematic responses of Chinese yields to foreign monetary policy announcements. Section 6 presents our theoretical explanation of the yield comovements. Section 7 estimates the responses of risk-neutral rates and term premia to international monetary policy announcements. Section 8 concludes.

## 2 Institutional Background

On March 1, 2006, China Central Depository & Clearing Co., Ltd. (`www.chinabond.cn`) started to estimate the Treasury yield curve to reflect the yield-to-maturity of onshore-traded RMB bonds. Since then, the yield curve data has been released at 5 PM every day and has become the official Chinese yield curve used by monetary and fiscal authorities and market participants. We use the zero-coupon yields for our exercise.

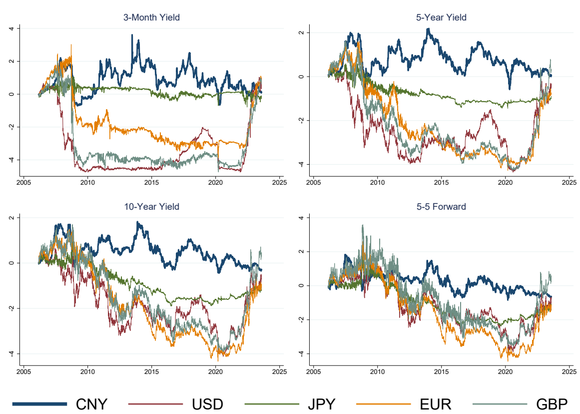
China's Treasury yields appear disconnected from those of developed economies. Figure 2a illustrates the time series of Chinese yields alongside those of the U.S., Japan, Eurozone, and the U.K., all normalized to start at zero. Obviously, the dynamics of Chinese yields are disconnected from those of foreign countries. The short-term rates in the U.S., Eurozone, and the U.K. experienced sharp declines in 2008 and 2009 in response to the Global Financial Crisis, while the long-term yields of all four foreign countries have continuously declined from 2006 to 2020. Notably, the long-term yields, particularly the 10-year yields and the 5-5 forward rates, exhibit a strong resemblance across these countries, reflecting the well-known comovement pattern of interest rates among developed economies. In contrast, Chinese yields across all maturities have remained stable over the past two decades. This stability suggests that Chinese yields are largely independent of those in developed economies. However, we will demonstrate that while this disconnection holds most of the time, there are significant exceptions during the monetary policy announcements of foreign central banks. During these periods, China's yields closely track the changes in the yields of the announcing countries, indicating a marked influence of foreign monetary policy on China's Treasury yields.

Treasury bonds are one of the key instruments of the People's Bank of China (PBoC) for monetary policy operations and enjoy large issuance and trading volumes with significant secondary market liquidity (Amstad and He (2020)). China's Treasury bond market has grown rapidly over the past two decades, and the value of outstanding Treasury securities increased from 2.6 trillion RMB in 2006 to 31 trillion RMB in 2024. Treasury securities are traded in two markets: the interbank market and the exchange market. The interbank market, often referred to as the China Interbank Bond Market (CIBM), was established in 1997 and has become the dominant market for bond issuance and trading in China. Over 95% of the outstanding Treasury bonds are traded in the interbank market. The interbank market was closed to international investors before 2010 but has gradually opened up since then.

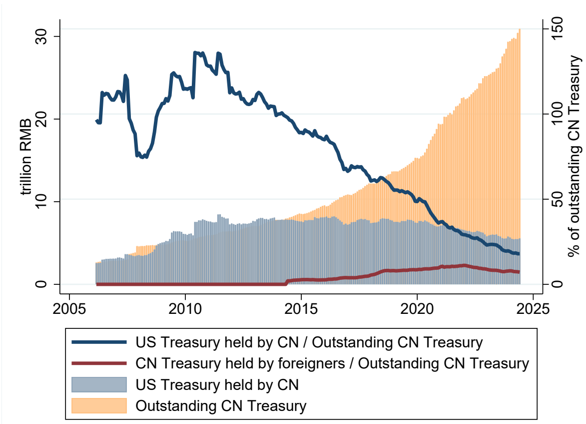
Figure 2b depicts the evolution of China's Treasury bond market. The figure highlights three points:

1. The market capitalization of the Treasury bonds has grown rapidly over the past two decades.

2. The foreign participation rate is low. Since 2010, China has taken significant steps




(a) Dynamics of Treasury yields.




(b) Outstanding Chinese Treasury securities and composition of holdings.

Figure 2: Yield dynamics and holdings composition.

*Notes.* (2a): Time series of Treasury yields, all normalized to start at zero on March 1, 2006. (2b): The left axis represents the market values of U.S. Treasury securities held by China, as well as the outstanding Chinese Treasury securities, measured in trillion RMB. The right axis indicates the fraction of outstanding Chinese Treasury securities held by foreign investors and the value of U.S. Treasury securities held by Chinese investors divided by the total value of outstanding Chinese Treasury securities.

to liberalize foreign investors' access to the fixed-income market, particularly through the interbank market. Nevertheless, the foreign participation remains limited. The foreign holding share of Chinese Treasury securities peaked at 11% in February 2022 but subsequently declined to 7% by June 2024. Therefore, it is unlikely that foreign investors' portfolio decisions significantly affect Chinese yields when foreign central banks make announcements. This contrasts with the mechanism emphasized by the global financial cycle literature. For example, Miranda-Agrippino and Rey (2020) highlight the roles of U.S. and European global banks in channeling U.S. monetary policy worldwide, but foreign investors as a whole only hold a small fraction of Chinese Treasury bonds.

3. Chinese investors hold a significant amount of foreign Treasury bonds, especially the U.S. Treasuries. In 2011, Chinese investors held 8.47 trillion RMB worth of U.S. Treasury securities, amounting to 135% of the value of outstanding Chinese Treasury securities. Although foreign investors may have limited direct impacts on China's Treasury market, foreign interest rates can still influence China's bond market through the portfolio decisions of Chinese investors.

Global banks play a crucial role in transmitting financial hubs' monetary policy shocks worldwide (Miranda-Agrippino and Rey (2020), Bräuning and Ivashina (2020)). De Leo et al. (2022) argue that the domestic banks' reliance on foreign funding increases the correlation between the emerging markets' market rates and the U.S. interest rate. However, foreign liabilities only contribute to roughly 1% of the total liabilities of China's banking sector.[4] Given the low foreign participation rate in China's Treasury bond market, it seems surprising how significantly its interest rates can be influenced by foreign monetary policy shocks through this channel.

On the other hand, China's monetary authority primarily aims to achieve its own economic growth targets, maintain price stability, and address other domestic policy goals.[5] The former Governor of the People's Bank of China (PBoC), Gang Yi, also commented that "China's monetary policy has not simply followed (interest rates in major developed

[4] According to the State Administration of Foreign Exchange, as of September 2024, the total foreign-currency liabilities of China's banking sector was 714.9 billion USD, while the total liabilities was 56,506 billion USD.

[5] See, for example, Zhou (2016).

economies) but adhered to the 'domestic goals first rule', becoming more independent and effective." (Yi (2023).) Indeed, we do not observe changes in China's interest rates on PBoC monetary policy announcement days that follow foreign monetary policy announcements. The departure of China's interest rate trend from the world trend also suggests a limited correlation between domestic and international factors. This has led to the widespread belief that China's monetary policy operates independently of other countries. Thus, it is remarkable how market forces have aligned China's Treasury yields with foreign yields during short event windows, despite such a restrictive environment. In particular, even the short-term rate is strongly synchronized with foreign counterparts during monetary policy announcements of foreign central banks such as the European Central Bank and the Bank of England.

# 3 The Two Puzzles

In this section, we present the baseline empirical results. First, we show that China's Treasury yields change persistently during foreign monetary policy announcement windows in directions different from their long-run trends. Second, we show that Chinese yields are highly correlated with the announcement country's yields during foreign monetary policy announcement windows, but not outside the windows.

## 3.1 Empirical Methodology

The Chinese yield curve data are sourced from China Central Depository & Clearing Co., Ltd, the authority that estimates China's Treasury yield curve every day. The sample comprises daily observations of zero-coupon yields from March 2006 to August 2024. The dates of monetary policy announcements are obtained from Bloomberg, and we manually verify them against the official websites of the respective central banks whenever possible.

Following Hillenbrand (2025), we define the monetary policy announcement window as the three days surrounding a monetary policy announcement. We manually verify that the foreign monetary policy announcement windows overlap minimally with Chinese monetary policy decisions. Our empirical results are essentially unaffected by excluding the overlapping windows.

For each central bank, we compute the cumulative changes in Chinese Treasury yields according to

$$\nabla y_t^W = \sum_{s=t_0+1}^{t} (y_s - y_{s-1}) \mathbf{1}_{s \in W}, \tag{1}$$

where $t$ and $s$ denote daily dates, $t_0$ is the first date of the sample, $y_s$ is the log $n$-year Treasury zero coupon yield on date $s$, $\mathbf{1}_{s\in W}$ is an indicator function for the set $W$, and $W \in \{window, non-window\}$ is either the set of monetary policy announcement window dates or remaining dates outside of central bank monetary policy announcement windows. Since the two event windows are disjoint and span the full sample, for each time $t$, the total change in the yield relative to the initial value equals the cumulative sum of yield change over the MP windows plus the cumulative sum of yield change over the non-MP windows:

$$y_t - y_0 = \nabla y_t^{AllDates} = \nabla y_t^{window} + \nabla y_t^{non-window}. \tag{2}$$

In the rest of the paper, we subtract the initial values from the observed yields so that $\nabla y_t^{AllDates}$ and $y_t$ can be used interchangeably.

### 3.2 The Response Puzzle

Figure 3 presents the cumulative effects of each central bank's monetary policy announcements on Chinese Treasury yields. We focus on the 3-month, 5-year, 10-year, and 5-5 forward rates. The placebo confidence intervals are the [$2.5^{\text{th}}$, $97.5^{\text{th}}$] and [$16^{\text{th}}$, $84^{\text{th}}$] percentiles of 10,000 placebo simulation paths. Intuitively, the intervals indicate the range of cumulative yield changes obtained from randomly drawing the same number of event windows as the monetary policy announcements.

Panel (3a) plots the observed yields and the sum of their daily changes during the Federal Reserve's announcement windows or other days. The 5- and 10-year yields have monotonically declined by 1.99 and 2.11 percentage points, respectively, during the Federal Reserve's monetary policy announcement windows. Notably, the cumulative effects on the 10-year yield are more pronounced at the long end of the curve, as the 5-5 forward rate has decreased monotonically by 2.24 percentage points during these windows. The magnitudes of the cumulative effects are substantial. The average levels of the 5- and 10-year yields are 3.1 and 3.4, and the initial values are 2.40 and 2.98 percentage points. So, U.S. monetary policy would have reduced China's long-term yields to the zero lower bound without adjustments between announcements. The cumulative effects of U.S. monetary policy on China's 3-month yield is U-shaped. The series continuously declined until June 18, 2013, by 64 basis points relative to its value on March 1, 2006. Then, on June 19, 2013, the 3-month yield jumped up by 1.61 percentage points and then continuously increased. By the end of August 2024, FOMC announcements have increased China's 3-month yield by 2.52 percentage points relative to its initial value.

It is intriguing to compare our results with those of Hillenbrand (2025) and Hofmann et al. (2025). These papers document that the Federal Reserve's monetary policy announcement windows account for a significant portion of the secular dynamics in long-term yields in the U.S. and G10 countries. In our analysis, China's long-term yields also experience persistent declines during these event windows, aligning with the patterns observed in G10 countries. However, a notable difference is that China's long-term yields do not demonstrate the same declining trajectory as those in the G10, so the cumulative effects of FOMC announcements do not resemble the long-run trend of actual Chinese yields. This observation reinforces the notion that U.S. monetary policy has consistently exerted downward pressure on global interest rates over the past few decades, and the divergence from the stable trends in Chinese interest rates suggests that U.S. monetary policy does not reflect the underlying fundamentals influencing China's rates. Rather, the persistent declines during the announcement windows appear to be the distinctive effects of U.S. monetary policy.

Panel (3b) illustrates the cumulative effects of Japanese monetary policy announcements on the Chinese Treasury yield curve. The patterns are similar to the cumulative effects of U.S. monetary policy. The short-term rate has not been significantly affected by Japanese monetary policy. The long-term rates, however, have declined persistently during Japanese monetary policy announcements. The 5- and 10-year yields have declined by 1.38 and 1.19 percentage points during the Japanese monetary policy windows, and the effects are more concentrated on the short end. The 5-5 forward rate has declined by 1.01 percentage points during the windows.

Panels (3c) and (3d) present the cumulative effects of the European Central Bank's and the Bank of England's monetary policy announcements on Chinese interest rates, respectively. The patterns are similar: the 3-month rate has declined persistently during the monetary policy windows, but the long-term rates have not been reduced. The 5-5 forward rate has even increased persistently during the event windows.

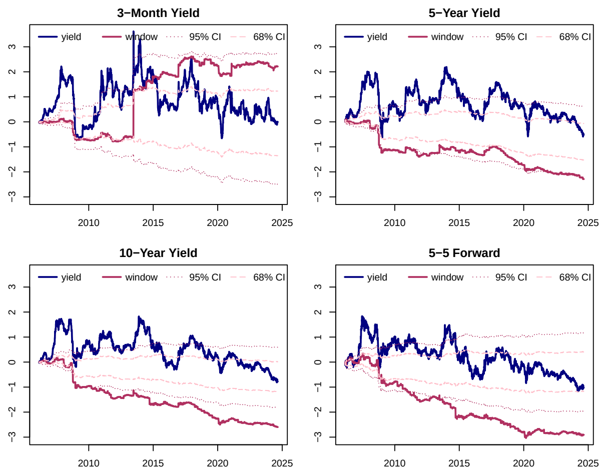
In summary, the Fed's and BoJ's policy announcements have persistently reduced China's long-term yields, while the ECB's and BoE's monetary policy announcements have persistently reduced China's short-term rate. In the Online Appendix, we demonstrate that our baseline results are unaffected by removing the foreign monetary policy announcements that overlap with Chinese monetary policy announcements.

Monetary policy announcement windows do not witness exceptionally high yield volatility. Instead, the windows are special because the yields change constantly in specific directions. Table 1 presents the mean and standard deviation of daily yield changes during monetary policy windows compared to other days. The mean daily yield changes outside monetary policy announcement windows are nearly zero, reflecting the stable interest rate trend in China. In contrast, the mean daily yield changes during the monetary policy announcement windows can be ten times larger in absolute values than those outside the windows. However, these announcement windows are not exceptionally volatile days for Chinese yields. Although the standard deviations of daily changes are slightly higher during the announcement windows, the difference is much less drastic than the variation in mean values. The comparison of mean and standard deviation suggests that the main difference between monetary policy announcement windows and other days is the sign of yield changes. The yields change in a more uniform direction during announcement windows, preventing them from canceling out on average as they do outside these windows.

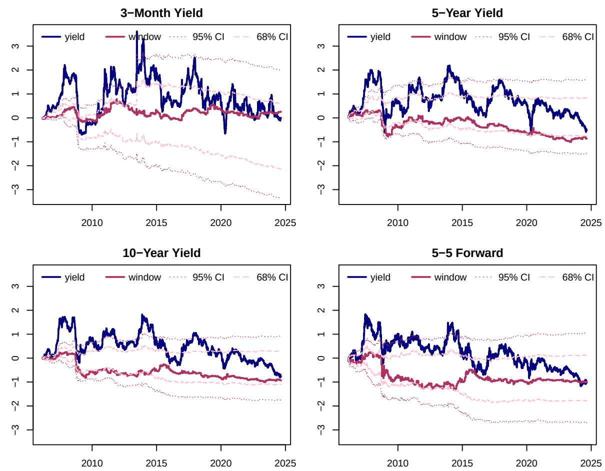
The average effects of different central banks on short- and long-term yields vary significantly. On average, the announcements of the Federal Reserve and the Bank of Japan significantly reduce long-term yields while either increasing or having no significant impact on the 3-month yield. In contrast, the European Central Bank and the Bank of England exhibit positive average effects on long-term yields but negative average effects on the 3-month yield.

## 3.3 The Comovement Puzzle

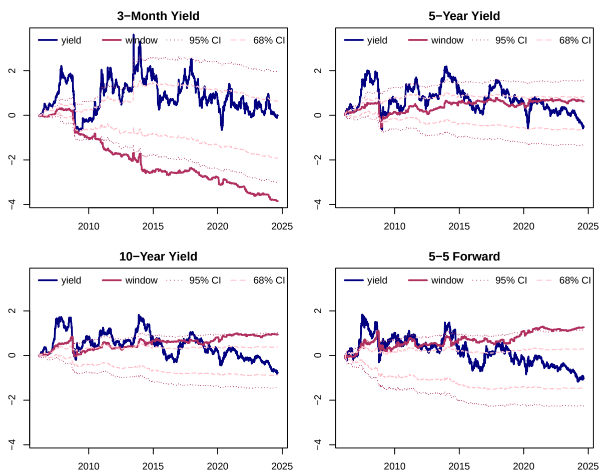
China implements a managed floating exchange rate regime and imposes tight controls on international capital flows, limiting arbitrage opportunities. Therefore, in principle, Chinese interest rates could be isolated from foreign interest rate fluctuations. In this section, we show that Chinese Treasury yields are tightly related to foreign yields during foreign monetary



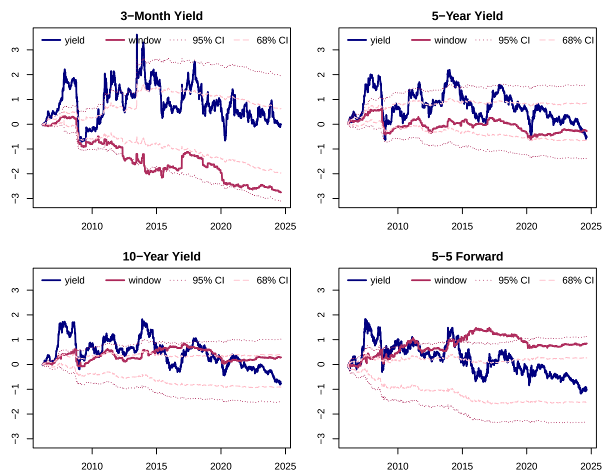

(a) FOMC




(b) BOJ




(c) ECB




(d) BOE

Figure 3: Cumulative changes in Chinese Treasury yields during foreign monetary policy announcement windows.

*Notes.* The series "yield" is the actual daily yield minus its initial value; "window" is the sum of daily yield changes during the respective monetary policy announcement windows. The 95% and 68% confidence intervals are the [$2.5^{\text{th}}$, $97.5^{\text{th}}$] and [$16^{\text{th}}$, $84^{\text{th}}$] percentiles of placebo simulations.

policy announcement windows, and the observed widening yield gaps are mainly formed outside the monetary policy announcement windows.

Figure 4 illustrates the cumulative changes in Chinese and foreign 10-year yields during or outside the Fed or ECB monetary policy announcement windows. We compute the

Table 1: Summary statistics of daily yield changes in China.

| | 3-Month Yield | | 5-Year Yield | | 10-Year Yield | | 5-5 Forward | |
|---|---|---|---|---|---|---|---|---|
| | Window | Others | Window | Others | Window | Others | Window | Others |
| | Mean | | | | | | | |
| Fed | 0.61 | -0.06 | -0.54 | 0.05 | -0.58 | 0.04 | -0.61 | 0.04 |
| BOJ | -0.00 | 0.00 | -0.44 | 0.04 | -0.42 | 0.03 | -0.39 | 0.01 |
| ECB | -0.57 | 0.07 | 0.11 | -0.02 | 0.18 | -0.04 | 0.26 | -0.06 |
| BOE | -0.30 | 0.04 | 0.00 | -0.01 | 0.11 | -0.03 | 0.21 | -0.05 |
| | Standard Deviation | | | | | | | |
| Fed | 9.23 | 4.58 | 3.74 | 3.20 | 3.41 | 2.79 | 4.67 | 4.27 |
| BOJ | 4.63 | 5.24 | 3.80 | 3.19 | 3.14 | 2.83 | 4.34 | 4.31 |
| ECB | 4.23 | 5.28 | 3.65 | 3.21 | 3.07 | 2.83 | 4.68 | 4.26 |
| BOE | 5.27 | 5.17 | 3.44 | 3.24 | 3.08 | 2.83 | 4.58 | 4.27 |

*Notes.* Each row corresponds to a central bank. "Window" refers to the three days surrounding the respective central bank's monetary policy announcement. "Others" refers to the remaining days. The units are annualized basis points.

cumulative yield changes in each country over a central bank's monetary policy cycle, and then compute the day-wise averages across cycles. Furthermore, we separately compute the average changes over the announcement windows and outside the windows.

During the announcement windows, the Chinese yield closely cointegrates with the yield in the announcement country. For example, the average U.S. yield change is within the 95% confidence interval of the average Chinese yield change during the Fed announcement window. Interestingly, the gap between the Chinese and the announcement country's yields during the window is smaller than the gap between the U.S. and the EU yields, indicating a strong sensitivity of the Chinese yield to foreign monetary policy announcements.

Despite China relaxing its currency peg and restricting capital flow, our results indicate that the autonomy of China's yield curve is effectively absent. This phenomenon suggests that the impossible trinity may be more accurately characterized as an "impossible unity".

The impossible unity is a conditional property, which is only observed during the tight windows around foreign monetary policy announcements. The gaps between Chinese and world interest rates have continuously widened between 2006 and 2021, and the divergence can be largely attributed to the days outside monetary policy windows, as illustrated in the right column of Figure 4. The U.S. and EU yields are still strongly cointegrated, suggesting a strong trans-Atlantic interest rate comovement that holds unconditionally. But both yields are far outside the 95% confidence interval of the Chinese yield. The contrast between monetary policy announcement windows and other days is the uniqueness of how Chinese yields cointegrate with world interest rates.

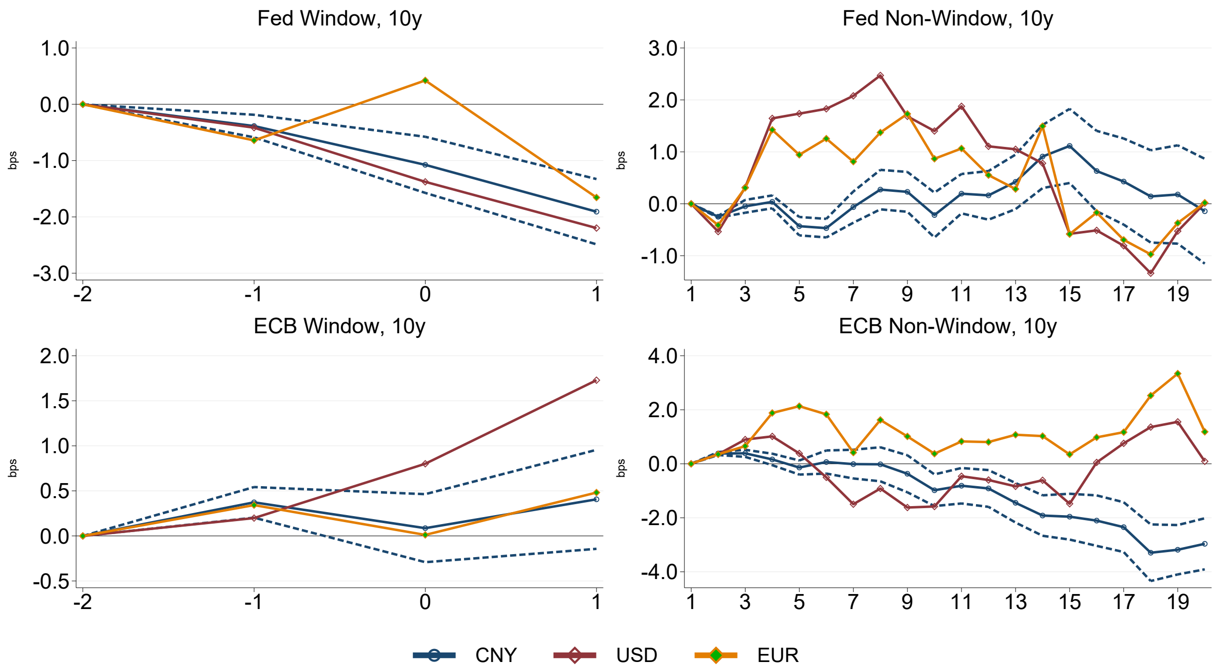



Figure 4: Cointegration during or outside monetary policy windows.

*Notes.* The figure plots the day-wise average cumulative yield changes over a Fed or ECB announcement cycle. The horizontal axis denotes days since the announcement (denoted by 0), and the vertical axis denotes cumulative yield changes in basis points. The dashed lines denote the 95% confidence interval for the Chinese yield change.

**Quantitative Analysis** We systematically compare the yield gaps between each country and the announcement country during or outside the three-day announcement windows. We measure the yield gaps by the root mean squared difference:

$$RMSD_{i,a} = \sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(\nabla y_{i,t}^{W} - \nabla y_{a,t}^{W}\right)^2}, \tag{3}$$

where $W \in \{window, non-window\}$, and $a$ denotes the announcement country.

Table 2 reports the RMSD results. Two systematic patterns arise:

1. The yield gap between China and the announcement country is significantly smaller during announcement windows than outside the windows. For other countries, the differences are much smaller.

2. During the Fed and ECB announcement windows, the gap between China and the announcement country is smaller than the gaps between other countries and the announcement country. For example, the CNY-EUR gap in the 10-year yield during ECB windows is 0.33 percentage points, while the USD-EUR gap is more than four times as large.

The dichotomy associated with monetary policy announcement windows suggests that foreign monetary policy shocks affect Chinese yields differently from other macro shocks. For example, as shown by Figure 9, U.S. macroeconomic announcements have limited impacts on Chinese yields. While China's interest rates appear insulated from the latter—aligning with the prevailing view of China's monetary policy independence—they behave similarly to those of fully open economies during announcements windows of globally important central banks. More strikingly, China's interest rates appear to be the most responsive to U.S. and EU monetary policy shocks among all the interest rates in our sample. This is strong evidence that China's interest rates are not independent of foreign monetary policy shocks, reinforcing the notion of "impossible unity".

**Comparison: Japanese Yields** Chinese and Japanese Treasury bond markets are similar in two aspects. First, foreign investors hold limited fractions of the country's Treasury bonds. Figure 5a illustrates the fractions of Chinese and Japanese Treasury bonds held by foreign investors. Throughout the sample period, foreign investors have held similar fractions of Treasury bonds in both markets, with a slightly higher foreign holding share in Japan. Second, China and Japan are the top two holders of U.S. Treasury securities with similar dollar amounts of holdings. In these respects, the two markets have similar degrees of foreign exposure. If anything, the Japanese bond market seems to be more vulnerable to foreign monetary policy shocks due to the higher foreign holding share and a more open capital account.

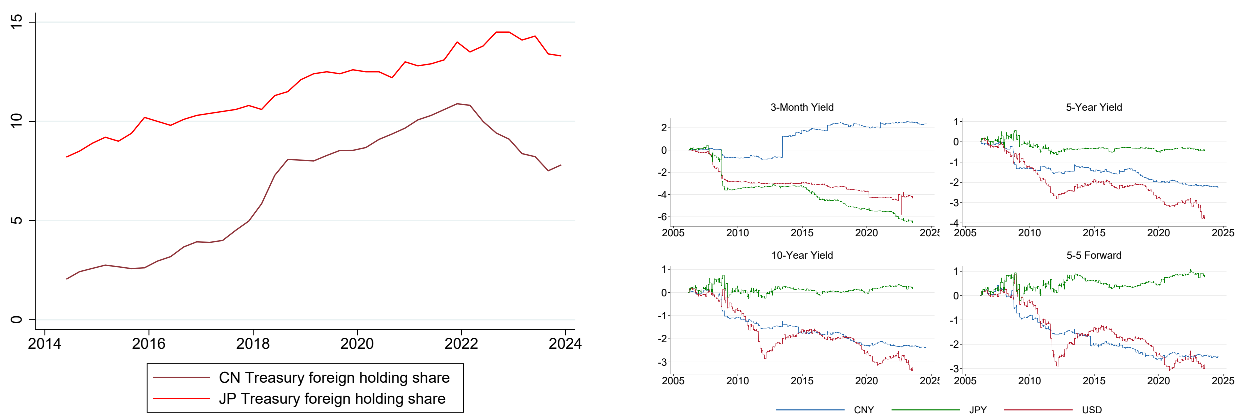
Table 2: Root mean squared yield differences.

| | CNY | USD | EUR | JPY | GBP | CNY | USD | EUR | JPY | GBP |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Fed Window | | | | | Fed Non-Window | | |
| 3m | 4.65 | 0.00 | 0.77 | 0.85 | 0.64 | 2.58 | 0.00 | 1.47 | 4.33 | 0.90 |
| 5y | 0.62 | 0.00 | 0.35 | 1.23 | 0.82 | 2.89 | 0.00 | 1.04 | 1.09 | 1.12 |
| 10y | 0.46 | 0.00 | 0.36 | 1.32 | 0.53 | 2.71 | 0.00 | 0.77 | 0.75 | 0.85 |
| f5-5 | 1.05 | 0.00 | 0.41 | 1.43 | 1.05 | 2.66 | 0.00 | 0.82 | 1.24 | 1.36 |
| | | | ECB Window | | | | | ECB Non-Window | | |
| 3m | 0.83 | 1.14 | 0.00 | 0.99 | 1.13 | 3.34 | 2.90 | 0.00 | 1.78 | 0.75 |
| 5y | 0.53 | 1.77 | 0.00 | 0.76 | 0.64 | 3.01 | 1.95 | 0.00 | 1.21 | 0.69 |
| 10y | 0.33 | 1.41 | 0.00 | 0.96 | 2.09 | 2.68 | 1.30 | 0.00 | 2.20 | 2.47 |
| f5-5 | 0.30 | 1.07 | 0.00 | 2.46 | 4.72 | 2.42 | 0.75 | 0.00 | 3.25 | 5.53 |
| | | | BOJ Window | | | | | BOJ Non-Window | | |
| 3m | 5.78 | 2.94 | 3.37 | 0.00 | 3.05 | 5.08 | 6.76 | 5.60 | 0.00 | 6.59 |
| 5y | 0.64 | 0.86 | 0.58 | 0.00 | 0.43 | 1.09 | 2.68 | 1.38 | 0.00 | 1.69 |
| 10y | 0.47 | 0.43 | 1.07 | 0.00 | 2.12 | 1.94 | 0.96 | 0.74 | 0.00 | 1.51 |
| f5-5 | 1.45 | 1.31 | 1.69 | 0.00 | 4.07 | 2.86 | 1.14 | 1.35 | 0.00 | 4.26 |
| | | | BOE Window | | | | | BOE Non-Window | | |
| 3m | 2.21 | 2.41 | 0.82 | 2.73 | 0.00 | 2.60 | 2.77 | 1.46 | 1.17 | 0.00 |
| 5y | 0.84 | 1.28 | 0.29 | 1.39 | 0.00 | 2.58 | 1.49 | 0.32 | 0.72 | 0.00 |
| 10y | 1.31 | 1.05 | 0.59 | 0.61 | 0.00 | 1.40 | 1.33 | 0.79 | 1.23 | 0.00 |
| f5-5 | 1.92 | 1.24 | 1.15 | 1.76 | 0.00 | 1.38 | 1.48 | 1.45 | 1.92 | 0.00 |

*Notes:* The table reports the root mean squared yield differences between the column country and the announcement country. The unit is percentage points per annum. "Window" denotes the cumulative yield changes during the three-day announcement windows; "Non-Window" denotes the cumulative yield changes outside the three-day announcement windows.

However, Japanese Treasury yields are much less sensitive to foreign monetary policy announcements. Figure 5b illustrates the cumulative changes in Japanese and U.S. Treasury yields during the FOMC windows from 2006 to 2024. The short-term yield in Japan closely follows its U.S. counterpart during the FOMC windows, reflecting the strong spillover effect of U.S. monetary policy shocks. As the maturity increases, Japanese yields become less sensitive to U.S. monetary policy announcements, and the 10-year yield barely reacts to these shocks. These patterns are in stark contrast to the reactions of Chinese yields to U.S. monetary policy announcements: Chinese long-term yields follow the U.S. yields almost 1-to-1 during the FOMC windows.

The comparison between the reactions of Chinese and Japanese yields to U.S. monetary policy announcements highlights the exposure of China's financial market to foreign monetary policy shocks. Despite China's capital account being significantly less open than Japan's,[6] China's interest rates are much more integrated with world interest rates during foreign monetary policy announcement windows.




(a) Foreign holdings of Chinese and Japanese government bonds.

(b) Comovement of yields during FOMC announcement windows.

Figure 5: Comparing Chinese and Japanese yields.

*Notes.* The series "CNY", "JPY", and "USD" are the sums of daily changes in the Chinese, Japanese, and U.S. yields during the FOMC announcement windows.

[6] For example, according to the Chinn-Ito Index, Japan has the highest degree of capital account openness, and China is only 16% as open as Japan.

## 3.4 Relationship with Hillenbrand (2025)

Hillenbrand (2025) documents that U.S. long-term yields decline persistently during FOMC announcement windows but remain flat between the windows. In contrast, while Chinese long-term yields also decline persistently during FOMC announcement windows, they revert after the announcement.

The reversion helps to distinguish the pure monetary policy shock channel from the natural rate channel. Suppose the market learns about the natural rate $r^*_{CN,t}$ from FOMC announcements, then the yield changes during FOMC windows should match $r^*_{CN,t}$, and, crucially, the yield should fluctuate around $r^*_{CN,t}$ between FOMC announcement windows. However, China's long-term yields increase persistently between FOMC windows, as indicated by the widening gap between the actual and FOMC-window series in Figure 3a. Therefore, the secular decline in Chinese long-term yields during FOMC windows is unlikely to result from the revealed natural rate.

# 4 Details of the Responses to Foreign Monetary Policy Announcements

## 4.1 Pre- and Post-Announcement Drifts

We decompose the cumulative yield changes observed during the three-day monetary policy announcement windows into individual contributions from each event day—specifically, the day before, the day of, and the day after the announcements. Equation (1) indicates that the daily contributions sum to the total changes during these announcement windows.

Figure 6 illustrates China's cumulative yield changes during foreign monetary policy announcement windows, along with the sum of changes during each event day. In Figure 6a, the sums of daily changes in Chinese long-term yields over each FOMC window days are similar to each other, suggesting that the announcement effects are evenly distributed across the window days. In Figure 6b, the sum of daily yield changes on the previous day of BOJ announcements is opposite to the cumulative yield changes over the three-day windows, while the sums of daily changes on the day and next day of the announcement are similar. Therefore, the cumulative effects of BOJ announcements are mainly due to the announcement-day and post-announcement effects.

Figure 6c and Figure 6d reveal more intriguing patterns for the European Central Bank (ECB) and the Bank of England (BOE). The persistent decline in China's short-term rates during the announcement windows of these two central banks primarily occurs on the announcement day. In contrast, the announcement day has a weaker impact on the persistent changes in China's long-term rates. Instead, the day before the announcements plays a crucial role in driving the persistent increases in China's long-term yields in response to ECB and BOE announcements. The post-announcement day also contributes significantly to these persistent reactions, though its impact is less pronounced than that of the pre-announcement day.

In summary, pre- and post-announcement drifts are both highly significant for the effects of foreign monetary policy announcements on China's Treasury yields. The magnitudes of these drifts can even exceed the responses observed on the announcement day. Consequently, focusing solely on yield dynamics from the announcement day would lead to underestimating the spillover effects of foreign monetary policy announcements.

## 4.2 Impact Persistence

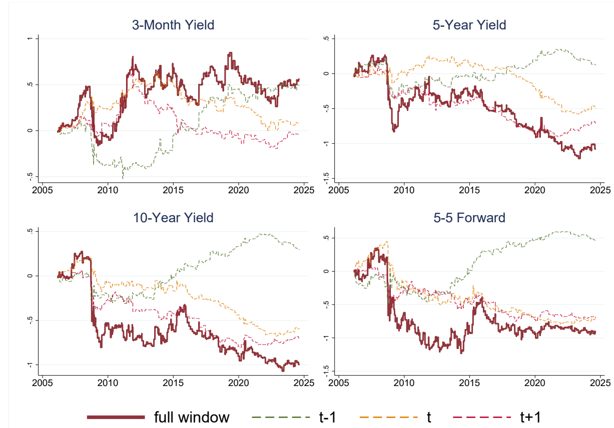
Our baseline exercise reveals that foreign monetary policy announcements have monotonically affected China's Treasury yields over the past two decades, with cumulative effects diverging from actual yields. This divergence implies that China's Treasury yields must revert after these announcements, contrasting sharply with patterns observed in G10 countries. For instance, Hillenbrand (2025) documents that U.S. yields remain relatively constant between FOMC announcements, causing the cumulative effects of these announcements to closely align with actual yield data. In this subsection, we investigate the time it takes for Chinese Treasury yields to revert following foreign monetary policy announcements.

We fix the starting point of the monetary policy announcement window to the day before the announcement and gradually extend the endpoint. For each window, we estimate the regression

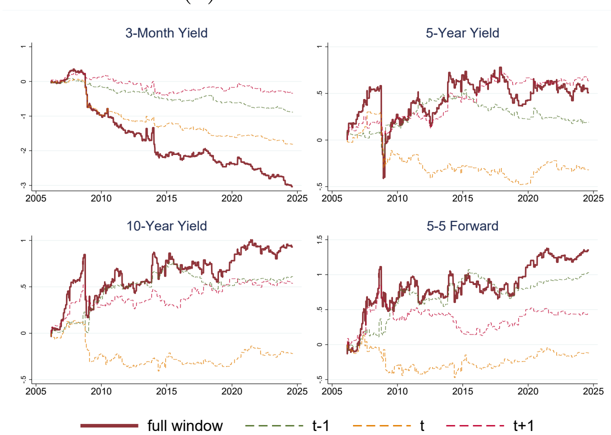
$$\Delta y_t = \beta_0^h + \beta_1^h window_t^h + \varepsilon_t^h, \tag{4}$$

where $\Delta y_t$ is the daily yield change in China, $window_t^h$ equals one if date $t$ belongs to the $-1$-to-$h$ window of a central bank's monetary policy announcement and zero otherwise. The

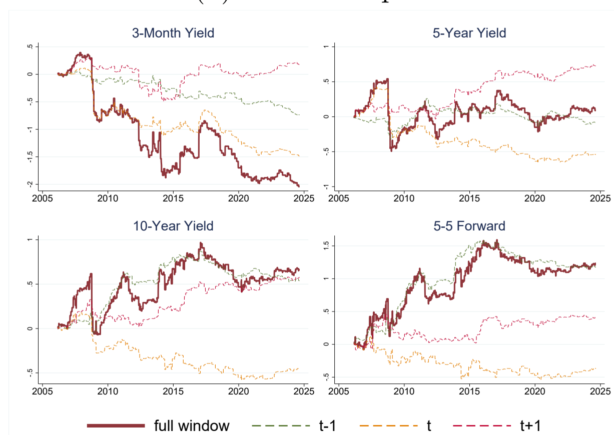

(a) Federal Reserve.




(b) Bank of Japan.




(c) European Central Bank.




(d) Bank of England.

Figure 6: Cumulative changes in Chinese Treasury yields during foreign monetary policy announcement windows: daily contributions.

*Notes.* The series "full window" is the sum of daily yield changes over the full monetary policy announcement windows; "t-1", "t", and "t+1" refer to the sum of daily yield changes over the days before, during, or after the announcement days. The latter three series sum to the "full window" series.

coefficient $\beta_1^h$ measures whether the average daily yield change during the announcement window differs from the average daily yield change outside the window.

In Figure 7, we report $\beta_1^h$ and its 90% confidence interval for $h$ ranging from 1 to 30 trading days, corresponding to the current to 6 weeks after the announcement. Note that the announcement dates of the four central banks are roughly evenly distributed over time.

The Federal Reserve announces its monetary policy approximately every 45 trading days, while the other central banks do so about once a month. Consequently, the 15-day (3-week) window typically does not include the next announcement from any central bank, and the 30-day (6-week) window generally excludes the next FOMC announcement.

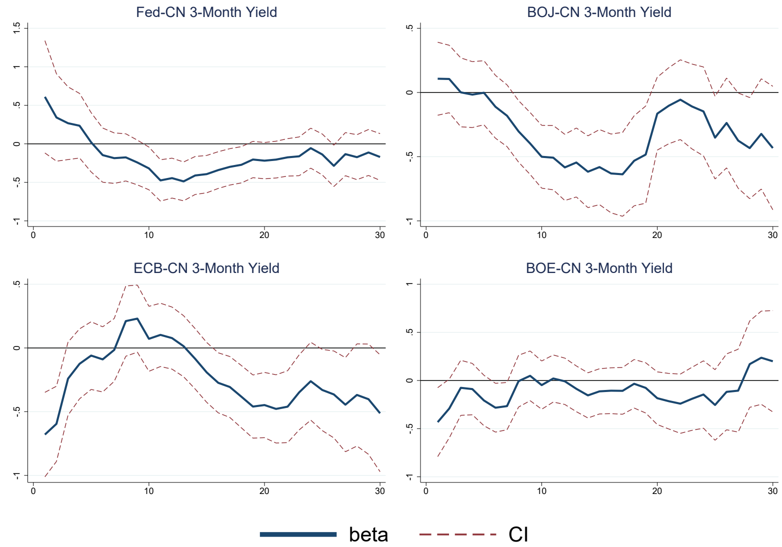
In Figure 7a, we focus on the 3-month yield in China. Across the four foreign central banks, the coefficient on the window dummy reverts to zero within the 1-week window, indicating that the impacts of foreign monetary policy announcements during the 3-day window are quickly offset by opposing yield changes within a week. This is intuitive because the short-term yield is closely tied to China's monetary policy, which operates independently of foreign influences, resulting in only transient responses to foreign monetary policy announcements.

In contrast, foreign monetary policy announcements exert much more persistent effects on China's long-term yields. In Figure 7b, we demonstrate the reversion rate of the 10-year yield. From the day before to the day after the FOMC announcement, the average daily change in the 10-year yield is significantly more negative than that outside the window. The coefficient $\beta_1^h$ becomes less negative during the first two weeks after the announcement but remains statistically significant. Between the second and fourth weeks after the shock, the slope coefficient remains essentially constant before finally reverting to zero 6 weeks after the announcement.

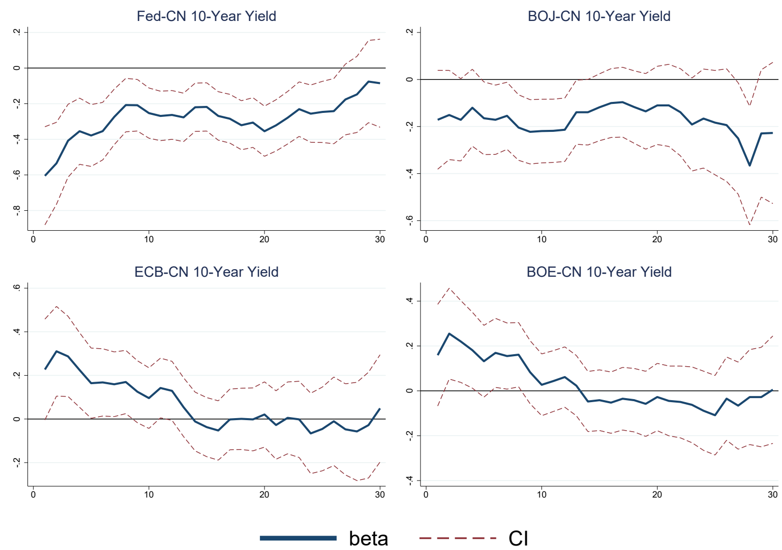
For announcements from the ECB and BOE, the coefficient $\beta_1^h$ becomes larger over the first week after the announcement, suggesting that China's Treasury market requires a week to fully digest the monetary policy announcements from these central banks. Interestingly, the announcement effects have dissipated on the short end during the same period, while long-term yields continue to respond to foreign monetary policy announcements. Three weeks after the shock, the effects of these announcements dissipate, with cumulative yield changes over the extended window resembling the actual yield series.

# 5 Trading Volume and Macroeconomic News

In this section, we investigate two mechanisms that can potentially explain the sensitivity of China's interest rates to foreign monetary policy announcements. One mechanism is that investors actively arbitrage away the yield gaps during foreign monetary policy an-




(a) 3-month yield.




(b) 10-year yield.

Figure 7: Impact persistence.

*Notes.* The figure shows the slope coefficient and its 90% confidence interval from the regression $\Delta y_t = \beta_0^h + \beta_1^h window_t^h + \varepsilon_t^h$, where $\Delta y_t$ is the daily yield change in China, $window_t^h$ equals one if date $t$ belongs to the $-1 \sim h$ window of a central bank's monetary policy announcement and zero otherwise. The horizontal axis denotes $h$. The unit of $\Delta y_t$ is annualized basis points.

nouncement windows. Another mechanism is that foreign monetary policy announcements reveal information about foreign macroeconomic fundamentals. Because the announcement countries/regions are China's largest trading partners, their macroeconomic fundamentals may affect China's macroeconomic variables, which ultimately affect China's interest rates.

## 5.1 Trading Volume

A possible transmission mechanism is that the investors rebalance their portfolios to exploit arbitrage opportunities when foreign interest rates are changed by monetary policy announcements. For example, Miranda-Agrippino and Rey (2020) and the global financial cycle literature emphasize the role of global banks' portfolio choices in transmitting U.S. monetary policy shocks worldwide. China's Treasury bonds are often held by commercial banks until maturity, so secondary market trading is limited (Schipke (2019)). It is also possible that China's monetary authority actively intervenes in the Treasury market during foreign monetary policy announcement windows to stabilize the exchange rate and capital flows. If the strong correlation between Chinese and foreign yields during foreign monetary policy announcement windows is driven by global banks' heightened arbitrage operations or the Chinese government's interventions, trading should be more active during such events.

We compute the annual average daily trading volumes and market values in China's interbank Treasury bond market during or outside the monetary policy announcement windows and then compute the window/non-window ratios. According to Figure 8, daily trading during the monetary policy announcement windows is not significantly more active than outside the announcement windows. Before 2015, daily trading volumes and market values during monetary policy announcement windows were even much smaller than outside the windows. Therefore, the intensity of trading does not seem to explain the strong exposure of Chinese yields to foreign monetary policy shocks.

## 5.2 Monetary vs. Macroeconomic Announcements

If foreign monetary policy announcements affect China's interest rates by revealing information about their macroeconomic conditions, then their macroeconomic data releases should also significantly affect China's interest rates. Indeed, U.S. macroeconomic shocks influence world macroeconomic variables. Boehm and Kroner (2023) demonstrate that U.S.

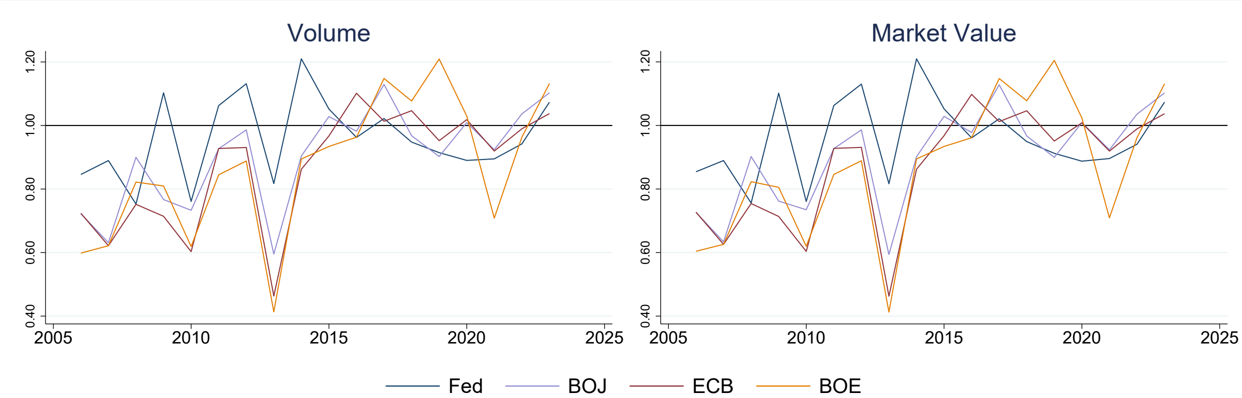



Figure 8: Volume and market value of transactions.

*Notes.* The figure plots the window/non-window ratio of annual average daily trading volumes (number of trades) or market values.

macroeconomic news announcements significantly impact world asset prices, independent of U.S. monetary policy responses. We investigate whether Chinese Treasury yields systematically change during U.S. macroeconomic announcement windows similarly to that during FOMC announcement windows.

We consider the CPI, GDP, industrial production, and unemployment announcements individually. The announcement calendar is from Bloomberg. For each macroeconomic announcement series, we drop the announcement days that are within the FOMC windows and construct the three-day windows for the remaining announcements. Figure 9 presents the cumulative change in China's 10-year yield during each U.S. macroeconomic news announcement window. In comparison, we contrast the macro-induced yield dynamics with the cumulative yield change during FOMC windows. The yield remains almost constant during CPI, industrial production, and unemployment announcement windows. Although it declines persistently during U.S. GDP announcement windows, the magnitude is dominated by the cumulative effects of FOMC announcements.

Surprisingly, Chinese macroeconomic announcements also have limited impacts on the yield. Figure 9 shows that the 10-year yield is slightly more volatile during Chinese CPI and industrial production announcement windows than during the U.S. announcement windows, but is still significantly less volatile than the actual yield in Figure 2a and the yield dynamics during FOMC announcement windows. Interestingly, U.S. GDP announcements seem to have a larger impact on China's 10-year yield than Chinese GDP announcements.

In summary, macroeconomic announcements have limited effects on China's Treasury yields. Therefore, the systematic yield changes during foreign monetary policy announcements are not responses to the implied global macroeconomic trend. Instead, the effects of monetary policy announcements are a unique monetary phenomenon.

# 6 A Model of Yield Comovement

We start by discussing standard mechanisms of monetary policy transmission and international spillover. We argue that the standard mechanisms face challenges in explaning key aspects of our empirical findings. Then, we present our model and empirical support for the model.

## 6.1 Discussion of Standard Mechanisms

**Long-Run Guidance of $r^*$** Hillenbrand (2025) emphasizes the role of the long-run level of interest rates signaled by FOMC announcements in explaining the downward trend of the FOMC-window series. For this channel to explain the cumulative responses of international yields to FOMC announcements, the recipient country's $r^*$ must be similar to, or even driven by, that in the U.S., which seems to be true for many countries (for example, see Holston et al. (2017), Del Negro et al. (2019)). Accordingly, the financial market learns about the recipient country's $r_t^*$ from FOMC announcements and adjusts interest rates to a neighborhood of the new $r_t^*$. An important implication of this channel is that the interest rates should be stable between FOMC announcements. Such a pattern holds for advanced economies (Hofmann et al. (2025)) but not for China. China's long-run level of interest rates diverges from the trends in all announcement countries considered in this paper, and Chinese interest rates revert strongly to China's own trend between foreign monetary policy announcements. Therefore, the $r^*$ channel unlikely explains the cumulative response of China's interest rates to foreign monetary policy announcements.

Relatedly, in standard DSGE models, interest rates are determined by the Euler equation:

$$e^{-ny_t^{(n)}} = \mathbf{E}_t \left[ e^{-n\delta} \frac{u'(C_{t+n})}{u'(C_t)} \frac{1}{\Pi_{t,t+n}} \right]. \tag{5}$$

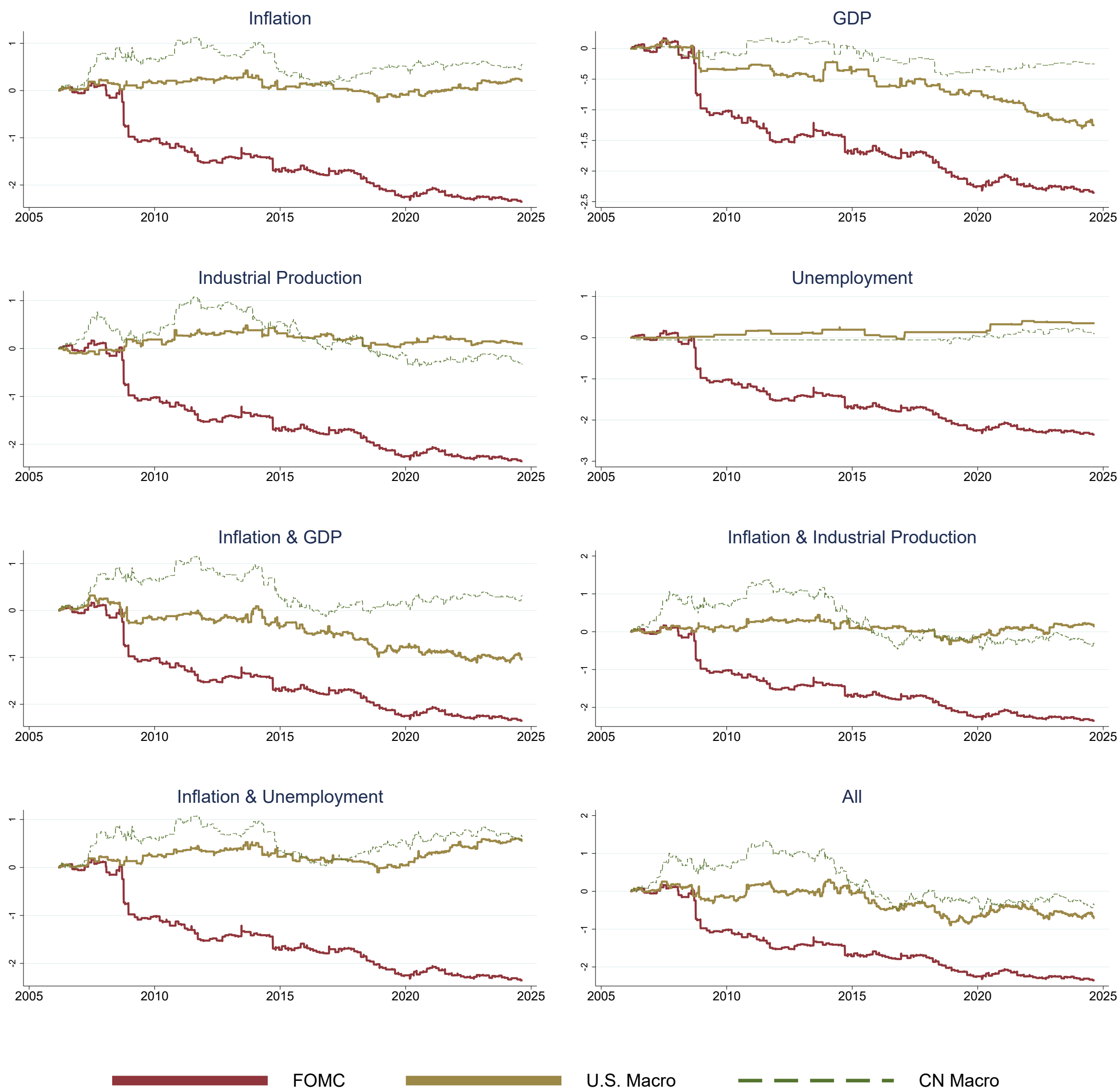



Figure 9: Cumulative effects of macroeconomic announcements.

*Notes:* The figure plots the cumulative change in China's 10-year yield during 3-day FOMC or macroeconomic news announcement windows. Macroeconomic announcement windows overlapping with FOMC windows are excluded.

Foreign monetary policy announcements may reveal macroeconomic news informative about Chinese fundamentals, and the yield comovements during monetary announcement windows suggest that $\mathbf{E}_t[Macro_{CN,t+n}]$ is similar to $\mathbf{E}_t[Macro_{foreign,t+n}]$ where $t$ denotes the foreign monetary policy announcement window. However, the widening yield gaps between monetary policy announcements suggest that $\mathbf{E}_{t+\Delta}[Macro_{CN,t+n}]$ differ substantially from $\mathbf{E}_{t+\Delta}[Macro_{foreign,t+n}]$. In rational expectations models, future macroeconomic variables are consistent with the consequences of current monetary policy, so it is challenging to explain why the expectation about a given future variable $Macro_{CN,t+n}$ reverts so drastically after the announcement. Moreover, the yield gaps between announcement windows have persisted for decades, so it is also puzzling why $\mathbf{E}_t[Macro_{CN,t+n}]$ does not incorporate the gaps.

**Arbitraging Away the Yield Gaps** The UIP condition suggests that the difference between Chinese and foreign bond yields should equal the expected rate of exchange rate change if the financial market is complete. If investors believe that China's objective is to stabilize the exchange rate, we would expect consistent yield comovement across all periods. However, as illustrated in Figure 4, the yield gaps continuously widen between monetary policy announcements, indicating substantial arbitrage opportunities. It is difficult to believe that investors only exploit these yield gaps during short monetary policy windows while ignoring the opportunities during other periods.

**Monetary Policy Coordination** Monetary policies worldwide are correlated (Clarida (2023)). However, as Figure 2a shows, China's short-term yield is vastly different from those in other countries, suggesting that China's monetary policy barely correlates with the monetary policies studied in this paper. In the Online Appendix, we demonstrate that China's Treasury yields remain flat during many PBoC announcement windows, so the yield comovements during foreign monetary policy announcement windows are unlikely due to anticipated follow-up PBoC policies.

## 6.2 A Possible Explanation

Ideas

- Foreign monetary policy signals are too strong to ignore. Everyone in the world pays attention to the monetary policy news. Therefore, it's better for Chinese investors to pay attention to that news as well.

- But after the announcement, the capital control and independent monetary policy kick in. People pay attention to different news outside the monetary policy windows. (supporting evidence: Brusa et al. (2020), Savor and Wilson (2014)) So, it makes little sense for Chinese investors to pay attention to foreign news.

### 6.3 Validation

Our model highlights the assumption that investors consider monetary policy announcements more informative about interest rate dynamics than other news. This assumption is consistent with the fact that Chinese yields are much less responsive to macroeconomic news than monetary policy announcements presented in Figure 9. Consequently, investors should pay more attention to monetary policy announcements than macroeconomic news when considering interest rates. We test this hypothesis using online news article data from GDELT.[7]

We estimate the regression

$$\%int_t = \beta_0 + \beta_1 FOMC_t + \beta_2 Macro_t + \varepsilon_t, \tag{6}$$

where the dependent variable is the percent of online news articles published on date $t$ that contains the Chinese word "interest rate", $FOMC_t$ and $Macro_t$ are dummy variables equaling 1 if $t$ belongs to the FOMC window or a U.S. macroeconomic news announcement window. Macroeconomic news windows that overlap with FOMC windows are excluded. The macroeconomic news announcement windows are the same as those considered in Figure 9. The news data covers Chinese online news articles published between 2017 and 2024. The coefficients $\beta_1$ and $\beta_2$ measure whether more articles mention "interest rate" during FOMC or macroeconomic news announcement windows than other days.

Every day, 1% of all articles mention "interest rate" on average. The maximum occurred on January 31, 2023, when 18% of the articles mentioned "interest rate". The day was also

[7]The GDELT Project monitors the world's broadcast, print, and web news from nearly every corner of every country in over 100 languages. Its Chinese database covers major Chinese media such as Sina, People's Daily, Caijing, etc. The archives are updated every 15 minutes.

Table 3: Frequency of "interest rate" in news articles.

| | CPI | GDP | IP | UN | CPI&GDP | CPI&IP | CPI&UN | All |
|---|---|---|---|---|---|---|---|---|
| const. | 1.02*** | 0.99*** | 1.02*** | 1.00*** | 1.01*** | 1.04*** | 1.02*** | 1.04*** |
| | (0.03) | (0.03) | (0.03) | (0.03) | (0.03) | (0.03) | (0.03) | (0.03) |
| FOMC | 0.21* | 0.24** | 0.21* | 0.24** | 0.22** | 0.20* | 0.22** | 0.20* |
| | (0.11) | (0.11) | (0.11) | (0.11) | (0.11) | (0.11) | (0.11) | (0.11) |
| Macro | -0.18*** | 0.12 | -0.21*** | 0.05 | -0.04 | -0.21*** | -0.08 | -0.10** |
| | (0.06) | (0.11) | (0.06) | (0.10) | (0.06) | (0.05) | (0.06) | (0.05) |
| N | 2797 | 2797 | 2797 | 2797 | 2797 | 2797 | 2797 | 2797 |
| $R^2$ (%) | 0.43 | 0.35 | 0.47 | 0.30 | 0.31 | 0.62 | 0.34 | 0.41 |
| FOMC - Macro | 0.39*** | 0.13 | 0.42*** | 0.19 | 0.26** | 0.41*** | 0.30** | 0.30*** |

*Notes.* The table reports the estimation results for $\%int_t = \beta_0 + \beta_1 FOMC_t + \beta_2 Macro_t + \varepsilon_t$, where the dependent variable is the percent of online news articles published on date $t$ that contains the Chinese word "interest rate", $FOMC_t$ and $Macro_t$ are dummy variables equaling 1 if $t$ belongs to the FOMC window or a U.S. macroeconomic news (column header) announcement window. Macroeconomic news windows that overlap with FOMC windows are excluded. The last row reports the point estimate for the hypothesis that $\beta_1 - \beta_2 = 0$ vs. $\beta_1 - \beta_2 \neq 0$. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

an FOMC meeting day, and the Committee raised the federal funds rate target range to 4.5 to 4.75 percent on February 1, 2023. On average, the fraction of news articles mentioning "interest rate" increases by 0.2 percentage points during FOMC windows relative to days without FOMC or macroeconomic news announcement days. During macroeconomic news announcement days, however, news articles are less likely to mention "interest rate" than on non-announcement days. The regression results support our model assumption by showing that interest-rate-related topics receive disproportionately more attention during monetary policy announcement windows than on other days in China.

# 7 Expectations vs. Term Premium

The expectations hypothesis holds in standard New Keynesian theories. Accordingly, the fluctuations in long-term yields are entirely driven by changes in expected short-term yields. In our context, it is interesting to investigate how much of the cumulative responses of Chinese long-term yields to foreign monetary policy announcements are due to expected changes in China's short-term yield. If the expectations component dominates, it implies that bond investors expect the PBoC to follow the actions of foreign central banks.

The expectations hypothesis component of the $n$-period yield is also called the "risk-neutral yield", and the associated bond price is called the "risk-neutral bond price". The risk-neutral bond prices satisfy the expectations hypothesis

$$P_t^{(n),rn} = \mathbf{E}_t \left[ e^{-y_t^{(1)}} P_{t+1}^{(n-1),rn} \right], \tag{7}$$

and the risk-neutral yields are the log prices: $y_t^{(n),rn} \equiv \ln P_t^{(n),rn}$. Iterating forward, the risk-neutral yields satisfy

$$y_t^{(n),rn} = \frac{1}{n} \mathbf{E}_t \left[ y_t^{(1)} + \cdots + y_{t+n-1}^{(1)} \right] + \theta^{(n)}, \tag{8}$$

where $\theta^{(n)}$ is a constant adjusting for Jensen's inequality. Intuitively, the $n$-period risk-neutral yield is the average expected short-term yields between $t$ and the maturity date (up to a constant).

To estimate the conditional expectations $\mathbf{E}_t \left[ y_{t+s}^{(1)} \right], s \in \{1, 2, 3, \dots\}$, we estimate an affine term structure model and compute the model-implied expectations. The model is estimated using the Adrian et al. (2013) regression method. To correct the small-sample bias in estimating the AR(1) coefficients of persistent state variables, we follow the bootstrap procedure of Bauer et al. (2014).

Since the term structure model is standard, we briefly describe the model and relegate the model details and estimation procedures to the Online Appendix.

## 7.1 Model

The yield curve is determined by a $K \times 1$ vector of state variables $X_t$ following a vector autoregression (VAR) process:

$$X_{t+1} = \boldsymbol{\mu} + \Phi X_t + U_{t+1}, \quad U_{t+1} | \{X_s\}_{s=0}^t \sim \mathcal{N}(\mathbf{0}, \Omega). \tag{9}$$

Let $P_t^{(n)}$ denote the zero coupon bond price with maturity $n$ periods at period $t$. The no-arbitrage condition implies

$$P_t^{(n)} = \mathbf{E}_t \left[ M_{t,t+1} P_{t+1}^{(n-1)} \right], \tag{10}$$

where $M_{t,t+1}$ is the stochastic discount factor (SDF). The SDF is exponentially affine:

$$\ln M_{t,t+1} = -\delta_0 - \boldsymbol{\delta}_1^\top X_t - \frac{1}{2}\Lambda_t^\top \Lambda_t - \Lambda_t^\top \Sigma^{-1} U_{t+1}, \tag{11}$$

where $\Sigma\Sigma^\top = \Omega$. The market prices of risk are of the essentially affine form:

$$\Lambda_t = \Sigma^{-1}(\Lambda_0 + \Lambda_1 X_t). \tag{12}$$

Finally, the risk-neutral bond prices satisfy

$$P_t^{(n)rn} = \mathbf{E}_t \left[ e^{-y_t^{(1)}} P_{t+1}^{(n-1)rn} \right], \tag{13}$$

where $y_t^{(1)} = -\ln P_t^{(1)}$ is the log short-term interest rate. The yields and risk-neutral yields are, respectively,

$$y_t^{(n)} = -\frac{1}{n} \ln P_t^{(n)}, \quad y_t^{(n)rn} = -\frac{1}{n} \ln P_t^{(n)rn}. \tag{14}$$

The term premium is the difference between the yield and the risk-neutral yield.

## 7.2 Decomposition Results

We decompose the cumulative yield changes during a given central bank's announcement windows, $\nabla y_t^{window}$, into the sum of daily changes in the risk-neutral rate and the sum of daily changes in the term premium. The results are illustrated in Figure 10. Risk premia explain most of China's long-term yield responses to U.S. and Euro monetary policy announcements. Risk-neutral rates have remained almost constant during the respective announcement windows. During the Bank of England's monetary policy announcement windows, the 5- and 10-year risk-neutral rates fluctuate around constant levels but are much more volatile than during the Fed's and ECB's windows. The case of Japanese monetary policy windows differs from that of other central banks. The long-term risk-neutral rates fall in tandem with the actual yields during the BOJ's windows. The 5- and 10-year risk-neutral rate series almost coincide with the term premia series, suggesting that the two components explain equal shares of the cumulative responses of the actual yields to Japanese monetary policy announcements.

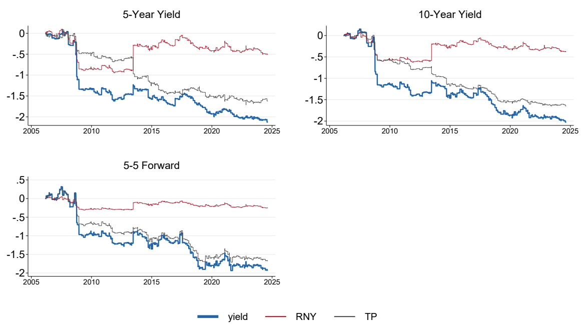
Our term structure model suggests that when the Fed or ECB announces monetary policy decisions, investors do not expect persistent changes in China's future short-term rates. This is in sharp contrast to the responses of developed economies' bond markets. Using the same term structure model as ours, Albagli et al. (2019) find that U.S. monetary policy announcements mainly affect risk-neutral rates in developed economies but term premia in developing economies.

Investors seem to expect persistent changes in China's short-term yields responding to Japanese monetary policy announcements. More intriguingly, Figure 3b showed that the contemporaneous changes in the short-term are opposite to the changes in the risk-neutral rates. Investors must expect the short-term rate to revert and overshoot persistently after Japanese monetary policy announcements.

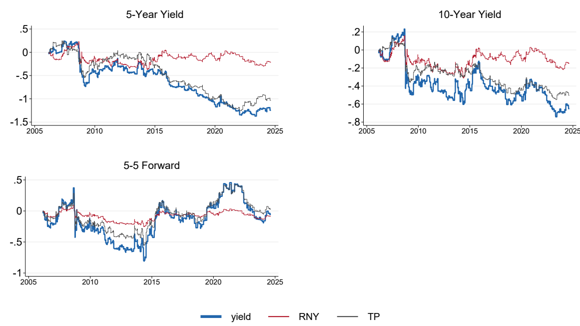
# 8 Conclusion

We examine the cumulative effects of foreign monetary policy announcements on China's Treasury yield curve, finding that these announcements impact various segments of the yield curve in a monotonic manner. Specifically, the monetary policy announcements from the Federal Reserve and the Bank of Japan have consistently reduced China's long-term yields, while those from the European Central Bank and the Bank of England have led to persistent declines in China's short-term interest rates.

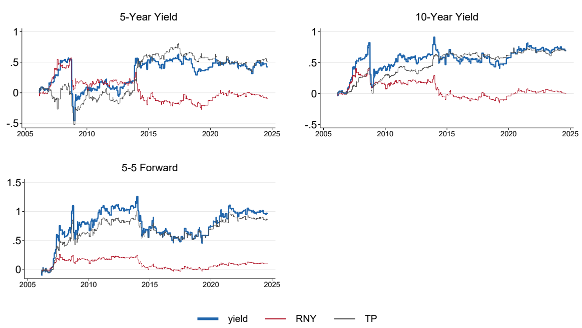
Overall, China's Treasury yields do not coincide with those of developed economies, as evidenced by the diverging trends. However, during the respective central banks' monetary policy announcements, China's Treasury yields are closely pegged one-to-one with foreign yields. This observation underscores the idea that the monetary policies of financial hub countries are key drivers of the global financial cycle, significantly influencing the dynamics of emerging market interest rates like those in China.



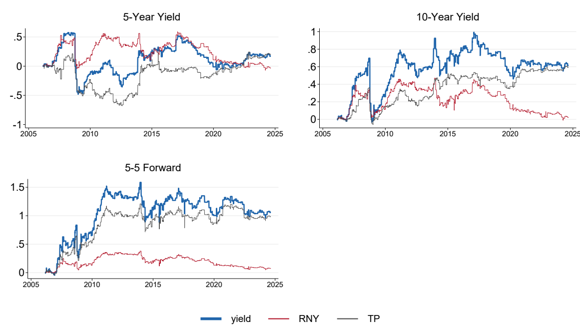

(a) Federal Reserve.




(b) Bank of Japan.




(c) European Central Bank.




(d) Bank of England.

Figure 10: Decomposing Chinese Treasury yields during foreign monetary policy announcement windows.

*Notes.* Decomposing $\nabla y_t^{window}$ into the risk-neutral rate and term premium. The series "yield" is the sum of daily changes in the observed yield during the central bank's announcement windows; "RNY" is the sum of daily changes in the risk-neutral rate during the announcement windows; "TP" is the sum of daily changes in the term premium during the announcement windows. The equality $yield = RNY + TP$ holds.

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# A1 Proofs

**Proof of ??.**

*Proof.* When there are no foreign announcements in period $t$, the conditional expectation and variance are based on $s_{h,t}$. The Bayes theorem implies

$$p(\theta_h|s_{h,t}) \propto p(s_{h,t}|\theta_h)p(\theta_h) \propto \exp\left\{-\frac{(s_{h,t}-\theta_h)^2}{2\sigma_h^2} - \frac{(\theta_h-\mu_{0,h})^2}{2\sigma_{0,h}^2}\right\}. \tag{A1}$$

Therefore, the posterior distribution is normal, with

$$\mathbf{E}[\theta_h|s_{h,t}] = \frac{\sigma_{0,h}^{-2}\mu_{0,h} + \sigma_h^{-2}s_{h,t}}{\sigma_{0,h}^{-2}+\sigma_h^{-2}} \tag{A2}$$

and

$$\mathbf{Var}(\theta_h|s_{h,t}) = \frac{1}{\sigma_{0,h}^{-2}+\sigma_h^{-2}}. \tag{A3}$$

Since $s_{h,t}$ is uninformative about $\theta_h$, the posterior distribution of $\theta_h$ equals the prior distribution.

When there are foreign announcements in period $t$, the conditional distribution is based on $s_{h,t}$ and $s_{f,t}$. Since the signals are independent, $\theta_h$ and $\theta_f$ can be inferred from their respective signals independently. Similar to the previous derivations,

$$p(\theta_h|s_{h,t}) \propto p(s_{h,t}|\theta_h)p(\theta_h) \propto \exp\left\{-\frac{(s_{h,t}-\theta_h)^2}{2\sigma_h^2} - \frac{(\theta_h-\mu_{0,h})^2}{2\sigma_{0,h}^2}\right\}, \tag{A4}$$

and

$$p(\theta_f|s_{f,t}) \propto p(s_{f,t}|\theta_f)p(\theta_f) \propto \exp\left\{-\frac{(s_{f,t}-\theta_f)^2}{2\sigma_f^2} - \frac{(\theta_f-\mu_{0,f})^2}{2\sigma_{0,f}^2}\right\}. \tag{A5}$$

Therefore,

$$\mathbf{E}[\theta_h|s_{h,t},s_{f,t}] = \frac{\sigma_{0,h}^{-2}\mu_{0,h} + \sigma_h^{-2}s_{h,t}}{\sigma_{0,h}^{-2}+\sigma_h^{-2}}, \quad \mathbf{E}[\theta_f|s_{h,t},s_{f,t}] = \frac{\sigma_{0,f}^{-2}\mu_{0,f} + \sigma_f^{-2}s_{f,t}}{\sigma_{0,f}^{-2}+\sigma_f^{-2}}, \tag{A6}$$

and

$$\mathbf{Var}(\theta_h|s_{h,t}, s_{f,t}) = \frac{1}{\sigma_{0,h}^{-2} + \sigma_h^{-2}}, \quad \mathbf{Var}(\theta_f|s_{h,t}, s_{f,t}) = \frac{1}{\sigma_{0,f}^{-2} + \sigma_f^{-2}}. \tag{A7}$$

□