

U.S. Monetary Policy and Global Market Liquidity

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Abstract

We show that US monetary policy affects the cost of trading equities worldwide. Using tick data from 37 markets over 2010–2022, we estimate liquidity responses to high-frequency policy surprises decomposed into federal funds rate, forward guidance, and asset purchase shocks. Only funds-rate shocks matter: spreads widen for up to two months, while equally sized surprises to longer-maturity yields reprice equities but leave liquidity unchanged. Effects are strongest where local policy rates closely track the federal funds rate and where foreign ownership is high. Trading costs are thus a distinct channel through which US policy shapes global financial conditions.

JEL Codes: G10, G12, G14, G15, E5.

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1 Introduction

US monetary policy decisions affect asset prices, capital flows, and intermediary balance sheets around the world, and are widely regarded as key drivers of the global financial cycle.¹ Evidence on these spillovers has focused primarily on the prices of assets and the quantities of capital moving across borders. Whether US monetary policy also affects the cost of trading assets, or market liquidity, remains largely unexamined, especially outside of the US. This gap matters because liquidity varies substantially over time, much of that variation is common across securities and countries, and drivers of liquidity and liquidity commonality remain incompletely understood, despite clear importance to investors allocating capital internationally.^{2,3}

In this paper, we estimate the causal effect of US monetary policy on stock market liquidity in the US and 36 international markets.⁴ We do this by drawing on well-established macroeconometric techniques that isolate plausibly exogenous components of monetary policy decisions from high-frequency changes in money market futures prices and treasury yields around FOMC announcements, following Swanson (2021), Bauer and Swanson (2023) and Swanson (2024). Changes in yields are decomposed via principal components into independent shocks to the current Federal Funds policy rate (“short-term interest rates”), guidance regarding expected paths of short-term interest rates (“forward guidance”), and expected quantities of large-scale asset purchase programs (LSAPs), as per Swanson (2021). They are also purged from any predictability conditional on realized economic data and other financial markets as per Bauer and Swanson (2023).⁵ We then embed each of these shocks

¹See Hausman and Wongsan (2011), Bruno and Shin (2015), Albagli, Ceballos, Claro, and Romero (2019) and Miranda-Agrippino and Rey (2020).

²See Chordia, Roll, and Subrahmanyam (2000), Hasbrouck and Seppe (2001), Huberman and Halka (2001), Hameed, Kang, and Viswanathan (2010) and Koch, Ruenzi, and Starks (2016) for evidence on liquidity commonality within the US, and Brockman, Chung, and Pérignon (2009) and Karolyi, Lee, and Van Dijk (2012) for international evidence.

³See Amihud (2002), Pástor and Stambaugh (2003), Acharya and Pedersen (2005) and Korajczyk and Sadka (2008) for evidence on the importance of liquidity risk for portfolio construction, and Bekaert, Harvey, and Lundblad (2007), Lee (2011) and Amihud, Hameed, Kang, and Zhang (2015) for the international context.

⁴For the purpose of this paper, we use the term “international markets” to refer non-US markets.

⁵These changes can be interpreted as unobserved changes in the preferences and decision-making process

into local projection models that estimate the causal response of market liquidity. Liquidity is constructed using granular tick data from each market, containing a total of 129 billion changes to the best bids and asks across 3,815 stocks from 2010 to 2022 for international market, obtained from LSEG Datascope Select.

We first test whether exogenous changes to monetary policy affect global market liquidity, focusing initially on the US, and international markets split into broad categories of developed and emerging economies. We find that exogenous increases in short-term interest rates have a significant and detrimental effect on global market liquidity and that international markets react more strongly and for longer than the US, in absolute terms. For the US, a positive 5bp shock to short-term interest rates contemporaneously increases quoted spreads by around 0.3bps, though the effect does not persist beyond one week. For international developed markets, the size of the effect starts at 0.4bps and persists over multiple weeks, growing to a peak of around 1.1bps, while for emerging markets, the on-impact effect is around 2.4bps, but dies out relatively more quickly. We find similar patterns for quoted depth, composite illiquidity and volatility, but no clear effects on cumulative returns.

The same is not true for shocks to the expected path of future rates, or to the size of LSAP programs. The responses of composite illiquidity, quoted spreads, quoted depth, and volatility remain close to zero at all horizons, and the corresponding confidence intervals include zero throughout for nearly all regions and horizons.⁶ Taken together, our results demonstrate the US monetary policy has a clear effect on global market quality, but it does so specifically through changes in short-term interest rates, and not through changes to longer-dated yields, or through direct Central Bank participation in treasury bond markets. Crucially, our approach isolates how different US monetary policy settings affect stock market liquidity, holding constant otherwise confounding factors, such as current or expected

of different FOMC members, or different member’s relative influence on overall FOMC decisions, strategic considerations of FOMC members, or measurement error in preliminary economic data, as discussed in Section 2 of Christiano, Eichenbaum, and Evans (1999).

⁶The exceptions are for emerging market quoted spreads and composite illiquidity at week 5 (6) for forward guidance (LSAP) shocks, and US volatility at week 4 for forward guidance, though no effect remains statistically significant beyond a single week.

economic conditions, in contrast to prior studies.

Monetary policy can affect market liquidity through a number of supply and demand channels. Financial intermediaries that provide liquidity to investors (market makers) require capital. When capital is scarce and relatively costly, market makers are constrained in their ability to perform this function and supply less liquidity in equilibrium (possibly with feedback effects, as per Brunnermeier and Pedersen, 2009). Short-term money markets are key source of capital for market makers, either directly for global broker-dealers, or indirectly, via prime brokerage and securities financing arrangements, for proprietary firms such as high-frequency traders or hedge funds, which may opportunistically supply liquidity (Aragon and Strahan, 2012; Jylhä, Rinne, and Suominen, 2014; Aragon, Martin, and Shi, 2019). Higher short-term interest rates increase the cost of capital for liquidity suppliers and reduce their ability to make markets. The fact that market liquidity is responsive to short-term interest rate shocks and not shocks to other parts of the yield curve is suggestive that funding liquidity plays an important role.

Alternatively, the role of US monetary policy in the global financial cycle, including capital flows, is well-documented (Miranda-Agrippino and Rey, 2020; Jordà, Schularick, Taylor, and Ward, 2019). Under this channel, unexpected US monetary policy tightening causes investors to unwind positions in risky assets like international equities, with cross-border equity flows especially affected (Rey, 2018; Miranda-Agrippino and Rey, 2020). Correlated rebalancing across investors after monetary policy shocks is a form of increased liquidity demand that can push market makers towards inventory constraints and make markets more illiquid. Changes to short-term rates can also affect funding liquidity for levered investors and therefore their ability to finance positions. When rates increase, these investors may demand more liquidity to facilitate a reduction in exposures. Currency exposures and macroeconomic interconnectedness with the US can also plausibly transmit monetary policy shocks to liquidity demand via increased real or financial linkages between countries (Ammer, Vega, and Wongswan, 2010; Iacoviello and Navarro, 2019; Wongswan, 2006; Loualiche, Pecora, Som-

ogyi, and Ward, 2026). In practice, these mechanisms are not mutually exclusive and can plausibly operate simultaneously.

To better understand why shocks to short-term interest rates affect liquidity, we first exploit the richness of our transactions data to estimate this relationship at the country-year level, providing a panel of liquidity responses to monetary policy shocks. We then collect a rich set of variables that plausibly proxy for the different channels capturing funding liquidity interconnectedness, foreign ownership structures, exchange rate factor structures and macroeconomic interconnectedness. For example, funding liquidity interconnectedness proxies include the size of US bank claims relative to GDP and correlation between the local currency policy rate and the Fed Funds Rate. Foreign ownership is estimated via EPFR holdings by foreign-domiciled equity funds in the local market, scaled by market capitalization. Exchange rate and macroeconomic interconnectedness proxies include currency betas with respect to dollar and carry factors, trade balance with the US, and growth correlation with the US. Country-year panel regressions of liquidity responses to monetary policy shocks onto these proxy variables identify what characteristics are associated with greater market liquidity exposure to US monetary policy.

Our panel regressions provide the strongest evidence for the funding liquidity and foreign ownership channels. Most notably, market liquidity is most responsive to US monetary policy in countries where (i) the local currency policy rate is highly correlated with the Fed Funds Rate and (ii) foreign investors own a greater fraction of the total market. In both cases, the results are economically significant. For (i), a market whose policy-rate changes are perfectly correlated with changes in the Fed Funds Rate has a composite-illiquidity response about 2.3 standard deviations larger than a market whose policy-rate changes are uncorrelated with U.S. policy, at the four week horizon. For (ii), doubling the foreign-ownership ratio increases the liquidity response to policy shocks by around 0.6 standard deviations. Exchange rate factor structure and macroeconomic interconnectedness are largely found to be absent as drivers of the market liquidity response to short-term interest rates.

Taken together, our results provide evidence that both supply and demand factors occupy meaningful roles in explaining cross-country differences in how equity market liquidity reacts to US monetary policy rate shocks. When the local currency cost of capital is most responsive to US interest rates, shocks to US short-term interest rates have a greater relative effect on the cost of funding liquidity for market makers, a supply channel. Evidence for the importance of the demand channel comes from the fact that countries with greater foreign ownership are more exposed to capital flows associated with the global financial cycle (Cerutti, Claessens, and Puy, 2019; Converse, Levy-Yeyati, and Williams, 2023).

Contribution to the literature

Evidence regarding the effect of US monetary policy on market liquidity is largely confined to the US. Chordia, Sarkar, and Subrahmanyam (2005) show that differences between realized and expected Fed Funds rates on announcement dates affect US stock and bond market liquidity, while explicitly noting that this potentially includes the effect of expected economic conditions. Goyenko and Ukhov (2009) show that the first-difference of Fed Funds Rate Granger causes US stock illiquidity.⁷ A complementary body of literature studies the role of US monetary policy on liquidity premia, sometimes proxied via differences in prices and expected returns across liquid and illiquid assets. Jensen and Moorman (2010) find that the liquidity premium in US equities is strongly related to whether US monetary policy is expansive or contractionary. Karolyi, Lee, and van Dijk (2019) extend this evidence internationally and find that unexpected increases in Fed Funds rates lead to lower returns for illiquid stocks, consistent with flight away from risky securities.

Our evidence builds on this work in a number of ways: we isolate the causal effect of monetary policy shocks from background economic conditions; we separately estimate the effect of shocks to different components of monetary policy (short-term interest rates, forward guidance, and LSAP programs); we document strong global effects of US rates on the level

⁷Fernández-Amador, Gächter, Larch, and Peter (2013) documents Granger Causality from short-term Euro interest rates to stock market liquidity in stocks in Europe.

of stock market liquidity, where liquidity is constructed from actual transactions and quote changes; and finally, we provide evidence that funding liquidity and portfolio flows explain heterogeneity in the effect.

Our results additionally provide new evidence regarding the existence of a global financial cycle and the role of US monetary policy, as discussed in Forbes and Warnock (2012), Rey (2018), Miranda-Agrippino and Rey (2020), Jordà et al. (2019), and Miranda-Agrippino and Rey (2022). That US monetary policy not only affects asset prices, but also the costs of trading assets is a potentially important mechanism within this cycle, as well as a newly documented channel of monetary policy transmission to broader financial conditions.

Finally, our results help our understanding of the liquidity risk and commonality. By linking global market liquidity to US monetary policy shocks, we isolate a clear causal channel that explains one source of time-variation in market-wide market liquidity. Considering that US monetary policy is also a clear driver of the global financial cycle, our results help link global market liquidity to this important macroeconomic and financial phenomenon.

Kamara, Lou, and Sadka (2008), Karolyi et al. (2012) and Koch et al. (2016) link liquidity commonality to correlated demand for trading, stemming from commonality in institutional ownership across securities, while Gromb and Vayanos (2002), Coughenour and Saad (2004), Brunnermeier and Pedersen (2009) and Comerton-Forde, Hendershott, Jones, Moulton, and Seasholes (2010) document supply-side explanations based on commonality in who provides liquidity across stocks and capital constraints. In both demand and supply cases, interest rates play a prominent role and we provide new empirical evidence supporting a causal effect via both demand and supply channels.

The remainder of this paper is organized as follows. Section 2 introduces the U.S. monetary policy shocks, explains their economic interpretations, and outlines the hypothesized channels through which they affect global market liquidity. Section 3 describes the data sources and defines the variables used in the analysis. Section 4 outlines the local projections approach and presents our main results on the responses of global market liquidity to

each type of shock. Section 5 uses cross-country panel analysis to examine how the strength of these liquidity responses varies with country characteristics. Section 6 reports robustness checks, and Section 7 concludes.

2 Monetary policy and market liquidity: Testable hypotheses

We distinguish three components of U.S. monetary policy announcements: the federal funds rate (the rate on overnight loans of reserves between banks), forward guidance (communication about the central bank’s outlook and policy plans), and large-scale asset purchases (LSAPs). We identify them separately with the high-frequency shocks of Swanson (2021) described in Section 3.1. The distinction matters because conventional and unconventional policy have been used jointly over the past decade and because each component may affect global market liquidity through different channels, which motivate the hypotheses below.

A contractionary federal funds rate shock, an unexpected increase in the effective federal funds rate, can affect market liquidity from both the supply and the demand side. On the supply side, liquidity suppliers need capital to hold inventory, and when capital is scarce or expensive they supply less liquidity in equilibrium. Short-term money markets are the main source of this capital: directly for global broker-dealers, and indirectly, through prime brokerage and securities financing, for proprietary trading firms such as high-frequency traders and hedge funds that supply liquidity opportunistically (Aragon and Strahan, 2012; Jylhä et al., 2014; Aragon et al., 2019). Repo and other short-term funding rates move closely with the effective federal funds rate. Because policy rates elsewhere follow U.S. policy (Rey, 2018; Miranda-Agrippino and Rey, 2020; Zhang and Zhong, 2020), the shock may also raise funding costs in foreign markets, not only for the global broker-dealers that fund themselves in U.S. money markets. A tightening can therefore raise the cost of capital for global liquidity suppliers and reduce their capacity to make markets.

On the demand side, three channels operate. First, higher short-term rates tighten the funding of levered investors, who consume market liquidity as they cut positions. Second,

because U.S. monetary policy drives the global financial cycle and international capital flows (Miranda-Agrippino and Rey, 2020; Jordà et al., 2019), a tightening prompts a flight from risky assets such as emerging market equities. Third, the shock triggers portfolio rebalancing: global investors treat the U.S. short rate as their risk-free rate, so a change in it shifts expected returns and optimal weights, as in a simple partial-equilibrium CAPM, generating correlated order flow from asset managers and hence correlated demand for liquidity. This leads to our first hypothesis:

Hypothesis 1 *A contractionary federal funds rate shock reduces global market liquidity, with stronger effects in markets more exposed to U.S. funding conditions and to portfolio rebalancing by international investors.*

A contractionary forward guidance shock may contain both Odyssean and Delphic guidance (Campbell, Evans, Fisher, and Justiniano, 2012). The Odyssean component is a commitment to future policy: it raises the expected path of short-term rates without changing the current rate, so its effect on funding costs is less immediate than an FFR shock's. The Delphic component conveys policymakers' assessment of the economy, leading investors to revise their views on growth and inflation as well as on policy. These shifts in the macroeconomic outlook can generate correlated order flow from asset managers, raising the demand for immediacy and reducing market liquidity, particularly in the U.S. and in economies closely tied to it. Our second hypothesis is therefore:

Hypothesis 2 *A contractionary forward guidance shock reduces global market liquidity through revisions to the expected policy path and the macroeconomic outlook rather than through current funding conditions, with stronger effects in the U.S. and in markets whose economic outlook is closely tied to it.*

A contractionary LSAP shock is a reduction in expected Federal Reserve asset purchases. The direct effect of purchases raises the prices and lowers the yields of the targeted securities, such as long-term Treasuries, a mechanism that relies on imperfect substitutability between

what the central bank buys and what it does not (Vayanos and Vila, 2021). Conversely, smaller expected purchases put upward pressure on longer-term yields. As safe U.S. assets become more attractive, investors shift away from riskier and foreign assets, reversing the international rebalancing that accompanies expansionary purchases (Fratzscher, Lo Duca, and Straub, 2018), and the resulting outflows and correlated selling raise the demand for liquidity in global equity markets. In addition to this direct effect, LSAPs also operate through a risk rebalancing channel: by taking risky assets onto the central bank’s balance sheet in exchange for safe reserves, they compress risk premia (Gertler and Karadi, 2011), and a contractionary shock reverses this transfer, leaving more risk with investors and intermediaries. On the demand side, higher premia prompt further portfolio adjustments and correlated order flow, as in the two previous cases; on the supply side, intermediaries carrying more risk hoard reserves, which tightens their constraints. Both impair market liquidity. Our third hypothesis is:

Hypothesis 3 *A contractionary LSAP shock reduces global market liquidity by raising risk premia and tightening private-sector risk-bearing constraints, with stronger effects in markets more exposed to portfolio rebalancing by international investors.*

3 Data description

This section describes the high-frequency U.S. monetary policy shocks and the weekly market liquidity panel, which covers the United States and 36 other equity markets over 2010–2022. We represent each market by its leading equity index, with constituents refreshed quarterly, so that the panel tracks the large, actively traded stocks that account for most of each market’s capitalization. The Appendix defines all variables and their sources (Table [Appendix Table 1](#)) and lists the index used for each market (Table [Appendix Table 2](#)).

3.1 U.S. monetary policy shocks

We use the three high-frequency U.S. monetary policy surprises of Swanson (2021): federal funds rate (FFR), forward guidance (FG), and large-scale asset purchase (LSAP), in an updated version provided by the author that extends through the end of our sample in December 2022. They are rotated principal components of 30-minute changes around each FOMC announcement in eight interest-rate instruments (federal funds futures, Eurodollar futures, and Treasury yields).⁸ We reverse the sign of LSAP so that positive values of FFR, FG, and $-LSAP$ all correspond to tightenings.

Following Bauer and Swanson (2023) and Swanson (2024), we then orthogonalize each surprise separately with respect to six pre-announcement variables: the nonfarm payrolls surprise; the 12-month log change in nonfarm payrolls; the 13-week changes in the log S&P 500, the yield-curve slope, and the log Bloomberg Commodity Spot Index; and the implied skewness of the 10-year Treasury yield (Bauer and Chernov, 2024). This removes the component of each surprise that is predictable from information available before the announcement, which the narrow window does not eliminate. We estimate the orthogonalization regressions ourselves, excluding March–December 2020 because the surprises cannot be cleanly orthogonalized during the COVID-19 policy interventions; these months are also excluded from the baseline sample. The residuals are our monetary policy shocks. All estimates use these orthogonalized series, which we continue to denote FFR, FG, and $-LSAP$. Each shock is assigned to the week of its FOMC announcement and set to zero in all other weeks.

3.2 Market liquidity measures

Our main outcome is market liquidity, measured by the quoted bid–ask spread, quoted depth, and a composite illiquidity measure combining the two dimensions. The quoted spread is

⁸The window runs from 10 minutes before to 20 minutes after each announcement. Each series is standardized, and the first three principal components explain about 94% of the variance. The rotation is identified by three restrictions: the FG and LSAP factors have no effect on the current federal funds rate, and the LSAP factor has minimal variance over the pre-ZLB period (1991–2008), on the assumption that pre-crisis announcements carried no asset-purchase news.

the best ask minus the best bid, divided by the midquote, in basis points. Quoted depth is the log of the average value posted at the best bid and ask, in local currency to avoid exchange-rate effects; we also compute a U.S. dollar version for cross-market comparisons. Composite illiquidity is the quoted spread divided by log share depth (the log of the average number of shares at the best quotes), in the spirit of the log quote slope of Hasbrouck and Seppi (2001).

We also use three other variables: realized volatility (the square root of the intraday realized variance of midquote log returns), the stock return (close-to-close, in local currency, adjusted for splits and capital changes), and foreign equity fund flows (the weekly net flow into a market from EPFR-covered equity mutual funds and ETFs domiciled outside it, scaled by the total allocation of all EPFR equity funds to that market in the previous week).

For non-U.S. stocks, we build the liquidity variables from intraday trades and quotes in LSEG Tick History (via Datascope Select): quoted spread and depth are averaged within each stock-day, weighting each quote by its time at the top of the book, and composite illiquidity is then computed from the daily spread and share depth. For U.S. stocks, we use the analogous stock-day indicators that WRDS constructs from millisecond TAQ. Country-day measures are market-capitalization-weighted averages of the stock-day measures across the constituents of each market’s leading index.

We then aggregate to country-weeks, which smooths daily noise and matches the weekly frequency at which EPFR reports fund flows. Week boundaries are aligned with U.S. monetary policy announcements: in each market, a new week begins with the first trading session in which it can react to an announcement, so the event week contains little pre-announcement trading. Within a week, level variables are averaged across trading days, while returns and flows are cumulated.

Finally, we winsorize all continuous variables at the 2.5th and 97.5th percentiles within each market and year, and we address two kinds of data problems that we identified by inspecting every market’s weekly series before estimation. The first is a level break in

several liquidity measures of a size that no plausible change in liquidity could produce.⁹ We attribute such breaks to changes in the underlying data feed and set all variables to missing for the affected market over the affected window. Nine markets have such a window, 4.6% of the sample. The second is an isolated spike in a single measure that reverts within a few weeks while the market’s other liquidity measures do not move. A genuine deterioration in liquidity shows up in spreads, depth, and trade-based measures together, so a spike confined to one measure is a recording error rather than illiquidity; we set only that measure to missing, which affects 55 market-weeks, or 0.2% of the sample.

Table 1 reports summary statistics for the final weekly panel: the United States in Panel A and, separately, the 16 developed and 20 emerging and frontier markets (MSCI classification) in Panel B.

[\[Insert Table 1 about here\]](#)

Liquidity is clearly ordered across market groups: average quoted spreads are 3.6 basis points in the United States, 9.9 in developed markets, and 31.4 in emerging and frontier markets, and average composite illiquidity rises from 0.60 to 1.43 to 3.72. Dollar quoted depth, by contrast, averages about 11 log dollars (roughly \$60,000) in all three groups, so the cross-group differences in illiquidity come mainly from spreads rather than depth. Trade-based measures such as effective spreads, price impact, and realized spreads show the same ordering. The ranking of the United States, developed markets, and emerging markets is consistent with existing cross-country evidence. Group averages calculated from Table 1 of Brockman et al. (2009) show that the three U.S. exchanges have narrower effective spreads than other developed exchanges, which in turn have narrower spreads than emerging exchanges. Similarly, Table IV of Fong, Holden, and Trzcinka (2017), based on intraday data from the same vendor we use, shows that the median emerging-market exchange has a wider quoted spread than the median developed-market exchange.¹⁰

⁹Quoted spreads in Indonesia, for example, fall from about 60 to 25 basis points in the first week of 2014, and posted depth in Thailand jumps by five log points in the first week of 2012.

¹⁰The levels are not directly comparable across studies. Our panel covers capitalization-weighted index con-

We now turn from the liquidity panel to the shock series. Figure 1 plots the three shocks over the sample period. FFR shocks are positive on average, so tightening surprises dominate over 2010–2022, whereas FG and $-LSAP$ are roughly mean zero and more volatile. The orthogonalization of Section 3.1, which addresses the “Fed response to news” bias of Bauer and Swanson (2023), matters mainly for FFR: the correlation between the raw surprises and the orthogonalized shocks is 0.78 for FFR but 0.98 for both FG and $-LSAP$. Although orthogonalization brings the shocks closer to the exogeneity that the local projections require, it does not drive the sign or persistence of our results, the main results have the same sign and significance pattern with and without orthogonalization (Figure OA.1 in the online appendix available for download [here](#)).

[Insert Figure 1 about here]

Figure 2 plots the 30-minute announcement-window changes in three reference rates: the effective federal funds rate implied by the current-month futures contract (MP1),¹¹ the 2-year Treasury yield, and the 10-year Treasury yield. MP1 remains nonzero even during the zero-lower-bound period: announcements continued to move expectations of the effective federal funds rate even while the target range was fixed at 0–25 basis points.

[Insert Figure 2 about here]

To give the impulse responses in later sections an economic scale, Table 2 maps a one-unit increase in each shock into a change in its reference rate. Because the orthogonalized shocks are not on the scale of the original factors, we estimate each mapping directly, by regressing the rate change on the shock across FOMC announcements, rather than applying

stituents from 2010–2022, whereas Brockman et al. (2009) equally weight all listed firms over 2002–2004, and Fong et al. (2017) use sample before 2008 that includes smaller stocks, whereas we restrict attention to larger index eligible stocks.

¹¹The current-month federal funds futures contract settles at 100 minus the average effective federal funds rate over the delivery month. For an announcement on day d of a D -day month, the new rate applies only to the remaining $D - d$ days, so the announcement-window change in the futures-implied rate, ff_1 , equals $(D - d)/D$ times the target-rate surprise. Following Kuttner (2001) and Gürkaynak, Sack, and Swanson (2005), we define $MP1 = [D/(D - d)] ff_1$. For announcements in the last seven days of a month, where the scale factor is large, we use the unscaled change in the next-month contract instead.

the loadings of the original rotation. A one-unit FFR shock corresponds to a 4.11 basis point increase in MP1, a one-unit FG shock to a 4.34 basis point increase in the 2-year Treasury yield, and a one-unit $-LSAP$ shock to a 2.83 basis point increase in the 10-year yield.

[Insert Table 2 about here]

4 Local projections

We estimate the dynamic response of market liquidity to U.S. monetary policy shocks using local projections (Jordà, 2005), following the formulation in Montiel Olea, Plagborg-Møller, Qian, and Wolf (2025). For each outcome and shock, we estimate a separate regression at each horizon $h = 0, 1, \dots, 8$ weeks. For the United States, the specification is

$$y_{t+h} = \mu_h + \theta_h x_t + \sum_{\ell=1}^p \left(\delta_{h,\ell}^{(x)} x_{t-\ell} + \delta_{h,\ell}^{(y)} y_{t-\ell} \right) + \xi_{t+h}, \quad (1)$$

where y_t is one of six outcomes: for liquidity and volatility, the weekly level of quoted spread, quoted depth, composite illiquidity, or realized volatility; for equity returns and foreign flows, the log of an index that compounds, respectively, the weekly returns and the weekly flow rates defined in Section 3.2. The shock $x_t \in \{FFR_t, FG_t, -LSAP_t\}$ is one of the orthogonalized shocks of Section 3.1, signed so that positive values are tightenings. The coefficient θ_h is the response at horizon h to a one-unit shock: a level response for liquidity and volatility, and a cumulative response for equity returns and foreign flows.

For the international sample, we estimate

$$y_{i,t+h} = \alpha_{i,h} + \theta_h x_t + \sum_{\ell=1}^p \left(\delta_{h,\ell}^{(x)} x_{t-\ell} + \delta_{h,\ell}^{(y)} y_{i,t-\ell} \right) + \xi_{i,t+h}, \quad (2)$$

where i indexes countries, $\alpha_{i,h}$ are country fixed effects, and the outcomes and shocks are as in (1). We estimate equation (2) separately for developed markets and for emerging markets, which include frontier markets as in Table 1.

We choose the lag length p for each outcome–shock pair by the Akaike information criterion applied to an auxiliary bivariate VAR in the outcome and the shock; the selected values are generally close to 13 weeks. In the later country-level analysis, we fix $p = 13$ so that responses are comparable across countries. Standard errors are Newey–West for the United States and Driscoll–Kraay for the international panels, both with a Bartlett kernel and an eight-week bandwidth; we report 68% and 95% confidence bands. The sample covers 2010–2022 and excludes March–December 2020.

All plotted responses are normalized to a 5 basis point increase in the shock’s reference rate. With $\hat{s}$ the estimated basis-point change in the reference rate per unit of the shock (Table 2), the plotted response is

$$\widehat{\text{IRF}}_h = \hat{\theta}_h \times \frac{5}{\hat{s}}.$$

Figures 3–5 report the responses of the six outcomes to the FFR, FG, and –LSAP shocks, respectively, with separate panels for the United States, developed markets, and emerging markets.

4.1 Effect of FFR shocks

Figure 3 reports the responses to an FFR shock normalized to a 5 bps increase in MP1. The liquidity responses are consistent with Hypothesis 1. In the United States, the quoted spread widens by about 0.3 bps in the announcement week, with the 95% band excluding zero, while quoted depth falls and composite illiquidity and realized volatility rise. All of these responses largely disappear after the announcement week.

[Insert Figure 3 about here]

Relative to the United States, the developed market response is larger and much more persistent: all three liquidity measures deteriorate over most of the eight-week horizon. The quoted spread widens by about 0.4 bps on impact and peaks at about 1.1 bps around week six; quoted depth falls by about 0.12 log points by week four and stays depressed; composite

illiquidity follows the spread’s hump-shaped path; and realized volatility rises. A shock measured in a 30-minute announcement window is thus followed by almost two months of lower liquidity in developed markets.

Emerging market point estimates also indicate lower liquidity: on impact, quoted spreads widen by about 2.4 bps, composite illiquidity rises by about 0.25, and quoted depth falls. These responses are less precisely estimated, and most 95% bands include zero after one to two weeks. Because emerging market spreads are both wider and more variable than developed market spreads (Table 1), a given change in basis points is a much smaller movement relative to normal variation in emerging markets, so raw-unit responses are not comparable across groups. Figure OA.2 in the online appendix therefore repeats the estimation with each variable standardized within market, so that responses are measured in standard deviations of each market’s own liquidity. In these units the developed market response is the larger of the two, and the emerging market response is significant at longer horizons as well.

The deterioration in liquidity is not matched by a comparable decline in local equity prices. Cumulative local-currency returns in developed markets are indistinguishable from zero throughout the horizon; the emerging market estimate dips by about 140 bps around week three, but the 95% band includes zero and the response subsequently reverses.

Foreign flows respond in both market groups, but in opposite directions. In emerging markets, foreign-domiciled equity funds withdraw: the cumulative outflow is significant in the first few weeks and reaches roughly 0.5% of lagged fund allocation by weeks four to six. Its timing overlaps with the deterioration in liquidity, which is consistent with, though not direct evidence of, the portfolio rebalancing channel of Hypothesis 1. In developed markets, the aggregate response is an inflow whose 95% bands include zero throughout, but the aggregate masks a significant component: when flows are split by fund type (Figure OA.3 in the online appendix), passive funds show a significant cumulative inflow while active flows stay near zero. Since inflows, like outflows, can generate correlated order flow and hence demand for liquidity, this pattern suggests that foreign investors may add to liquidity demand in

developed markets as well, through passive rather than active funds. Because an FFR shock also moves short-term funding rates directly, any such flow effect would operate alongside the funding channel of Hypothesis 1.

4.2 Effect of forward guidance shocks

Figure 4 reports the responses to an FG shock normalized to a 5 bps increase in the 2-year Treasury yield. They provide little support for Hypothesis 2: in the United States, developed markets, and emerging markets alike, the responses of quoted spreads, quoted depth, composite illiquidity, and realized volatility are small relative to those following an FFR shock, and the 95% bands include zero at nearly all horizons.

[Insert Figure 4 about here]

Returns nevertheless show some temporary repricing: cumulative local-currency returns fall by about 50–75 bps in both developed and emerging markets over the first several weeks before recovering. The 68% bands exclude zero over the first five to six weeks in both groups, but the 95% bands do so only for emerging markets, in the announcement week and in weeks three to five.

Foreign flows also respond less than to an FFR shock. Cumulative flows into the United States and developed markets remain close to zero, and the emerging market estimate shows an outflow of only about 0.1% of lagged fund allocation at middle horizons, roughly a fifth of the FFR response, with 95% bands that include zero throughout beyond the announcement week. The evidence of repricing and flow response is thus weak, and neither is accompanied by a systematic deterioration in liquidity.

Our design cannot separate the Delphic and Odyssean components of the shock, but the overall pattern can be read against both mechanisms in Hypothesis 2. The temporary repricing suggests that outlook revisions do occur: investors reassess the outlook after a forward guidance surprise, and equity prices fall. Yet the revision moves prices without

straining liquidity, even in the United States, where the hypothesis predicts the largest effect. On the demand side, outlook revisions may be incorporated mainly through quote updates rather than through trading, so that they generate little of the correlated order flow that would consume liquidity; the weak foreign flow response points this way. On the supply side, whatever order flow does arise meets liquidity suppliers whose funding costs are unchanged: by construction the shock raises the 2-year yield by 5 basis points, but longer-term yields, unlike the overnight rate, do not feed into intermediaries' funding costs immediately. Taken as a whole, the contrast with the FFR results is more consistent with current funding conditions, set by the short rate, than with the expected policy path or the outlook as the channel through which U.S. policy reaches market liquidity.

4.3 Effect of LSAP shocks

Figure 5 reports the responses to a $-$ LSAP shock normalized to a 5 bps increase in the 10-year Treasury yield. They provide little support for Hypothesis 3: in all three market groups, the liquidity responses are small relative to the FFR responses, and the 95% bands include zero at nearly all horizons. Local-currency return estimates turn negative at longer horizons, but the 95% bands include zero throughout, and flows show no significant response either. The delayed and imprecisely estimated decline in equity prices is directionally consistent with higher risk premia, but neither the rise in long-term yields nor the return of risk to private balance sheets appears to tighten liquidity suppliers' constraints enough to affect market liquidity.

[Insert Figure 5 about here]

Across the three components, only the FFR shock produces a significant deterioration in liquidity, and its magnitude and dynamics differ between developed and emerging markets. This pattern is most consistent with the funding channel of Hypothesis 1: the FFR shock is the component most directly tied to current short-term funding conditions. The flow

evidence suggests that portfolio rebalancing also operates alongside it, through outflows from emerging markets and passive inflows into developed markets.

5 Cross-country panel evidence

The liquidity response to FFR shocks is strong but differs markedly between developed and emerging markets. We next ask which country characteristics are associated with a stronger response, using proxies for the two channels in Hypothesis 1 and for alternative mechanisms.

We consider four groups of country characteristics. Funding liquidity interconnectedness with the United States proxies for the transmission of U.S. short-term financing conditions into local markets, while foreign ownership proxies for exposure to portfolio rebalancing or trading activity related to foreign investors. We also examine currency factor exposures as measures of systematic currency risk through which U.S. monetary policy can be transmitted internationally (Loualiche et al., 2026), as well as macroeconomic linkages that capture a country’s macroeconomic ties to the United States.

For each country i and calendar year τ , we re-estimate the local projection in equation (2), allowing the impulse response coefficients to vary by country-year:

$$\tilde{y}_{i,t+h} = \mu_{i,\tau,h} + \beta_{i,\tau,h} x_t + \sum_{\ell=1}^p (\delta_{i,\tau,h,\ell}^{(x)} x_{t-\ell} + \delta_{i,\tau,h,\ell}^{(y)} \tilde{y}_{i,t-\ell}) + \xi_{i,\tau,t+h}. \quad (3)$$

where $\tilde{y}_{i,t}$ is composite illiquidity standardized within country and x_t is the FFR shock, normalized to a 5 bps MP1 increase as in Section 4. Each regression uses the weeks t in country-year (i, τ) , with leads and lags allowed to extend into adjacent years, and fixes $p = 13$ so that responses are comparable across countries and years. We omit 2020, for which the March–December exclusion leaves too few observations. We then regress the estimated responses on country-year characteristics,

$$\hat{\beta}_{i,\tau,h} = \gamma_h + \boldsymbol{\delta}_h^\top Z_{i,\tau} + \varepsilon_{i,\tau,h}, \quad (4)$$

where $Z_{i,\tau}$ contains the proxies for the four channels and control variables (definitions, units, and sources in Table [Appendix Table 1](#) in Appendix); an alternative specification adds year fixed effects. Table [3](#) reports the estimates at $h = 4$, for each group separately and then jointly; Table [4](#) reports the joint specification at $h = 0, 2, 4, 6, 8$.

[\[Insert Table 3 about here\]](#)

[\[Insert Table 4 about here\]](#)

We begin with funding interconnectedness. Financial intermediaries, market makers, leveraged asset managers, rely on short term money markets for funding. We measure a market’s funding ties to the United States using four proxies: a dollar peg indicator, an indicator for a standing Federal Reserve swap line, U.S. bank claims on the country relative to GDP, and the full-sample correlation of the country’s policy rate changes with U.S. policy rate changes, $\rho(\Delta r, \text{U.S. } \Delta r)$. In Table [3](#), the funding block is jointly significant when entered alone (columns (1) and (2)) and when included together with proxies for the other three channels (columns (9) and (10)). While several of the funding liquidity interconnectedness variables become insignificant after controlling for the other channels, the result for policy-rate comovement, $\rho(\Delta r, \text{U.S. } \Delta r)$, is particularly strong. In the specification with year fixed effects, moving from no policy-rate correlation with the United States to perfect correlation is associated with a composite illiquidity response that is 2.3 standard deviations larger at the four-week horizon. Table [4](#) shows that this association strengthens and then weakens across horizons, rising from about 1.6 at $h = 2$ to its peak at $h = 4$ before fading at longer horizons. Overall, countries with tighter funding liquidity connections to the United States seem to have stronger illiquidity responses. Liquidity thus responds more where the local cost of capital is most responsive to U.S. rates, so that an FFR shock has a larger effect on market makers’ funding costs, the supply channel of Hypothesis [1](#).

Foreign ownership is the second channel that remains significant after controlling for the other country characteristics. We use EPFR’s estimated allocation of foreign-domiciled

equity ETFs and mutual funds to the local market, scaled by local market capitalization, as a proxy for foreign investor presence in the local market. In column (10) of Table 3, we find that a doubling of foreign ownership is associated with an illiquidity response that is roughly 0.6 standard deviations larger ($\ln 2 \times 0.85$). Table 4 shows that the association holds at almost all horizons, building from about 0.67 at $h = 2$ to 0.96 at $h = 6$. The foreign ownership block also includes the market’s U.S. cross-listing intensity. The foreign ownership block, which includes both proxies for ownership structure, is the second channel that remains jointly significant after controlling for the other channels. The countries with greater foreign presence of mutual funds and ETFs may be more exposed to capital flows associated with the global financial cycle, which is evidence of the importance of the demand channel.

For the third channel, we measure currency factor exposure using carry and dollar betas. Verdelhan (2018) documents that these two factors account for a substantial fraction of bilateral exchange rate variation, and Loualiche et al. (2026) show that international investment fund flows are related to currency risk exposure and that funds buy safe currencies and sell risky currencies after an unexpected U.S. monetary policy tightening. In Table 3, we find that the dollar beta is positive and significant when entered with the currency variables alone, whereas the carry beta is weaker and unstable across specifications. However, the dollar beta becomes insignificant in the joint specification, suggesting that its association with liquidity responses is likely captured by the country characteristics included in the other channels. This pattern also holds across horizons: Table 4 shows that the FX risk exposure proxies are jointly insignificant at the 5% level in every horizon except $h = 6$. Our evidence suggests that, for equity market liquidity, differences in currency factor exposure explain little of the cross-market variation in liquidity responses to U.S. monetary policy shocks after controlling for the other country characteristics.

We find only very limited evidence supporting the final channel, macroeconomic interconnectedness. U.S. shocks affect the macroeconomic outlook, including growth, expected

returns, and discount rates. Changes in these macroeconomic fundamentals could lead to correlated order flow from asset managers, representing liquidity demand, especially in the United States and in non-U.S. countries with macroeconomic connections to the United States. We find that a country’s correlation of its GDP growth with U.S. growth, and its bilateral trade balance are jointly significant when entered on their own, but becomes statistically much weaker once the other channels are included. Across horizons, Table 4 shows the proxies are jointly insignificant at all horizons other than $h = 6$. Overall, we find limited evidence that macroeconomic interconnectedness explains differences in the magnitude of liquidity responses to U.S. monetary policy shocks. This is consistent with our findings in the previous section that U.S. market liquidity is less affected than liquidity in international markets and that forward guidance shocks have no clear effect.

Taken together, our results indicate that market liquidity is most responsive to FFR shocks in countries where local policy rates comove more strongly with the U.S. policy rate and where foreign investors own a greater fraction of the market. The two proxies are consistent with the channels in Hypothesis 1: stronger rate pass-through transmits U.S. policy more directly to financial intermediaries’ funding costs, while greater foreign ownership exposes local markets to correlated order flows from asset managers.

6 Robustness

This section assesses the robustness of the liquidity responses of Section 4.1 and of the cross-country associations of Section 5, and adds supplementary evidence on foreign flows and exchange rates.

The baseline result does not depend on measuring liquidity in levels. Figure OA.2 shows that standardizing each measure within country before estimation leaves the signs and dynamics unchanged: quoted spreads widen, quoted depth falls, and composite illiquidity rises after a contractionary FFR shock. The emerging market estimates also become more precise at several short horizons. Standardization makes the responses comparable across groups:

at $h = 4$, composite illiquidity rises by 0.51 standard deviations in developed markets and 0.23 in emerging markets (Table OA.1). Relative to its normal variation, liquidity therefore deteriorates more and for longer in developed markets, even though emerging markets show a larger response in levels on impact.

Nor are the pooled estimates driven by a few countries. The country-specific responses of composite illiquidity, in levels (Figure OA.4) and in within-country standard deviations (Figure OA.5), vary considerably in magnitude and dynamics, but illiquidity rises across a broad set of developed and emerging markets.

The findings also extend to trade-based measures. Figure OA.6 reports the response of the effective spread and its decomposition into price impact and realized spread. Effective spreads rise after a contractionary FFR shock in both developed and emerging markets—primarily through price impact in developed markets and through both components in emerging markets—while the U.S. estimates are smaller and less significant.

Tables OA.2 and OA.3 vary the lag length from 3 to 18 weeks and the standard-error estimator. The impact response of composite illiquidity remains positive and significant in all three groups for every lag length, and the developed market response at $h = 4$ remains positive and highly significant across lag lengths and estimators. The emerging market coefficient at $h = 4$ stays positive but its significance is sensitive to both choices, so the evidence for a persistent response is strongest for developed markets.

Turning to the cross-country results, Tables OA.4 and OA.5 vary the first-stage lag length from $p = 1$ to $p = 15$ and compute second-stage standard errors with White, Driscoll–Kraay, and country-clustered estimators. At $h = 4$, the coefficients on policy-rate comovement and foreign ownership remain positive and significant for every lag length and estimator.

Alternative outcomes show that these associations run through spreads. With quoted spread in place of composite illiquidity, both coefficients remain positive and significant at $h = 4$ (Table OA.6); with effective spread, policy-rate comovement is significant from $h = 0$ through $h = 6$ and foreign ownership at $h = 6$ and $h = 8$ (Table OA.7); with share depth,

neither is significant at $h = 4$ (Table OA.8). This is consistent with Table 1, where developed and emerging markets differ far more in spreads than in log dollar depth. The foreign-ownership association also survives replacing holdings relative to market capitalization with their U.S.-dollar value, in both the $h = 4$ per-channel and the cross-horizon specifications (Tables OA.9 and OA.10).

Figure OA.3 splits foreign equity flows into those from active and from passive funds for each shock. After a contractionary FFR shock, both active and passive funds withdraw from emerging markets, starting on impact and increasing over subsequent weeks; in developed markets, passive inflows build gradually while active flows stay near zero. The passive inflow is significant at several horizons, which the aggregate developed market response in Figure 3 masks. Together with the emerging market outflow of Section 4.1, this establishes a significant flow response to FFR shocks in both market groups—in opposite directions and through different investor types—consistent with the foreign-investor channel of Hypothesis 1.

Finally, Figure OA.7 reports the exchange-rate component of international equity returns. Developed and emerging market currencies depreciate against the dollar after contractionary FFR and forward guidance shocks, with little systematic response to LSAP shocks. The depreciation is immediate and persistent after a forward guidance shock, but builds over three to four weeks and partially reverses after an FFR shock. Accordingly, cumulative equity returns after an FFR shock fall more in U.S. dollars than in local currency (Figure OA.8), although neither response is significant. Gradual depreciation thus accompanies the persistent liquidity deterioration after an FFR shock, but equity repricing, even in dollar terms, remains a weak explanation for it.

7 Conclusion

We provide new causal evidence that changes in short-term interest rates have detrimental effects on global market liquidity while changes to further out the yield curve, or regarding quantities of asset purchase programs do not. Short-term interest rates affect market liquidity

most in countries where foreign investors are prevalent and where the pass-through of US monetary policy to local currency interest rates is stronger, consistent with both liquidity demand and liquidity supply channels from monetary policy to market liquidity.

Prior research has established a clear and important role for US monetary policy in the global financial cycle, especially regarding asset prices and capital flows. Our results also provide new, complementary evidence that global equity market liquidity is also sensitive to this key policy tool, a previously undocumented channel through which monetary policy affects global financial conditions. Our results additionally help identify US monetary policy as an important driver of global market liquidity and liquidity commonality.

Our analysis deliberately concentrates on the role of US monetary policy shocks. This follows the fact that the US remains the home of the world's deepest and most liquid capital markets, and of highly liquid interest rate cash and futures markets across different maturities, permitting a clean high-frequency identification of monetary policy shocks that is well-established in the macro-econometric literature. One natural follow-up question is whether domestic monetary policy plays a similar role in determining domestic market liquidity? Additionally, do monetary policy decisions in other major markets (e.g. Eurozone or China) also have global effects? Whether similar market liquidity effects are present in other asset markets (such as government and corporate bond markets) would also be interesting, but would require reliable and broad measurement of cross-country liquidity for these markets, which primarily trade OTC.

A Appendix

Appendix Table 1: VARIABLE DEFINITIONS

Variable	Definition	Freq.	Source
Panel A. Market-quality outcomes			
Quoted Spread (bps)	Relative bid-ask spread $(\text{Ask} - \text{Bid})/\text{Mid}$, in basis points.	Weekly	WRDS TAQ; LSEG Tick History
Quoted Depth (log USD)	Natural log of dollar depth at the best bid and offer, $(\text{Bid}_\$ + \text{Ask}_\$)/2$.	Weekly	WRDS TAQ; LSEG Tick History
Quoted Depth (log, local ccy)	As Quoted Depth above, but valued in each stock's local currency rather than USD (no exchange-rate conversion), so it is not mechanically affected by movements in the U.S. dollar; for the U.S. it coincides with the USD measure.	Weekly	WRDS TAQ; LSEG Tick History
Composite Illiquidity (bps)	Quoted Spread (in bps) divided by the natural log of share depth at the best bid and offer, $\text{Quoted Spread} / \log(\text{Share Depth})$. Combines spread and depth into a single illiquidity measure.	Weekly	WRDS TAQ; LSEG Tick History
Intraday Volatility (bps)	Standard deviation of one-second log midquote returns within the trading day, in basis points. For the United States this is the WRDS second-by-second quote-based intraday volatility; for other markets it is computed from the daily realized variance of five-minute midquote returns, rescaled to a one-second interval under the assumption of serially uncorrelated returns.	Weekly	WRDS TAQ; LSEG Tick History
Returns (bps)	Weekly return of the local equity market, weighted across constituents by the previous trading day's market capitalization and compounded across the week, in basis points.	Weekly	CRSP; LSEG Tick History
Currency Return (bps)	Weekly change in the log of the end-of-week exchange rate against the U.S. dollar, expressed in U.S. dollars per unit of local currency, in basis points; a positive value is a local-currency appreciation. Euro-area markets enter with the euro; the Nordic index, which spans several currencies, is excluded.	Weekly	LSEG
Returns, USD (bps)	Weekly return of the local equity market converted to U.S. dollars at the end-of-week exchange rate, i.e., the local-currency return plus the currency return above, in basis points. Used for the USD panels of Figure OA.8; for the United States it coincides with Returns.	Weekly	CRSP; LSEG Tick History
Foreign Fund Flow (%)	Net flow from all foreign-domiciled equity funds (ETFs and mutual funds, active and passive) into the country, scaled by the previ week's total estimated allocation of all EPFR equity funds (foreign- and domestically domiciled) to the country.	Weekly	EPFR

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Variable	Definition	Freq.	Source
Foreign Passive Fund Flow (%)	Net flow from foreign-domiciled passively managed equity funds (index mutual funds and ETFs, per the EPFR classification) into the country, scaled by the previous week's total estimated allocation of all EPFR equity funds (foreign- and domestically domiciled) to the country.	Weekly	EPFR
Foreign Active Fund Flow (%)	Net flow from foreign-domiciled actively managed equity funds into the country, scaled as above. Passive and active flows sum to the total foreign fund flow.	Weekly	EPFR
Effective Spread (bps)	Effective spread of trade k , $2D_k(P_k - M_k)/M_k$, in basis points, where P_k is the trade price, M_k the midquote prevailing immediately before the trade, and D_k the trade direction, +1 for buyer-initiated and -1 for seller-initiated trades. Trades are signed with the algorithm of Lee and Ready (1991): a trade above (below) the prevailing midquote is a buy (sell), and a trade at the midquote is a buy (sell) if its price is above (below) the price of the most recent preceding trade at a different price (tick test); the few trades that neither rule can sign are dropped. For the United States we use the WRDS implementation of this classification. Trade-level spreads are averaged within each stock-day with trade-value weights. The same D_k and weights apply to Price Impact and Realized Spread below.	Weekly	WRDS TAQ; LSEG Tick History
Price Impact (bps)	Five-minute price impact, $2D_k(M_{k+5} - M_k)/M_k$, where M_{k+5} is the midquote five minutes after trade k .	Weekly	WRDS TAQ; LSEG Tick History
Realized Spread (bps)	Five-minute realized spread, $2D_k(P_k - M_{k+5})/M_k$. By construction, Effective Spread = Price Impact + Realized Spread.	Weekly	WRDS TAQ; LSEG Tick History
Total Volume (log USD)	Natural log of the daily dollar trading volume per index constituent, capitalization-weighted across constituents and averaged over the week.	Weekly	WRDS TAQ; LSEG Tick History
Market Capitalization	Average equity market capitalization per index constituent (aggregate market cap of the constituents divided by their number), in USD billions.	Weekly	CRSP; LSEG Tick History
Panel B. Country-year controls			
USD-pegged FX	Indicator equal to one if the IMF AREAER <i>de facto</i> classification assigns the country a non-floating, U.S.-dollar-anchored exchange-rate regime, zero otherwise.	Yearly	IMF

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Variable	Definition	Freq.	Source
Standing swap line (SSCB)	Indicator equal to one if country i is in the standing-swap central bank cohort, zero otherwise. The cohort consists of the 13 panel countries served by the five SSCBs (Bank of Canada, ECB, Bank of Japan, Bank of England, Swiss National Bank): Canada, Japan, the United Kingdom, and the 10 ECB-area economies (Austria, Belgium, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain).	Time-invariant	New York Fed
log U.S.-bank claims/GDP	Natural log of consolidated total claims of U.S.-headquartered banks on the counterparty country (BIS CBS, ultimate-risk/guarantor basis, all sectors and currencies), scaled by nominal GDP in USD.	Yearly	BIS; World Bank
$\rho(\Delta r, \text{U.S. } \Delta r)$	Static full-sample Pearson correlation between the country's and the United States' monthly changes in the central-bank policy rate (Δr), over 2010–2022.	Time-invariant	BIS; Bloomberg
$\rho(\text{GDP growth, U.S.})$	Pearson correlation between the country's and the United States' annual real-GDP growth rates over the full 2010–2022 sample (one value per country).	Time-invariant	World Bank
Dollar beta (β^{DOL})	Within-year univariate OLS slope of currency i 's daily log spot return (USD per foreign) on the dollar factor, estimated separately for each calendar year τ . The dollar factor (DOL) is the equal-weighted cross-sectional mean of daily log spot returns across the sample currencies and seven additional major currencies (CHF, DKK, NOK, SEK, ILS, TRY, CNY), following Verdelhan (2018) and Loualiche et al. (2026). Euro-area members share the EUR series.	Yearly	LSEG
Carry beta (β^{CAR})	Within-year univariate OLS slope of currency i 's daily log spot return on the carry factor, by calendar year τ . The carry factor (CAR) is a daily-rebalanced HML return: currencies are sorted into quintiles by their previous-day 1-month forward discount $\log(F_{t-1}/S_{t-1})$ (a CIP-implied interest-rate differential), over the same currency universe as the dollar factor, going equal-weighted long the high-yield bottom quintile and short the low-yield top quintile. Euro-area members share the EUR series.	Yearly	LSEG
Trade balance with U.S./GDP	Country i 's bilateral goods trade balance with the United States (exports FOB minus imports CIF, USD) as a percentage of nominal GDP in USD.	Yearly	IMF; World Bank
log FDI stock/GDP	Natural log of the inward stock of foreign direct investment (External Wealth of Nations “FDI liabilities (stock)”, millions of current USD) as a percentage of nominal GDP in USD.	Yearly	Lane and Milesi-Ferretti; World Bank

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Variable	Definition	Freq.	Source
log Foreign equity / Mcap	Natural log of the yearly mean of weekly EPFR estimated allocations by all foreign-domiciled equity funds (active plus passive) to country i , scaled by the country's aggregate local-market equity capitalization. The robustness tables in the online appendix use the same allocation in absolute USD levels (log Foreign equity) in place of the market-cap ratio.	Yearly	EPFR; Bloomberg
log(1 + U.S. cross-listings/GDP)	log(1 + x) of the aggregate market capitalization of country i 's U.S.-exchange-listed ADRs (annual mean of country-total monthly market cap), scaled by nominal GDP in USD. ADRs are identified in the CRSP monthly stock file as depositary receipts of firms incorporated outside the United States, with the country of incorporation taken from Compustat through the CRSP-Compustat link.	Yearly	CRSP; Compustat; World Bank
log Mcap	Natural log of country i 's aggregate equity market capitalization in USD (Bloomberg equity-market-cap-to-GDP ratio $\times$ nominal GDP). A standard control for equity-market size.	Yearly	Bloomberg; World Bank
log GDP per capita	Natural log of nominal GDP per capita in current U.S. dollars.	Yearly	World Bank

Appendix Table 2: EQUITY MARKET INDICES

This table lists the 37 equity markets in the panel and the leading index whose constituents represent each market, together with the index's Refinitiv Identification Code (RIC) and its MSCI market classification (DM, developed; EM, emerging; FM, frontier). All market-level variables in the paper are built from the constituents of these indices, with constituent lists refreshed quarterly.

Market	Class	Index	RIC
<i>United States</i>			
United States	DM	S&P 500	.SPX
<i>Developed markets excluding the United States (16)</i>			
Australia	DM	S&P/ASX 200	.AXJO
Austria	DM	Austrian Traded Index (ATX)	.ATX
Belgium	DM	BEL 20	.BFX
Canada	DM	S&P/TSX 60	.SPTSE
France	DM	CAC 40	.FCHI
Germany	DM	DAX	.GDAXI
Hong Kong	DM	Hang Seng Index	.HSI
Ireland	DM	ISEQ 20	.IETP
Italy	DM	FTSE MIB	.FTMIB
Japan	DM	TOPIX 100	.TOPX100
Netherlands	DM	AEX	.AEX
Nordic	DM	OMX Nordic 40	.OMXN40
Portugal	DM	PSI (Euronext Lisbon)	.PSI20
Singapore	DM	FTSE Straits Times Index	.STI
Spain	DM	IBEX 35	.IBEX
UK	DM	FTSE 100	.FTSE
<i>Emerging markets (18)</i>			
Brazil	EM	Bovespa Index	.BVSP
Czechia	EM	PX Index	.PX
Egypt	EM	EGX 30	.EGX30
Greece	EM	FTSE/Athex Large Cap	.ATF
Hungary	EM	BUX	.BUX
India	EM	Nifty 50	.NSEI
Indonesia	EM	LQ45 (Liquidity 45)	.JKLQ45
Korea	EM	KOSPI 50	.KS50
Malaysia	EM	FTSE Bursa Malaysia KLCI	.KLSE
Mexico	EM	S&P/BMV IPC	.MXX
Philippines	EM	PSEi	.PSI
Poland	EM	WIG20	.WIG20
Qatar	EM	QE General Index	.QSI
Russia	EM	MOEX Russia Index	.MCX
Saudi Arabia	EM	Tadawul Free Float Index	.TASI
South Africa	EM	FTSE/JSE Top 40	.JTOPI
Thailand	EM	SET 50	.SET50
UAE	EM	DFM General Index	.DFMGI
<i>Frontier markets (2)</i>			
Romania	FM	BET Index	.BETI
Vietnam	FM	VN Index	.VNI

References

- Acharya, V. V. and L. H. Pedersen (2005). Asset pricing with liquidity risk. *Journal of Financial Economics* 77(2), 375–410.
- Albagli, E., L. Ceballos, S. Claro, and D. Romero (2019). Channels of us monetary policy spillovers to international bond markets. *Journal of Financial Economics* 134(2), 447–473.
- Amihud, Y. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets* 5(1), 31–56.
- Amihud, Y., A. Hameed, W. Kang, and H. Zhang (2015). The illiquidity premium: International evidence. *Journal of Financial Economics* 117(2), 350–368.
- Ammer, J., C. Vega, and J. Wongswan (2010). International transmission of us monetary policy shocks: Evidence from stock prices. *Journal of Money, Credit and Banking* 42, 179–198.
- Aragon, G. O., J. S. Martin, and Z. Shi (2019). Who benefits in a crisis? evidence from hedge fund stock and option holdings. *Journal of Financial Economics* 131(2), 345–361.
- Aragon, G. O. and P. E. Strahan (2012). Hedge funds as liquidity providers: Evidence from the lehman bankruptcy. *Journal of Financial Economics* 103(3), 570–587.
- Bauer, M. D. and M. Chernov (2024). Interest rate skewness and biased beliefs. *Journal of Finance* 79(1), 173–217.
- Bauer, M. D. and E. T. Swanson (2023). A reassessment of monetary policy surprises and high-frequency identification. *NBER Macroeconomics Annual* 37(1), 87–155.
- Bekaert, G., C. R. Harvey, and C. Lundblad (2007). Liquidity and expected returns: Lessons from emerging markets. *Review of Financial Studies* 20(6), 1783–1831.
- Brockman, P., D. Y. Chung, and C. Pérignon (2009). Commonality in liquidity: A global perspective. *Journal of Financial and Quantitative Analysis* 44(4), 851–882.
- Brunnermeier, M. K. and L. H. Pedersen (2009). Market liquidity and funding liquidity. *Review of Financial Studies* 22(6), 2201–2238.
- Bruno, V. and H. S. Shin (2015). Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics* 71, 119–132.
- Campbell, J. R., C. L. Evans, J. D. Fisher, and A. Justiniano (2012). Macroeconomic effects of federal reserve forward guidance. *Brookings Papers on Economic Activity* 2012(1), 1–80.
- Cerutti, E., S. Claessens, and D. Puy (2019). Push factors and capital flows to emerging markets: why knowing your lender matters more than fundamentals. *Journal of International Economics* 119, 133–149.

- Chordia, T., R. Roll, and A. Subrahmanyam (2000). Commonality in liquidity. *Journal of Financial Economics* 56(1), 3–28.
- Chordia, T., A. Sarkar, and A. Subrahmanyam (2005). An empirical analysis of stock and bond market liquidity. *Review of Financial Studies* 18(1), 85–129.
- Christiano, L. J., M. Eichenbaum, and C. L. Evans (1999). Monetary policy shocks: What have we learned and to what end? *Handbook of Macroeconomics* 1, 65–148.
- Comerton-Forde, C., T. Hendershott, C. M. Jones, P. C. Moulton, and M. S. Seasholes (2010). Time variation in liquidity: The role of market-maker inventories and revenues. *Journal of Finance* 65(1), 295–331.
- Converse, N., E. Levy-Yeyati, and T. Williams (2023). How etfs amplify the global financial cycle in emerging markets. *Review of Financial Studies* 36(9), 3423–3462.
- Coughenour, J. F. and M. M. Saad (2004). Common market makers and commonality in liquidity. *Journal of Financial Economics* 73(1), 37–69.
- Fernández-Amador, O., M. Gächter, M. Larch, and G. Peter (2013). Does monetary policy determine stock market liquidity? new evidence from the euro zone. *Journal of Empirical Finance* 21, 54–68.
- Fong, K. Y. L., C. W. Holden, and C. A. Trzcinka (2017). What are the best liquidity proxies for global research? *Review of Finance* 21(4), 1355–1401.
- Forbes, K. J. and F. E. Warnock (2012). Capital flow waves: Surges, stops, flight, and retrenchment. *Journal of International Economics* 88(2), 235–251.
- Fratzscher, M., M. Lo Duca, and R. Straub (2018). On the international spillovers of US quantitative easing. *The Economic Journal* 128(608), 330–377.
- Gertler, M. and P. Karadi (2011). A model of unconventional monetary policy. *Journal of Monetary Economics* 58(1), 17–34.
- Goyenko, R. Y. and A. D. Ukhov (2009). Stock and bond market liquidity: A long-run empirical analysis. *Journal of Financial and Quantitative Analysis* 44(1), 189–212.
- Gromb, D. and D. Vayanos (2002). Equilibrium and welfare in markets with financially constrained arbitrageurs. *Journal of Financial Economics* 66(2-3), 361–407.
- Gürkaynak, R. S., B. Sack, and E. Swanson (2005). Do actions speak louder than words? The response of asset prices to monetary policy actions and statements. *International Journal of Central Banking* 1(1), 55–93.
- Hameed, A., W. Kang, and S. Viswanathan (2010). Stock market declines and liquidity. *Journal of Finance* 65(1), 257–293.
- Hasbrouck, J. and D. J. Seppi (2001). Common factors in prices, order flows, and liquidity. *Journal of Financial Economics* 59(3), 383–411.

- Hausman, J. and J. Wongswan (2011). Global asset prices and fomc announcements. *Journal of International Money and Finance* 30(3), 547–571.
- Huberman, G. and D. Halka (2001). Systematic liquidity. *Journal of Financial Research* 24(2), 161–178.
- Iacoviello, M. and G. Navarro (2019). Foreign effects of higher us interest rates. *Journal of International Money and Finance* 95, 232–250.
- Jensen, G. R. and T. Moorman (2010). Inter-temporal variation in the illiquidity premium. *Journal of Financial Economics* 98(2), 338–358.
- Jordà, O. (2005). Estimation and inference of impulse responses by local projections. *American Economic Review* 95(1), 161–182.
- Jordà, Ò., M. Schularick, A. M. Taylor, and F. Ward (2019). Global financial cycles and risk premiums. *IMF Economic Review* 67(1), 109–150.
- Jylhä, P., K. Rinne, and M. Suominen (2014). Do hedge funds supply or demand liquidity? *Review of Finance* 18(4), 1259–1298.
- Kamara, A., X. Lou, and R. Sadka (2008). The divergence of liquidity commonality in the cross-section of stocks. *Journal of Financial Economics* 89(3), 444–466.
- Karolyi, G. A., K.-H. Lee, and M. A. Van Dijk (2012). Understanding commonality in liquidity around the world. *Journal of Financial Economics* 105(1), 82–112.
- Karolyi, G. A., K.-H. Lee, and M. A. van Dijk (2019). Us monetary policy transmission and liquidity risk premia around the world. *Available at SSRN 3395313*.
- Koch, A., S. Ruenzi, and L. Starks (2016). Commonality in liquidity: a demand-side explanation. *Review of Financial Studies* 29(8), 1943–1974.
- Korajczyk, R. A. and R. Sadka (2008). Pricing the commonality across alternative measures of liquidity. *Journal of Financial Economics* 87(1), 45–72.
- Kuttner, K. N. (2001). Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market. *Journal of Monetary Economics* 47(3), 523–544.
- Lee, C. M. C. and M. J. Ready (1991). Inferring trade direction from intraday data. *Journal of Finance* 46(2), 733–746.
- Lee, K.-H. (2011). The world price of liquidity risk. *Journal of Financial Economics* 99(1), 136–161.
- Loualiche, E., A. R. Pecora, F. Somogyi, and C. Ward (2026). Monetary policy transmission through the exchange rate factor structure. *Journal of Financial Economics* 182, 104305.
- Miranda-Agrippino, S. and H. Rey (2020). Us monetary policy and the global financial cycle. *Review of Economic Studies* 87(6), 2754–2776.

- Miranda-Agrippino, S. and H. Rey (2022). The global financial cycle. In *Handbook of International Economics*, Volume 6, pp. 1–43. Elsevier.
- Montiel Olea, J. L., M. Plagborg-Møller, E. Qian, and C. K. Wolf (2025). Local Projections or VARs? A Primer for Macroeconomists. *NBER Macroeconomics Annual*.
- Pástor, L. and R. F. Stambaugh (2003). Liquidity risk and expected stock returns. *Journal of Political Economy* 111(3), 642–685.
- Rey, H. (2018). Dilemma not trilemma: the global financial cycle and monetary policy independence. Technical report, National Bureau of Economic Research.
- Swanson, E. T. (2021). Measuring the effects of federal reserve forward guidance and asset purchases on financial markets. *Journal of Monetary Economics* 118, 32–53.
- Swanson, E. T. (2024). The macroeconomic effects of the Federal Reserve’s conventional and unconventional monetary policies. *IMF Economic Review* 72, 1152–1184.
- Vayanos, D. and J.-L. Vila (2021). A preferred-habitat model of the term structure of interest rates. *Econometrica* 89(1), 77–112.
- Verdelhan, A. (2018). The share of systematic variation in bilateral exchange rates. *Journal of Finance* 73(1), 375–418.
- Wongswan, J. (2006). Transmission of information across international equity markets. *Review of Financial Studies* 19(4), 1157–1189.
- Zhang, L. and Q. Zhong (2020). The global financial cycle, us monetary policy, and the impossible trinity. *Journal of Financial Research* 476(2), 15–33.

Figures and Tables

Figure 1: ORTHOGONALIZED MONETARY POLICY SHOCKS

This figure plots the three weekly U.S. monetary policy shocks used in the analysis. From top to bottom, the panels show the orthogonalized federal funds rate shock (FFR), forward guidance shock (FG), and negative large-scale asset purchase shock ($-LSAP$). Positive values indicate a monetary tightening. The underlying shocks are the three rotated factors of Swanson (2021), extracted from 30-minute changes around FOMC announcements in eight interest rate instruments: the first and third federal funds futures contracts, the second through fourth Eurodollar futures contracts, and the 2-, 5-, and 10-year Treasury yields. Following Bauer and Swanson (2023), each orthogonalized shock is the residual from a regression of the raw factor on six pre-announcement variables: the nonfarm payrolls surprise, the 12-month log change in nonfarm payrolls, the log change in the S&P 500, the change in the yield curve slope, and the log change in the Bloomberg Commodity Spot Index, each measured over the prior 13 weeks, and the implied skewness of the 10-year Treasury yield (Bauer and Chernov, 2024). Each shock is assigned to the week of its FOMC announcement and set to zero in weeks without an announcement. Table 2 maps a one-unit change in each shock into basis-point changes in interest rates. The sample covers 98 announcements from 2010 through 2022. The gap in each panel is March–December 2020, which is excluded from the sample.

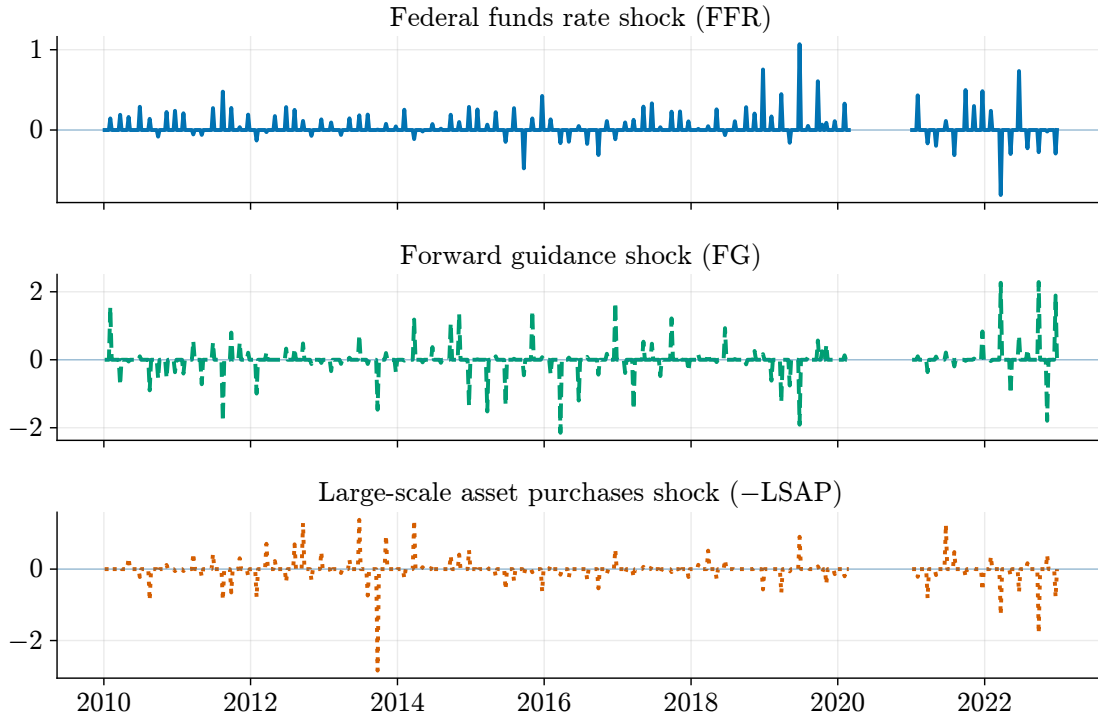


Figure 2: INTEREST RATE RESPONSES TO FOMC ANNOUNCEMENTS

This figure plots the change in three interest rate measures over the 30-minute window around each FOMC announcement, in basis points. Each bar is one announcement. The top panel reports the federal funds futures surprise (MP1), and the middle and bottom panels report the changes in the 2-year (TNOTE02) and 10-year (TNOTE10) Treasury yields. Following Kuttner (2001) and Gürkaynak et al. (2005), MP1 scales the change in the current-month federal funds futures rate (FF1) by $D/(D - d)$, where D is the number of calendar days in the month and d is the day of the announcement, so that it measures the surprise in the target rate for the remainder of the month. For announcements in the last seven days of a month, MP1 is the unscaled change in the next-month contract (FF2). The underlying futures and yield changes are from the updated monetary policy surprises dataset of Bauer and Swanson (2023). These three series are the dependent variables in Table 2, which relates them to the orthogonalized shocks in Figure 1. The sample covers 98 announcements from 2010 through 2022. The gap in each panel is March–December 2020, which is excluded from the sample.

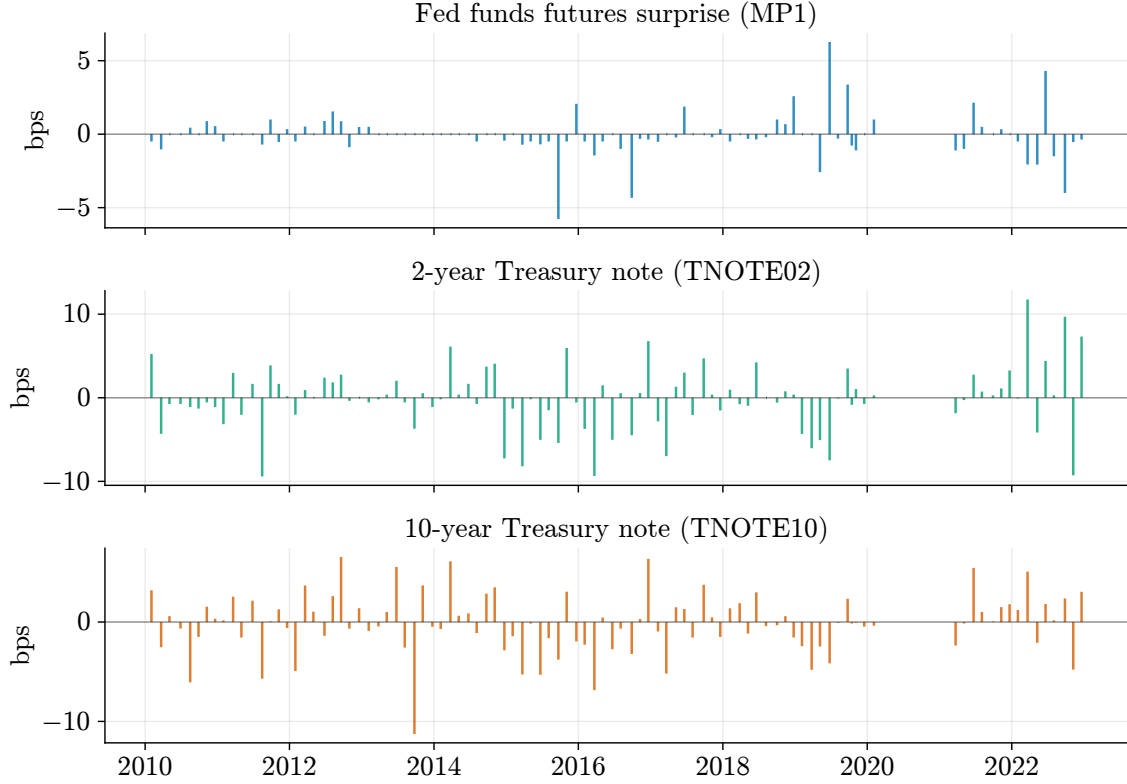


Figure 3: MARKET LIQUIDITY, RETURNS, AND FOREIGN FLOWS FOLLOWING A FEDERAL FUNDS RATE SHOCK

This figure plots local projection impulse responses to the orthogonalized federal funds rate shock (FFR) at horizons of 0 to 8 weeks. The columns report the United States, developed markets, and emerging markets, with frontier markets included among emerging markets. From top to bottom, the rows report the responses of the quoted spread, quoted depth, composite illiquidity, and intraday volatility, followed by the cumulative response of the local-currency equity index return and the cumulative net flow from foreign equity funds, as a percentage of the previous week's total allocation of all EPFR equity funds to the market. The U.S. estimates use equation (1) and the international estimates equation (2) with country fixed effects. Responses are scaled to a 5-basis-point increase in MP1 using Table 2, and the lag length is selected by AIC for each outcome and market group. The darker and lighter bands are 68% and 95% confidence intervals from Newey–West standard errors for the United States and Driscoll–Kraay standard errors for the international panels. The sample is weekly, 2010–2022, and excludes March–December 2020. Table OA.1 in the online appendix tabulates the liquidity coefficients.

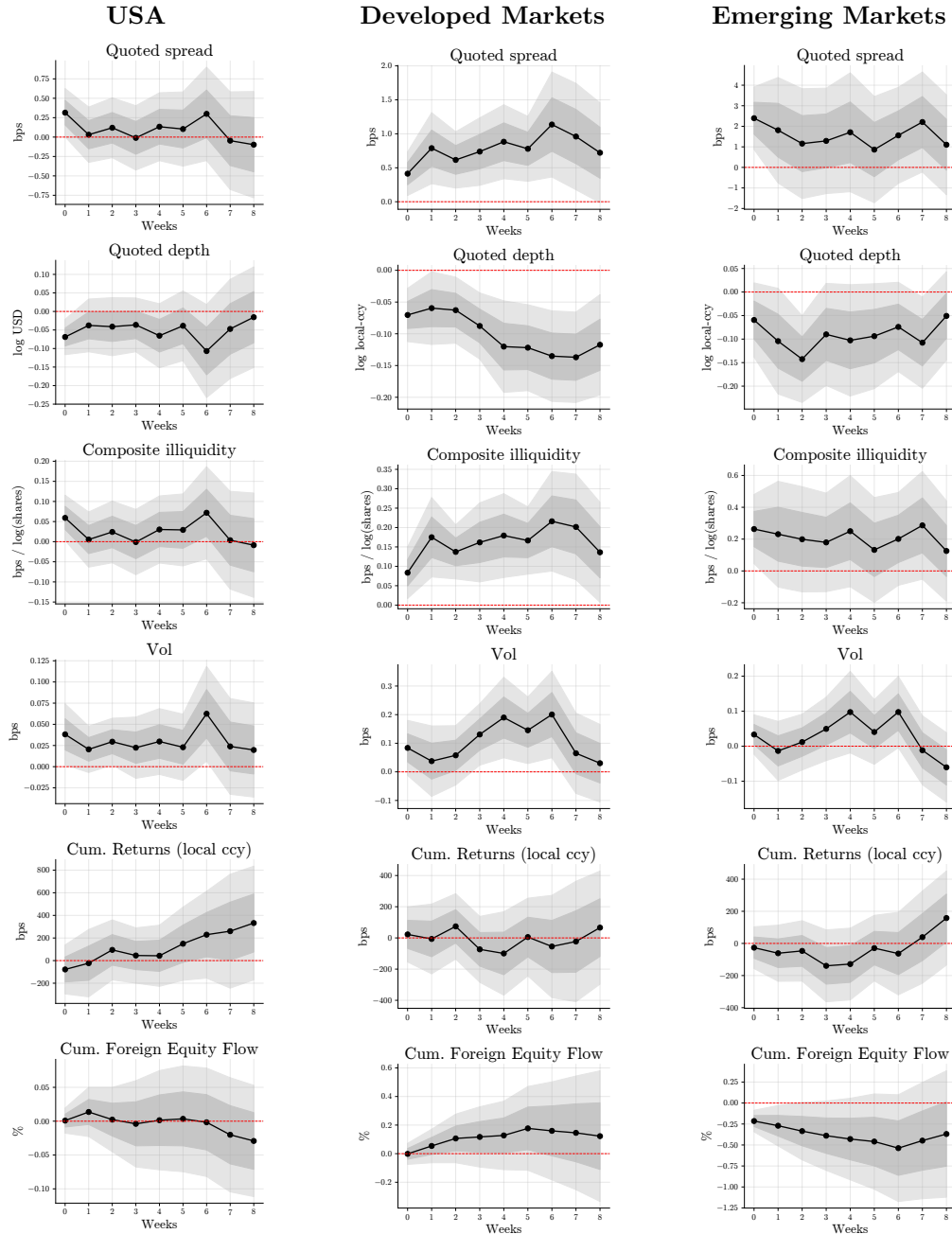


Figure 4: MARKET LIQUIDITY, RETURNS, AND FOREIGN FLOWS FOLLOWING A FORWARD GUIDANCE SHOCK

This figure is the counterpart of Figure 3 for the orthogonalized forward guidance shock (FG). Responses are scaled to a 5-basis-point increase in the 2-year Treasury yield, using the mapping in column (2) of Table 2. The columns, rows, units, estimation, lag selection, confidence bands, and sample are as in Figure 3.

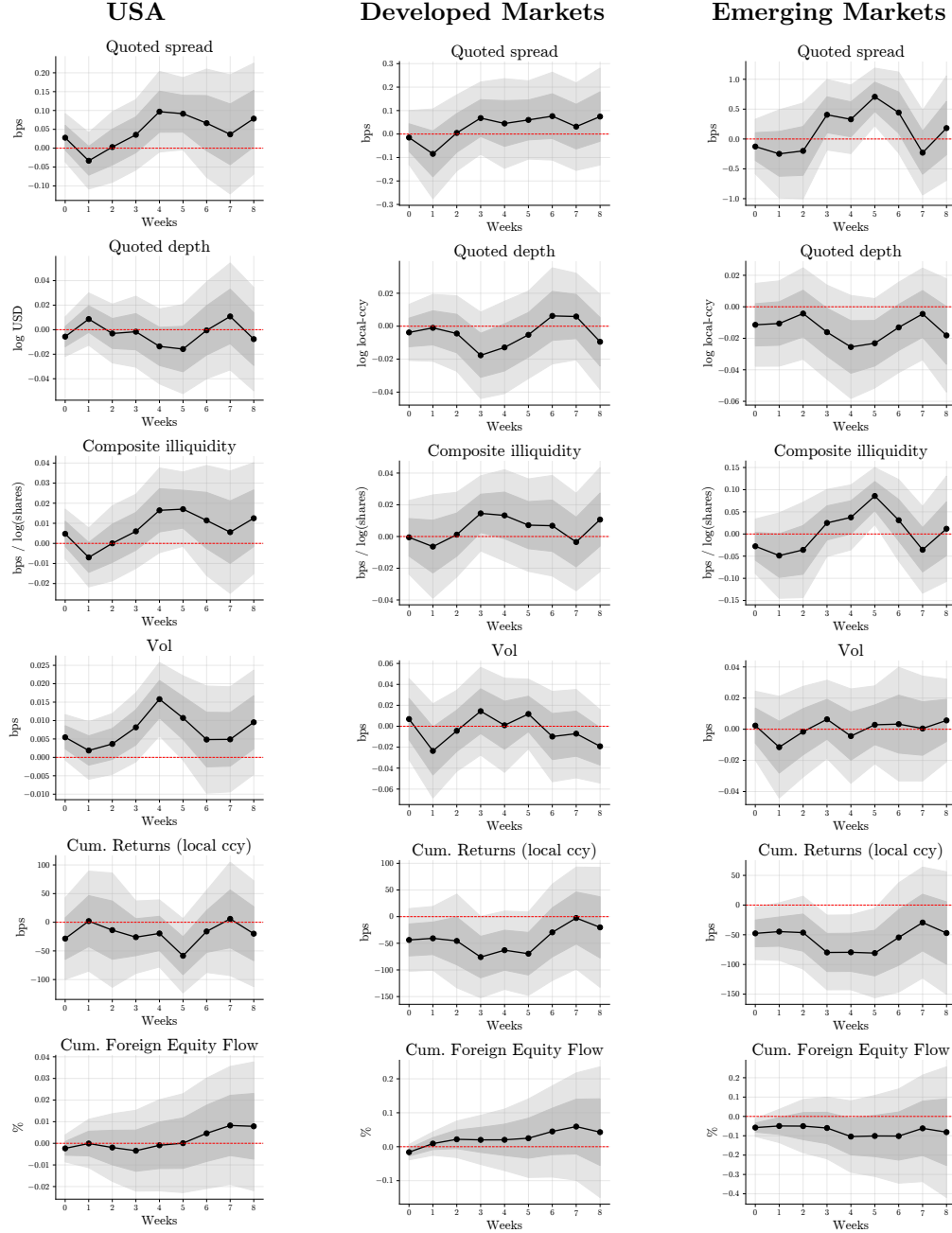


Figure 5: MARKET LIQUIDITY, RETURNS, AND FOREIGN FLOWS FOLLOWING A
CONTRACTIONARY LSAP SHOCK

This figure is the counterpart of Figure 3 for the orthogonalized negative large-scale asset purchase shock (–LSAP). The shock is signed so that positive values represent a reduction in expected asset purchases, that is, a monetary tightening. Responses are scaled to a 5-basis-point increase in the 10-year Treasury yield, using the mapping in column (3) of Table 2. The columns, rows, units, estimation, lag selection, confidence bands, and sample are as in Figure 3.

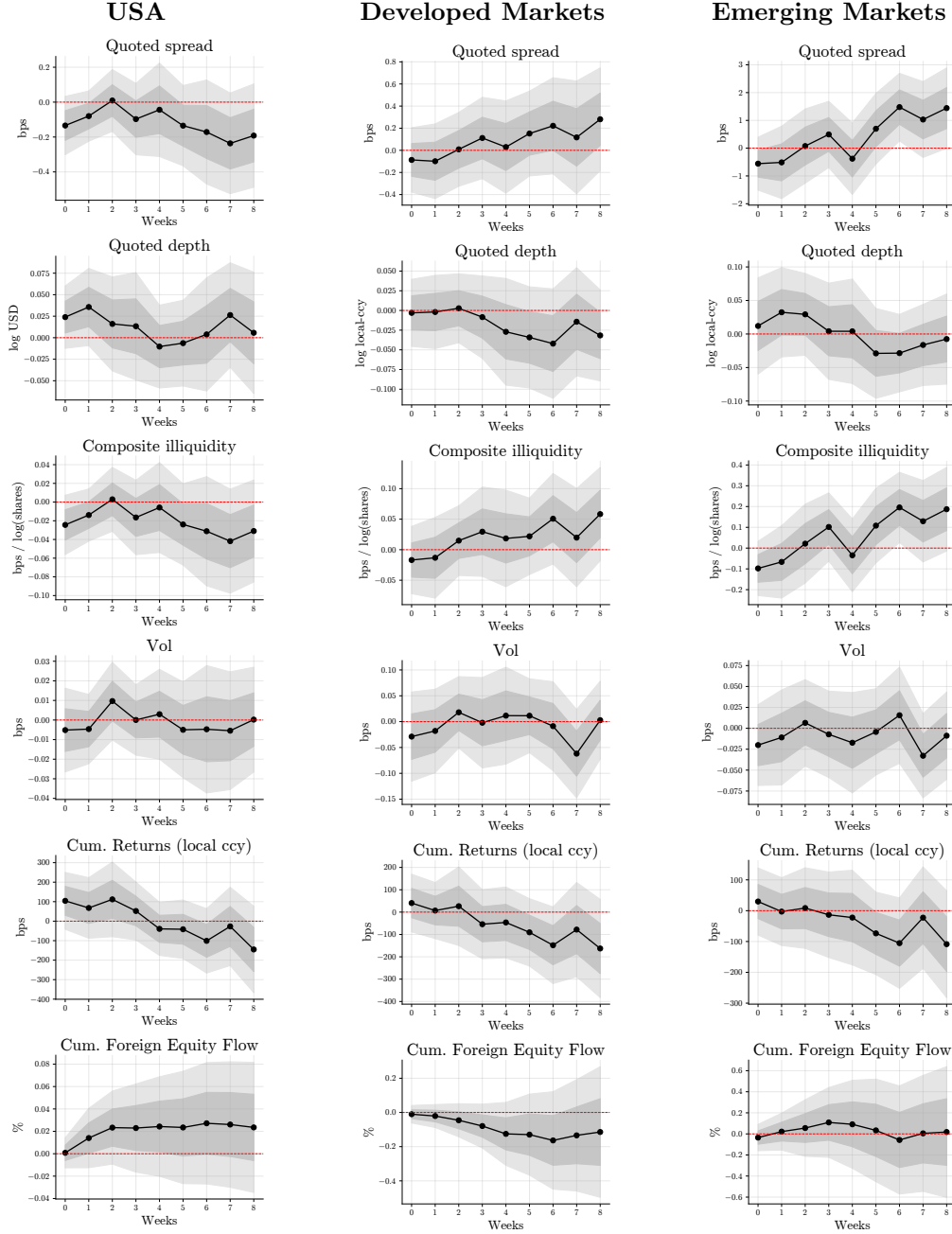


Table 1: SUMMARY STATISTICS

This table reports the summary statistics of weekly measures of market capitalization, liquidity, volatility, returns, foreign fund flows, and other market quality variables. Panel A covers the United States, with 634 weekly observations. Panel B covers 16 developed markets and 20 emerging and frontier markets, classified according to MSCI, with 10,144 and 12,680 market-week observations, respectively. Each market is represented by the constituents of its leading equity index; Table [Appendix Table 2](#) in the online appendix lists the indices. Each variable is computed for every index constituent on each trading day, aggregated across constituents with market capitalization weights, and then averaged over the trading days of the week; returns are compounded within the week. Table [Appendix Table 1](#) in the online appendix gives full definitions and sources. Each statistic uses all nonmissing observations for the corresponding variable. Continuous variables are winsorized at the 2.5th and 97.5th percentiles. The sample covers 2010–2022 and excludes March–December 2020.

Panel A. USA

Reported for 2010-2022	United States				
Statistics	Mean	St. Dev.	p10	p50	p90
Variables					
Market Capitalization (Billions USD)	41.20	16.53	22.74	37.33	70.15
Quoted Spread (bps)	3.63	0.69	2.99	3.45	4.61
Quoted Depth (log USD)	10.96	0.22	10.66	10.96	11.27
Composite illiquidity	0.60	0.17	0.45	0.54	0.85
Intraday Volatility (bps)	0.46	0.07	0.38	0.46	0.54
Returns (bps)	24.09	187.87	-231.88	40.86	235.29
Foreign Fund Flow (%)	0.01	0.03	-0.02	0.01	0.04
Effective Spread (bps)	3.46	0.63	2.74	3.36	4.41
Price Impact (bps)	2.32	0.42	1.87	2.25	2.93
Realized Spread (bps)	1.17	0.42	0.73	1.08	1.71

Panel B. Non-U.S.

Reported for 2010-2022	Developed Markets (N=16 countries)					Emerging Markets (N=20 countries)				
	Mean	St. Dev.	p10	p50	p90	Mean	St. Dev.	p10	p50	p90
Variables										
Market Capitalization (Billions USD)	20.04	13.19	4.33	18.78	38.61	6.92	6.25	0.98	5.57	15.24
Quoted Spread (bps)	9.90	7.65	3.78	7.28	18.22	31.42	26.29	7.12	22.95	70.29
Quoted Depth (log USD)	11.06	1.75	9.78	11.10	13.48	10.93	1.73	8.85	10.60	13.48
Quoted Depth (log, local currency)	11.82	2.72	9.61	11.09	15.81	14.49	3.42	11.12	13.51	20.38
Composite illiquidity	1.43	1.29	0.58	1.03	2.57	3.72	2.85	1.11	2.93	7.84
Intraday Volatility (bps)	0.87	0.25	0.61	0.81	1.18	0.97	0.32	0.62	0.92	1.36
Returns (bps)	9.83	220.71	-275.62	20.90	266.88	9.01	225.41	-269.18	14.44	276.04
Foreign Fund Flow (%)	0.03	0.18	-0.19	0.02	0.25	0.03	0.39	-0.31	0.02	0.37
Effective Spread (bps)	12.10	8.49	4.13	10.01	22.59	30.90	24.43	8.45	22.70	60.88
Price Impact (bps)	8.15	5.23	3.18	6.69	15.30	19.94	13.18	6.59	16.28	38.41
Realized Spread (bps)	3.97	7.04	-0.62	1.26	11.38	10.98	14.05	1.19	6.64	26.90

Table 2: MAPPING ORTHOGONALIZED MONETARY POLICY SHOCKS TO INTEREST RATE CHANGES

This table reports the slope coefficients from three separate OLS regressions of the 30-minute change in an interest rate around FOMC announcements on the corresponding orthogonalized monetary policy shock. Column (1) regresses the federal funds futures surprise (MP1) on FFR, column (2) the change in the 2-year Treasury yield on FG, and column (3) the change in the 10-year Treasury yield on $-LSAP$. Interest rate changes are in basis points, so each coefficient is the basis-point move per one-unit increase in the shock. Observations are FOMC announcement weeks from 2010 through 2022, excluding March–December 2020. t -statistics in brackets use HAC standard errors with a Bartlett kernel and a bandwidth of 4. One, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	MP1 (1)	2-Year Treasury (2)	10-Year Treasury (3)
FFR	4.11*** [5.53]		
FG		4.34*** [31.09]	
$-LSAP$			2.83*** [3.21]
R^2	0.549	0.917	0.300
N	98	98	98

Table 3: COUNTRY CHARACTERISTICS AND THE LIQUIDITY RESPONSE TO A FEDERAL FUNDS RATE SHOCK

This table reports the slope estimates from cross-sectional regressions of the country-year impulse response of composite illiquidity to the orthogonalized federal funds rate shock on country characteristics, equation (4). The dependent variable is the response four weeks after the announcement, $\hat{\beta}_{i,\tau,h=4}$, estimated separately for each country i and year τ from equation (3) with 13 lags, where composite illiquidity is standardized within country and the shock is scaled to a 5-basis-point increase in the federal funds futures surprise MP1. The characteristics are grouped into four channels. Columns (1)–(2) include the funding liquidity proxies, columns (3)–(4) the foreign ownership proxies, columns (5)–(6) the currency factor exposures, columns (7)–(8) the macroeconomic linkage proxies, and columns (9)–(10) all four channels jointly. Within each pair, the first column has no fixed effects and the second adds year fixed effects. Table Appendix Table 1 in the online appendix defines each characteristic. All columns include log GDP per capita, log FDI stock to GDP, and log equity market capitalization as controls; their coefficients are not reported. The rows under *Joint Wald test p-values* report, for each channel included in the column, the p -value of a Wald test that all coefficients of that channel equal zero. Observations are at the country-year level over 2010–2022, excluding 2020, for which the March–December exclusion leaves too few weeks to estimate a response. Continuous characteristics and the dependent variable are winsorized at the 2.5th and 97.5th percentiles. t -statistics in brackets use standard errors clustered by country. One, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable: country-year IRF coefficient $\hat{\beta}_{i,\tau,h=4}$ of composite illiquidity (within-country s.d.) on the orthogonalized FFR shock										
	Funding-liquidity links with U.S.		Foreign ownership structure		FX risk exposure		Macroeconomic links with U.S.		All four channels	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Funding liquidity interconnectedness with U.S.</i>										
USD-pegged FX	-0.674*** [-3.22]	-0.661*** [-2.92]	—	—	—	—	—	—	-0.326 [-0.92]	-0.022 [-0.07]
Standing swap line (SSCB)	+0.168 [0.81]	+0.134 [0.64]	—	—	—	—	—	—	+0.184 [0.94]	-0.262 [-1.31]
log U.S.-bank claims/GDP	-0.452** [-2.47]	-0.491*** [-2.64]	—	—	—	—	—	—	-0.357 [-1.54]	-0.449** [-2.08]
$\rho(\Delta r, \text{U.S. } \Delta r)$	+1.057* [1.81]	+0.993 [1.64]	—	—	—	—	—	—	+1.640*** [3.23]	+2.261*** [4.67]
<i>Ownership structure</i>										
log Foreign equity/Mcap	—	—	+0.315*** [3.28]	+0.444*** [4.32]	—	—	—	—	+0.430*** [3.14]	+0.849*** [5.51]
log(1 + U.S. cross-listings/GDP)	—	—	-0.369* [-1.88]	-0.481** [-2.34]	—	—	—	—	-0.202 [-0.83]	-0.289 [-1.16]
<i>FX risk exposure</i>										
Dollar β	—	—	—	—	+0.301*** [2.88]	+0.378*** [4.10]	—	—	+0.032 [0.16]	+0.136 [0.57]
Carry β	—	—	—	—	-0.223 [-1.25]	-0.528** [-2.01]	—	—	+0.095 [0.39]	-0.430 [-1.26]
<i>Macroeconomic interconnectedness with U.S.</i>										
$\rho(\text{GDP growth, U.S.})$	—	—	—	—	—	—	+0.534 [1.48]	+0.489 [1.36]	-0.552 [-1.21]	-0.714* [-1.95]
Trade balance with U.S./GDP	—	—	—	—	—	—	-0.049* [-1.66]	-0.052* [-1.76]	-0.045* [-1.74]	-0.034 [-1.41]
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	—	✓	—	✓	—	✓	—	✓	—	✓
<i>Joint Wald test p-values</i>										
H_0 : Funding channel coefficients = 0	0.001***	0.002***	—	—	—	—	—	—	0.021**	0.000***
H_0 : Ownership channel coefficients = 0	—	—	0.001***	0.000***	—	—	—	—	0.003***	0.000***
H_0 : FX channel coefficients = 0	—	—	—	—	0.016**	0.000***	—	—	0.816	0.396
H_0 : Macro channel coefficients = 0	—	—	—	—	—	—	0.026**	0.036**	0.072*	0.050*
N	373	373	373	373	373	373	373	373	373	373
R^2	0.046	0.054	0.038	0.067	0.021	0.038	0.022	0.026	0.073	0.126

Table 4: COUNTRY CHARACTERISTICS AND THE LIQUIDITY RESPONSE TO A FEDERAL FUNDS RATE SHOCK ACROSS HORIZONS

This table is the counterpart of column (10) of Table 3, the joint four-channel specification with year fixed effects, estimated at horizons of 0, 2, 4, 6, and 8 weeks after the announcement. The dependent variable in column (k) is the country-year impulse response of within-country standardized composite illiquidity at the horizon shown in the column header, estimated from equation (3) and winsorized at the 2.5th and 97.5th percentiles separately for each horizon. Column (3) reproduces column (10) of Table 3. All columns include the same three controls and year fixed effects; the control coefficients are not reported. The characteristics, sample, shock scaling, joint Wald tests, and standard errors are as in Table 3. One, two, and three stars indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All controls				
	$h = 0$ (1)	$h = 2$ (2)	$h = 4$ (3)	$h = 6$ (4)	$h = 8$ (5)
<i>Funding liquidity interconnectedness with U.S.</i>					
USD-pegged FX	-0.125 [-0.53]	-0.069 [-0.28]	-0.022 [-0.07]	0.164 [0.40]	0.253 [0.61]
Standing swap line (SSCB)	0.202 [0.84]	-0.227 [-0.89]	-0.262 [-1.31]	0.171 [0.81]	0.128 [0.36]
log U.S.-bank claims/GDP	-0.140 [-0.88]	-0.382*** [-2.63]	-0.449** [-2.08]	-0.236 [-1.23]	-0.204 [-0.89]
$\rho(\Delta r, \text{U.S. } \Delta r)$	0.320 [0.77]	1.572*** [3.57]	2.261*** [4.67]	0.935* [1.95]	0.448 [0.95]
<i>Ownership structure</i>					
log Foreign equity/Mcap	-0.245 [-1.36]	0.670*** [5.41]	0.849*** [5.51]	0.959*** [5.72]	0.533** [2.12]
log(1 + U.S. cross-listings/GDP)	0.058 [0.35]	0.234* [1.66]	-0.289 [-1.16]	-0.316 [-1.64]	-0.166 [-0.65]
<i>FX risk exposure</i>					
Dollar β	0.229 [1.32]	-0.032 [-0.19]	0.136 [0.57]	-0.383* [-1.68]	-0.031 [-0.12]
Carry β	-0.236 [-0.81]	0.199 [0.82]	-0.430 [-1.26]	0.599*** [2.73]	0.433 [1.22]
<i>Macroeconomic interconnectedness with U.S.</i>					
$\rho(\text{GDP growth, U.S.})$	-0.519 [-1.23]	-0.599 [-1.27]	-0.714* [-1.95]	-0.733 [-1.47]	-0.508 [-0.82]
Trade balance with U.S./GDP	-0.005 [-0.31]	-0.026 [-1.57]	-0.034 [-1.41]	-0.074*** [-3.02]	-0.001 [-0.05]
Controls	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
<i>Joint Wald test p-values</i>					
H_0 : Funding channel coefficients = 0	0.784	0.001***	0.000***	0.303	0.747
H_0 : Ownership channel coefficients = 0	0.391	0.000***	0.000***	0.000***	0.089*
H_0 : FX channel coefficients = 0	0.412	0.704	0.396	0.024**	0.398
H_0 : Macro channel coefficients = 0	0.463	0.176	0.050*	0.009***	0.712
N	373	373	373	373	373
R^2	0.028	0.074	0.126	0.110	0.051