Monetary Policy and the Short-Rate Disconnect in Emerging Economies*

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Abstract

We document that central banks in emerging economies follow the Taylor rule, lowering policy rates when inflation is below average and during economic slowdowns. However, unlike in advanced economies, short-term market rates in many emerging economies do not always move together with policy rates, both on average and over the business cycle. This short-rate disconnect arises from the importance of external financing conditions for domestic market rates in emerging economies. Emerging economies whose banks rely more on external funding and face high external premiums are more likely to experience this disconnect, which reduces the efficacy of monetary policy.

JEL classification: E43; E50; E52; F30.

Keywords: Monetary Policy, Financial Intermediation, Global Financial Conditions

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1 Introduction

We document that central banks in emerging economies, on average, adopt a countercyclical stance to monetary policy, lowering policy rates when inflation is below average and during economic slowdowns. However, their control over short-term market rates—the primary conduit for monetary policy—is often weaker than intended. Specifically, fluctuations in the international funding costs faced by domestic financial intermediaries open up a wedge between policy rates and market rates. As a result, market rates move less closely with policy rates precisely when external funding conditions are shifting, complicating central banks' ability to steer monetary conditions through this channel.

Our work focuses on countries that do not fix their exchange rates, based on the country-quarter classification of Ilzetzki et al. (2019) covering the period 1990:Q1 to 2018:Q4. Henceforth, when we refer to emerging markets we are referring to the subset whose exchange rates are not fixed.[1] We begin by studying the typical behavior of emerging economies' policy rates vis-à-vis local inflation and economic activity by estimating policy rules à la Taylor (1993, 1999) using quarterly data, both with OLS and IV–GMM. We find that central banks adjust the policy rate procyclically: raising rates with higher inflation and higher real GDP growth (or more positive output gaps). This behavior is similar to that of their counterparts in advanced economies.

We then examine the behavior of short-term market rates—specifically, 3-month local-currency Treasury rates—relative to policy rates. We document that market rates are significantly less tightly linked to policy rates in emerging economies than in advanced economies. Consistent with this, the short-rate wedge—defined as the market rate minus the policy rate—is significantly more volatile in emerging economies. The short-rate wedge is our metric

[1] Note that the majority of emerging economies are managed floats. Following the country-quarter coarse classification of Ilzetzki et al. (2019), we drop fixed exchange rate countries (category 1) and use country-quarter observations with categories 2 to 4. Category 1 is a hard peg; category 2 is crawling peg or a crawling band narrower than or equal to +/- 2%; category 3 is a crawling band that is wider than +/-2% and other managed floats; category 4 is freely floating, and 5 is freely falling.

of disconnect between short-term market rates and policy rates.

Furthemore, we show that this short-rate wedge systematically comoves with macroeconomic conditions. In emerging economies, it is significantly and negatively related to *both* GDP growth and inflation, both contemporaneously and dynamically. Thus, although central banks in emerging economies raise policy rates when GDP growth or inflation is elevated, the offsetting movement in the short-rate wedge dampens the extent to which monetary policy changes are reflected into market rates. In advanced economies, by contrast, the wedge exhibits no systematic relationship with either GDP growth or inflation.

We also examine the response of policy and market rates to a well-identified shock to global financial conditions: a US monetary policy tightening, identified as the monetary policy surprises around FOMC announcements, orthogonalized with respect to the economic and financial variables that predate the announcements as in Bauer and Swanson (2023). We document that the disconnect between policy and market rates in emerging economies is also evident following this shock. After an exogenous US monetary policy tightening, central banks in both emerging and advanced economies lower policy rates by similar magnitudes. However, while market rates in advanced economies closely follow policy rates, market rates in emerging economies rise relative to policy rates. We illustrate this broader disconnect during the 2013 Taper Tantrum, triggered by news of a potentially earlier start to US monetary policy tightening. During this period, most emerging-market central banks lowered policy rates. At the same time, short-term market rates increased across the board relative to policy rates, resulting in a pronounced widening of the short-rate wedge. This was not the case for advanced economies.

Our results establish that the short-rate disconnect and its cyclical behavior are robust features of the average emerging economy. At the same time, there is substantial heterogeneity across countries. We show that this heterogeneity is partly explained by the financial sector's reliance on external dollar funding. Greater reliance on external financing exposes domestic intermediaries to fluctuations in funding costs arising from both exogenous changes in global financial conditions and endogenous changes in external financing premia associated with domestic developments, such as shifts in credit, inflation, or recession risk.

We find that the short-term market rates are less tightly linked to policy rates in emerging economies whose financial intermediary sector has greater external exposure, as measured by intermediaries' external liabilities, and faces larger and more volatile external financing premia, as measured by the EMBI spread.[2] Quantitatively, a 10 percentage point increase in the EMBI spread is associated with a 2 percentage point increase in the short-rate wedge, while a 10 percentage point higher share of external liabilities is associated with a 0.5–1 percentage point higher short-rate wedge.

Lastly, we present a simple model that can qualitatively match these findings. The model places at its center domestic banks that transmit fluctuations in external financial conditions to domestic markets. The domestic banks rely both on domestic local currency deposits and on international markets for dollar funding (in line with the evidence in Baskaya et al., 2017, and Hahm et al., 2013). Fluctuations in dollar funding conditions and banks' exposure to external funding directly impact the marginal funding costs of domestic banks, and, consequently, influence the equilibrium domestic market rates. Foreign investors cannot undo this effect as they face restrictions to accessing local-currency short-term bond markets in these economies. Since domestic banks determine the market rates, monetary policy rates are not perfectly correlated with market rates. The model thus rationalizes the comovements between external conditions and the wedge: when external funding costs rise or the banks' exposure to these costs rises via their external borrowing, the short-rate disconnect wedge increases.[3]

A few clarifications of our findings may be helpful. First, while we find that emerging markets in our sample implement countercyclical monetary policies, on average, not all do

[2] Although the EMBI spread is typically interpreted as the sovereign default risk premium on dollar-denominated government debt, we show that it is also strongly correlated with a measure of banks' dollar funding costs that we compile for a subset of countries and time periods.

[3] For example, in the current environment, the US—as the country imposing tariffs—may face higher inflation and respond by tightening monetary policy. Meanwhile, many emerging markets, confronted with weaker demand for their exports, could experience disinflationary pressures and seek to ease monetary policy. However, they may still experience higher market interest rates as global financial conditions tighten.

and not all the time. Second, the existence of the short-rate disconnect does not necessarily imply that monetary policy transmission, as measured by the impact of an *exogenous* change in monetary policy on short-term rates, is impaired. In the data policy rate changes are overwhelmingly a response to developments in the economy. Our findings are consistent with changes in external funding costs (arising exogenously or endogenously) playing a sizeable role in the business cycles of emerging markets with large external exposures. While policy rates move procyclically, market rates reflect the movements in policy rate partially, owing to the impact of these external funding changes on market rates.

We also clarify that our findings should not be interpreted as implying that monetary policy in emerging economies is suboptimal. Rather, they document that the comovement between policy rates and short-term market rates differs systematically from that in advanced economies. In principle, if the short-rate wedge were exogenous to the policy rate, a central bank could adjust the policy rate to achieve a desired market rate despite fluctuations in the wedge. However, external funding conditions and the short-rate wedge may themselves respond to monetary policy actions, limiting the central bank's ability to attain a given market rate. Moreover, monetary policy operates through multiple channels—including longer-term interest rates, exchange rates, broader financial conditions, and expectations—so the policy rate that achieves a particular short-term market rate need not be optimal along these other dimensions. Therefore, a time-varying short-rate disconnect can create meaningful tradeoffs for monetary policy even if central banks take its behavior into account.

Relation to Literature Our paper builds on previous studies that have examined the transmission of the global financial cycle through local banks' funding conditions (di Giovanni et al., 2022; Fendoglu et al., 2019), changes in global risk perceptions (Miranda-Agrippino and Rey, 2020; Kalemli-Ozcan, 2019; Chari et al., 2021), and global financial intermediaries' net worth (Morelli et al., 2022). This paper is related to the literature that examines the challenges to monetary policy effectiveness in emerging economies. We draw upon the work of Rey (2013) and Miranda-Agrippino and Rey (2020), who document that changes in global risk aversion and US monetary policy significantly affect global leverage and capital flows, in both floaters and peggers, and argue that the global financial cycle may limit the monetary autonomy of countries even with floating exchange rate regimes. Kalemli-Ozcan (2019) shows monetary policy can still be effective in floaters if they have low risk premia, which is endogenous both to monetary and exchange rate policies. Relative to these earlier papers, our research undertakes a systematic evaluation of monetary policy conduct focusing solely on emerging economies who do not fix the exchange rate and demonstrates the link between monetary policy effectiveness and fluctuating external funding conditions transmitted through the domestic banking sector.[4,5]

The literature on monetary and fiscal policy in emerging markets was initiated by the seminal contribution of Kaminsky et al. (2005). Using data from 1960–2003, Kaminsky et al. document strong evidence of procyclical fiscal policy (see also Gavin and Perotti, 1997) and more limited evidence on the cyclicality of monetary policy, defined with respect to GDP growth. Extending the sample through 2009, Vegh and Vuletin (2013) find that policy rates in emerging economies are positively correlated with the cyclical component of real GDP, particularly after 2000. Our findings suggest that fluctuations in the short-rate wedge often attenuate the extent to which this countercyclical policy stance, defined with respect to GDP growth and inflation, is reflected into market rates. In other words, while policy rates in emerging economies may behave countercyclically in the sense of Kaminsky et al. (2005), short-term market rates need not. We therefore emphasize that using short-term market rates as a proxy for the stance of monetary policy can lead to misleading conclusions about the cyclical properties of monetary policy in emerging economies, both before and after 2000. By contrast, this distinction appears to be of little quantitative importance in

[4] A related strand of the literature studies the cross-country co-movement of market interest rates, where floaters' market rates move less than one-to-one with US market rates. A list of papers include Shambaugh (2004); Bluedorn and Bowdler (2010); Miniane and Rogers (2007); Klein and Shambaugh (2015); Obstfeld (2015); Han and Wei (2018).

[5] We note that our definition of short-rate disconnect is different from Lenel et al.'s (2019) notion of "short-rate disconnect," that is the spread between a "shadow" short rate—measured as the short end of a yield-curve model estimated with only medium and long maturity Treasury rates—and the three month T-bill rate.

advanced economies. Finally, we emphasize that the evidence that the monetary policy stance is countercyclical does not imply that monetary authorities in emerging economies are not subject to "fear of floating" (Calvo and Reinhart, 2002).

Our paper also contributes to the existing literature on emerging economies' business cycles and the dynamics of real interest rates, as in Neumeyer and Perri (2005), Uribe and Yue (2006), Aguiar and Gopinath (2007), García-Cicco et al. (2010), Fernández and Gulan (2015), Fernández-Villaverde et al. (2011), Coulibaly (2023), Arellano et al. (2026), and Witheridge (2023). Our paper focuses on a mechanism where local banks' reliance on international markets for funding exposes local short-term funding conditions to global financial fluctuations, with implications for emerging markets' business cycles.

The rest of the paper proceeds as follows. Section 2 studies the behavior of monetary policy rates in emerging economies. Section 3 documents that the monetary policy stance implied by policy rates is not necessarily reflected into short-term market rates, in contrast to advanced economies. Section 4 establishes an empirical link between the short-rate disconnect wedge, domestic banks' external exposure, and the external borrowing premium. Section 5 develops a model that highlights the link between the short-rate disconnect wedge and banks' external funding conditions. Section 6 concludes.

2 What Do Central Banks in Emerging Economies Do?

In this section we document the behavior of monetary policy by examining policy rates around episodes of global distress, and estimating reaction functions à la Taylor (1993, 1999). To characterize the monetary policy stance we use publicly announced policy rates.

Dataset Our sample focuses on countries and periods that are not characterized by fixed exchange rate regimes and excludes episodes of hyperinflation and currency crises. To classify exchange rate regimes, we rely on the historical exchange rate classification of Ilzetzki et al. (2019), which provides a country-quarter measure of exchange rate regimes. We retain observations corresponding to categories 2, 3, and 4 of Ilzetzki et al.'s coarse classification.

Our sample consists of both advanced and emerging economies. Among emerging economies that are sovereign issuers included in JPMorgan's Emerging Market Bond Index (EMBI) Global index, we retain countries with at least four years of data in which policy rates and market rates are jointly available under the selected exchange rate regimes over 1990:Q1–2018:Q4.[6] These selection criteria result in an unbalanced panel. We winsorize observations at the 1% level to ensure that our results are not driven by outliers.

The final sample consists of 18 emerging economies (Armenia, Brazil, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Poland, Romania, Russia, Serbia, South Africa, Tanzania, Thailand, and Turkey) and 13 advanced economies (Australia, Canada, Denmark, Germany, Iceland, Israel, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States).

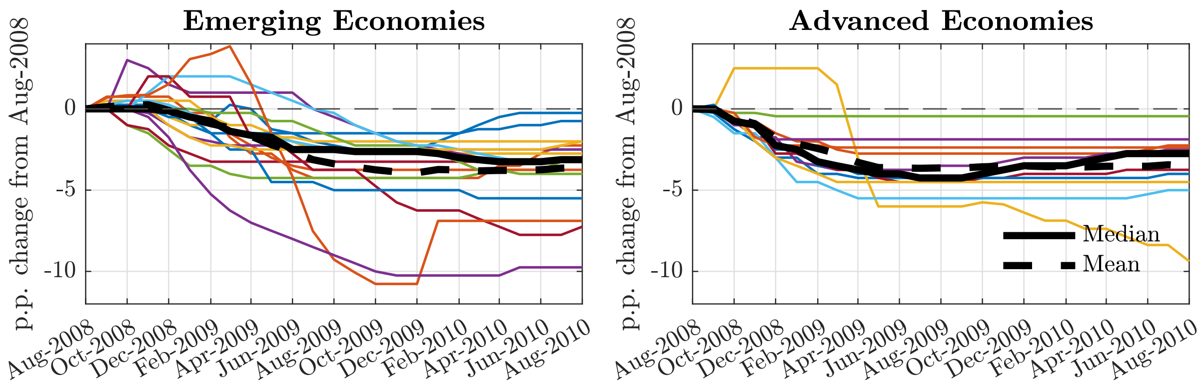
Policy rates, denoted as $i^P_{c,t}$, are defined as "Policy rates are the target interest rates set by central banks in their efforts to influence short-term interest rates as part of their monetary policy strategy." Our preferred source for policy rates is the *Bank for International Settlements (BIS)*. When *BIS* data are unavailable, we supplement the series with data from the *IMF International Financial Statistics* or national sources retrieved from *Bloomberg*. The choice of data source does not materially affect our results.[7] For short-term market interest rates (denoted as $i^M_{c,t}$), we focus on three-month Treasury rates. We obtained these series from the *IMF International Financial Statistics* or from national sources retrieved from *Bloomberg*. Finally, data on CPI inflation, real GDP, and nominal exchange rates are obtained from the *IMF International Financial Statistics* and *Datastream*.

Policy Rates around Episodes of Global Distress It is useful to examine the behavior of policy rates during two noteworthy episodes, the Great Financial Crisis and COVID-19.

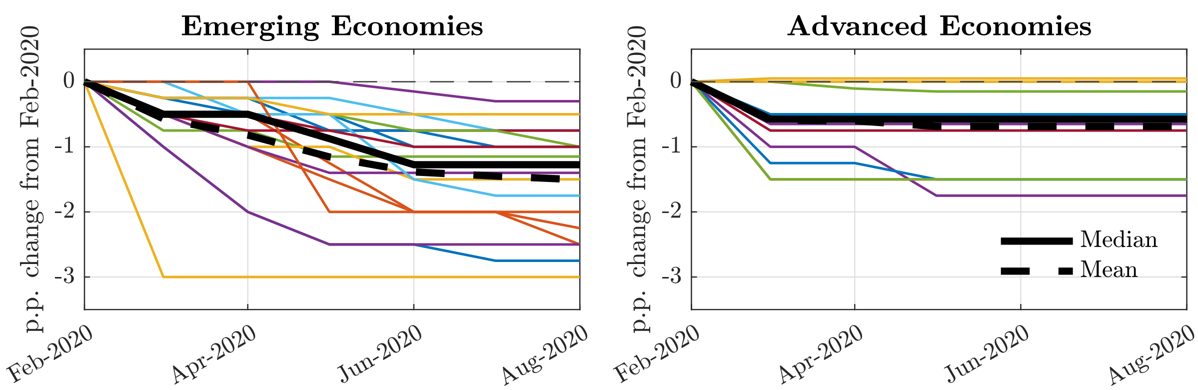
[6] Following JPMorgan's EMBI methodology, a country is eligible for inclusion in the emerging-market sovereign index suite if it satisfies either the Index Income Ceiling (IIC) criterion or the Index PPP Ratio (IPR) criterion, subject to the index's debt-market eligibility requirements. The IIC is based on a country's GNI per capita relative to a threshold that is updated annually using World Bank data (J.P. Morgan Global Index Research, 2023).

[7] For countries and periods where all sources are available, the correlation between *BIS* policy rates and rates from alternative sources is always above 0.96.

Figure 1: Monetary Policy Rates around Episodes of Global Financial Distress



(a) Policy Rates during Global Financial Crisis



(b) Policy Rates during COVID-19

Notes: The figure reports the change in policy rates (in percentage points) in both emerging and advanced economies during the 2008–2009 Global Financial Crisis (Panel (a)) and during the COVID-19 pandemic (Panel (b)). Although the COVID-19 period is not part of the baseline sample, the same sample selection criteria are applied.

It is evident from Figure 1 that both advanced (AEs) and emerging economies (EMEs) lowered their policy rates during these two downturns.[8] This went along with depreciations in emerging economies currencies. That is, despite concerns that weaker currencies can spur inflation or generate disruptive financial conditions, emerging markets cut policy rates.[9]

[8] Focusing largely on the sudden stops occurred around the global financial crisis, Eichengreen and Gupta (2018) find that monetary policy was eased in response to these sudden stops more often than it is tightened (only 8 out of 43 EMs tightened). They rely on IMF reports and market commentary to code changes in monetary policies, following the narrative approach of Romer and Romer (1989) and Alesina et al. (2018).

[9] Several studies document a high exchange rate pass-through into import prices in EMEs (see, for example, Burstein and Gopinath, 2014).

Table 1: Estimated Central Banks' Reaction Function

	Emerging Economies	Advanced Economies
i^P_{t-1}	0.856***	0.912***
	(0.010)	(0.008)
π_t	0.090***	0.103***
	(0.013)	(0.013)
GDP growth$_t$	0.030***	0.084***
	(0.010)	(0.008)
R-Squared	0.92	0.95
No. of Countries	18	13
Country FE	✓	✓

Notes: The table reports panel estimates of equation (1) by OLS. Data are at a quarterly frequency. Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Estimation of Central Banks' Reaction Function To summarize central banks' reaction functions, macroeconomists often use interest rate rules of the type proposed by Taylor (1993, 1999). A standard Taylor rule is

$$i^P_{c,t} = \rho i^P_{c,t-1} + (1-\rho)\left(\phi_\pi \pi_{c,t} + \phi_y \tilde{y}_{c,t}\right) + \varepsilon^P_{c,t},$$

where the central bank adjusts the policy rate in response to inflation (with coefficient ϕ_π) and economic conditions (with coefficient ϕ_y). The specification also allows for interest rate smoothing through the lagged policy rate and for i.i.d. monetary policy shocks, $\varepsilon^P_{c,t}$.

In our baseline specification, we follow Carvalho et al. (2021) and estimate the Taylor rule by ordinary least squares (OLS), while reporting IV–GMM estimates (Clarida et al., 2000) in the Appendix.[10] The estimating equation is

$$i^P_{c,t} = \alpha_c + \beta_1 i^P_{c,t-1} + \beta_2 \pi_{c,t} + \beta_3 \text{GDP growth}_{c,t} + \epsilon_{c,t}. \tag{1}$$

[10] Carvalho et al. (2021) argue that OLS outperforms instrumental variables (IV) in small samples when structural monetary policy shocks explain only a small fraction of the variation in the regressors.

Here, $i^P_{c,t}$ denotes the policy rate, $\pi_{c,t}$ is year-over-year CPI inflation, and GDP growth$_{c,t}$ is year-over-year real GDP growth. The term α_c captures country fixed effects.

Table 1 reports the estimated reaction functions for advanced and emerging economies. The estimated Taylor rule coefficients are fairly similar across the two groups, both qualitatively and quantitatively. In both advanced and emerging economies, central banks raise policy rates significantly in response to higher inflation and stronger GDP growth. Consistent with the existing literature, we also find substantial policy rate smoothing in both groups.[11]

The results in Table 1 are not driven by the use of OLS to estimate the Taylor rule, which suffers from potential endogeneity due to monetary policy shocks. In the Appendix, we estimate a two-step GMM specification with instrumental variables (Clarida et al., 2000). In this specification, real GDP growth is instrumented using four annual lags of itself. The results, presented in Appendix Table A.2, yield coefficient estimates that are broadly similar to those obtained using OLS in Table 1.[12] The estimated policy rate response to inflation and economic activity in emerging economies is in fact larger under the IV–GMM specification. This is consistent with the idea that OLS may suffer from attenuation bias when monetary policy shocks—which raise policy rates and lower inflation and economic activity—are not accounted for.

We verify that the results do not depend on the specific measure of economic slack chosen. While in the baseline we use GDP growth as a proxy for economic slack, in Appendix Table A.3 we rely on output gap estimated by IMF (2020, Chapter 3) for a subset of sample economies. These estimates are qualitatively similar to the baseline ones.

Last, one may argue that the reaction functions of emerging market central banks include the exchange rate as a policy objective alongside, or even instead of, inflation and economic slack, particularly in the presence of "fear of floating" (Calvo and Reinhart, 2002). To address this possibility, we augment the central bank's reaction function with the rate of nominal

[11] The message from our estimated Taylor rule largely aligns with Leibovici (2019) despite differences in countries considered and specifications.

[12] The instruments pass the Kleibergen-Paap rk LM test for under-identification and the Hansen J test for over-identifying restrictions.

Table 2: Unconditional Properties of Policy and Market Rates

	Emerging Economies	Advanced Economies
$\text{corr}(\Delta i^M_{c,t}, \Delta i^P_{c,t})$	0.698	0.880
	[0.668, 0.726]	[0.865, 0.893]
$\text{sd}(i^M_{c,t} - i^P_{c,t})$	0.017	0.004
	[0.016, 0.018]	[0.004, 0.004]
No. of Countries	18	13
Country FE	✓	✓

Notes: The table reports panel estimates of the correlation between changes in market rates and changes in policy rates, as well as the standard deviation of the short-rate wedge, along with their respective 95% confidence intervals. Data are at a quarterly frequency.

exchange rate depreciation (Appendix Table A.4). Although central banks appear reluctant to let exchange rates fluctuate freely—possibly reflecting balance sheet effects associated with US dollar-denominated debt (Céspedes et al., 2004)—the evidence indicates that inflation and GDP growth remain the primary determinants of monetary policy in emerging economies. The coefficients on output and inflation remain stable and significant.

3 Short-Term Market Rates in Emerging Economies

Policy rates are the target interest rates set by central banks to influence short-term interest rates as part of their monetary policy strategy. We therefore examine whether the monetary policy stance implied by policy rates is reflected into short-term market rates. As our measure of short-term market rates, we use 3-month local-currency Treasury rates, which are the yields at which governments issue short-term debt. Although closely related, policy rates and Treasury rates are distinct: Treasury rates are market-determined and therefore provide only an imperfect measure of the monetary policy stance. As we show below, distinguishing between policy rates and short-term market rates is particularly important in emerging economies.

Unconditional Properties of Market Rates vis-á-vis Policy Rates We begin by comparing the unconditional properties of policy and market rates across emerging and advanced economies. Table 2 reports two summary statistics: the correlation between changes in policy rates and changes in market rates, and the standard deviation of the short-rate wedge, defined as the difference between market and policy rates. Both measures are computed after removing countries' fixed effects.

The table shows that market rates comove much less closely with policy rates in emerging economies than in advanced economies. Consistent with this weaker relationship, the short-rate wedge, $i^M_{c,t} - i^P_{c,t}$, is substantially more volatile in emerging economies. Its standard deviation is 1.7 percentage points, compared with only 0.4 percentage points in advanced economies. These unconditional moments indicate that a disconnect between policy and market rates is a distinctive feature of emerging economies.[13,14]

Short-Rate Disconnect and Macroeconomic Conditions The unconditional evidence suggests that, unlike in advanced economies, policy rates and market rates frequently diverge in emerging economies. We now examine whether this short-rate disconnect varies systematically over the business cycle by studying its relationship with real GDP growth and inflation.

Specifically, we estimate local projections relating the short-rate wedge at horizons of up to two years to current real GDP growth and inflation:

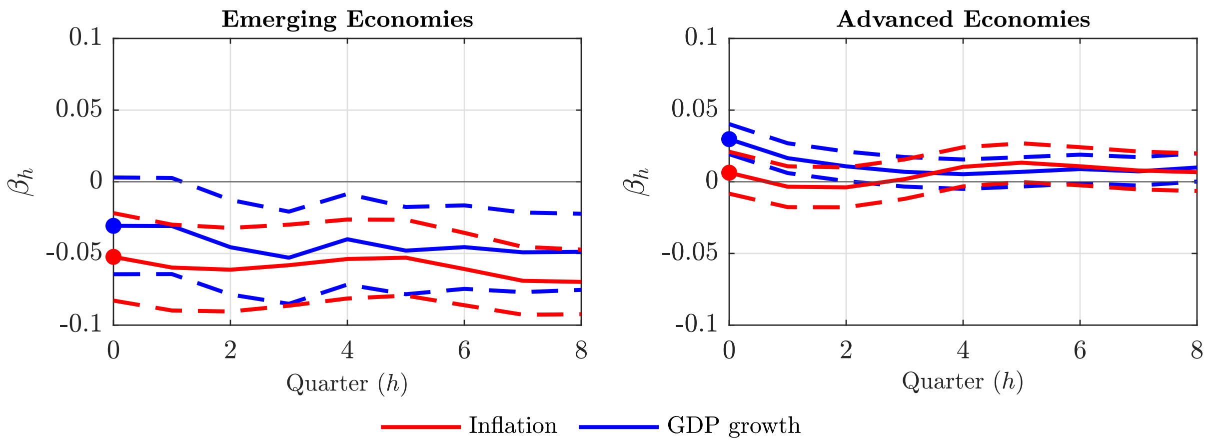
$$i^M_{c,t+h} - i^P_{c,t+h} = \alpha_{c,h} + \beta^{GDP}_h \text{GDP growth}_{c,t} + \beta^{\pi}_h \pi_{c,t} + \epsilon_{c,t+h}, \tag{2}$$

for $h = 0, \ldots, 8$ quarters. As in the Taylor-rule regressions, both GDP growth and inflation are measured as year-over-year changes. The coefficients of interest are β^{GDP}_h and β^{π}_h, which

[13] Fontanier and Simsek (2026) show that market rates are more closely related to policy rates in emerging economies with moderate levels of exchange rate stabilization, relative to both fully floating and heavily pegged regimes.

[14] Using data on borrowing rates from World Bank surveys of households and firms, Anagol and Wang (2026) find that these rates are more closely related to policy rates in high- and middle-income countries than in low-income countries.

Figure 2: The Short-term Disconnect Wedge and Macroeconomic Conditions



Notes: The figure reports the panel estimates of β_h^{GDP} and β_h^{π} in regression equation (2), along with 95% confidence intervals. These regressions feature country fixed effects. Data are at a quarterly frequency.

capture the contemporaneous and dynamic relationship between macroeconomic conditions and the short-rate wedge.

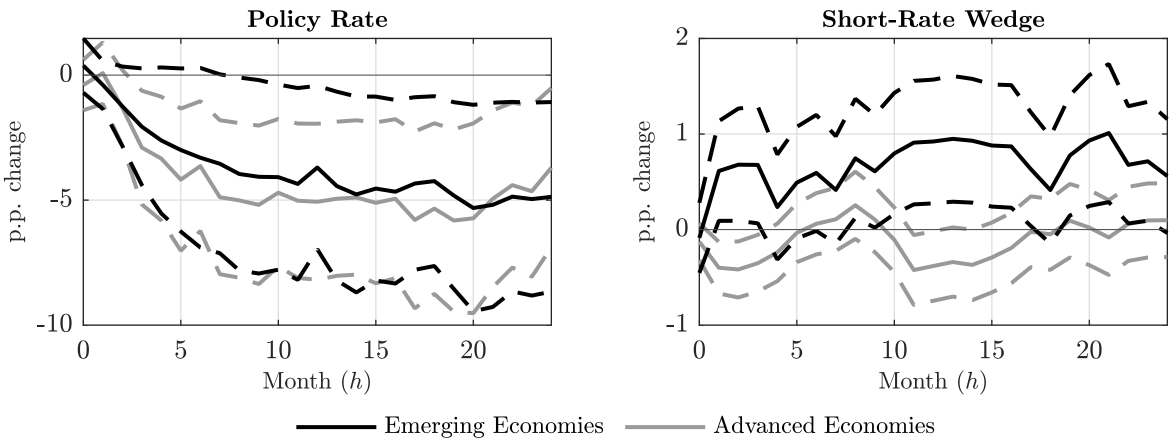
The results are reported in Figure 2. In emerging economies, the short-rate wedge is significantly and negatively related to both GDP growth and inflation, both contemporaneously and over subsequent quarters. The estimated magnitudes are economically meaningful relative to the Taylor-rule coefficients in Table 1. Thus, although central banks raise policy rates when output growth or inflation is high, market rates do not follow suit exactly, which hinders the countercyclical stance of monetary policy. By contrast, in advanced economies the wedge is not systematically related to either GDP growth or inflation.[15]

Our conclusion is that fluctuations in the short-rate wedge often attenuate the countercyclical stance of monetary policy in emerging economies. This implies that the countercyclical stance of monetary policy—construed with respect to output and inflation—is inherently harder to detect using market rates than using policy rates in emerging economies.

US Monetary Policy Tightening and the Short-Rate Disconnect The unconditional behavior of policy and market rates may conceal different properties in response to different

[15] The wedge in advanced economies is mildly *positively* related to GDP growth contemporaneously, implying that, if anything, it slightly reinforces rather than offsets the policy stance with respect to economic activity.

Figure 3: Dynamic Effects of a US Monetary Policy Tightening

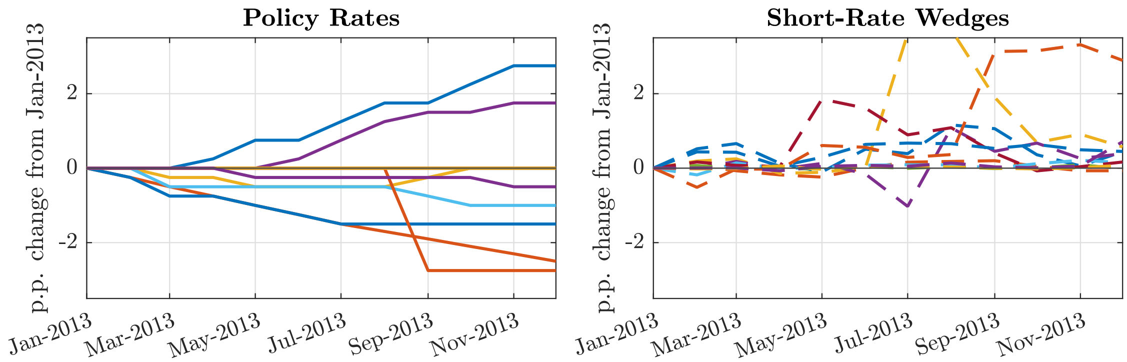


Notes: Impulse responses are obtained from panel local projections. 95% confidence intervals (calculated using Newey and West (1987) standard errors) are shown by the shaded areas. The US policy (12-month US treasury rate) is instrumented by surprises in the first principal component of the changes in first four quarterly Eurodollar futures contracts (ED1–ED4) around FOMC announcements, orthogonalized with respect to the economic and financial variables that predate the announcements as in Bauer and Swanson (2023). Controls include 6 lags of the dependent variable and the instrument. The impulse responses are scaled so that the US policy rate increases by 1 percentage point increase after 12 months. These regressions feature country fixed effects. Data are at a monthly frequency.

shocks. We now study the effects of an identified US monetary policy tightening, which is exogenous and external from the viewpoint of the small open economies in the sample. Economic agents across small open economies pay close attention to the stance of US monetary policy as it affects global demand as well as the cost of international borrowing.

To identify the exogenous component in US monetary policy changes we use an approach that follows from the recent literature on high-frequency identification of monetary policy surprises (Kuttner, 2001; Bernanke and Kuttner, 2005; Gertler and Karadi, 2015; Nakamura and Steinsson, 2018; Bauer and Swanson, 2023). Specifically, we utilize Bauer and Swanson's (2023) estimated surprises in the first principal component of the changes in first four quarterly Eurodollar futures contracts (ED1–ED4), around FOMC announcements, orthogonalized with respect to the economic and financial variables that predate the announcements. To trace out the effects of US monetary policy shocks, we use panel local projections with instrumental variables at monthly frequencies (see Jordà, 2005, and Stock and Watson, 2018). The regression

Figure 4: Policy Rates and Market Rates of Emerging Economies around Taper Tantrum



Notes: The figure reports the p.p. change in policy rates (left panel) and the short-rate wedge (right panel) of emerging economies from January to December 2013.

specification is:

$$y_{c,t+h} = \alpha_c + \beta_h \hat{i}_t^{US} + \gamma_h W_{c,t} + \varepsilon_{c,t+h}; \quad h = 0, 1, 2, 3 \ldots, \tag{3}$$

where, as above, $y_{c,t+h}$ is either the policy rate, $i^P_{c,t+h}$, or the short-rate wedge, $i^M_{c,t+h} - i^P_{c,t+h}$. In regression equation (3), $\hat{i}_t^{US}$ denotes the 12-month US treasury rate instrumented by the orthogonalized monetary policy surprises from Bauer and Swanson (2023) described above. Controls ($W_{c,t}$) include six-month lags of the dependent variable and the instrument.

Figure 3 shows that a US monetary tightening triggers comparable policy rate cuts in emerging and advanced economies.[16] Notably, however, a US monetary policy tightening significantly increases the short-rate disconnect wedge in emerging economies, whereas it remains largely unaffected in advanced economies. In emerging economies, market rates rise well above policy rates, while in advanced economies, market and policy rates move closely together. This evidence is consistent with the notion that US monetary policy shocks induce significant changes in premia, and that these are partly reflected in market rates (Kalemli-Ozcan, 2019).

[16] We emphasize the importance of isolating the local policy rate reaction to external US monetary policy shocks, rather than examining the unconditional correlation between local and US policy rates. This correlation could be influenced by the endogenous response of policy rates to various, potentially correlated shocks.

For the purpose of illustration, we show that a similar disconnect between policy rates and market rates emerged during the 2013 Taper Tantrum—a period of heightened financial market volatility triggered by then-Federal Reserve Chairman Ben Bernanke's suggestion that the Fed might begin tapering its quantitative easing (QE) program earlier than anticipated. The announcement led investors to anticipate rising US interest rates, with significant spillover effects in emerging markets (see, e.g., Chari et al., 2021). Figure 4 illustrates the evolution of policy rates and short-rate wedges in emerging economies beginning in January 2013. While policy rates declined over the course of the year across most countries, market rates generally did not move along with the intended change in the monetary policy stance. In contrast, no comparable disconnect is observed in advanced economies during the same period (Appendix Figure A.1).

As US monetary policy tightening is typically associated with a tightening of global financial and economic conditions (Miranda-Agrippino and Rey, 2020; Kalemli-Ozcan, 2019; Degasperi et al., 2026), it can generate a trade-off for emerging market central banks between lowering rates to lean against a domestic recession and raising rates to prevent disruptive currency depreciations—a form of "fear of floating." We find that policy rates in emerging economies *decline* following U.S. monetary tightening (Figure 3), even as their currencies typically depreciate during these episodes. These findings imply that, even if present, fear of floating does not prevent countercyclical monetary policy, on average, in response to US monetary tightenings.

4 Short-Rate Disconnect and External Factors

We have documented that short-term market rates can meaningfully disconnect from policy rates in emerging economies, resulting in time-varying short-rate wedges. We hypothesize that these fluctuations derive from the reliance of emerging economies on fluctuating external funding conditions. To test this hypothesis, we explore the relationship between short-rate wedges and a country's external funding conditions.

To measure a country's exposure to external funding conditions we use the share of domestic banks' foreign liabilities (portfolio debt + other investment debt) as a fraction of total banks' liabilities (domestic + external) from Avdjiev et al. (2022). We focus on the domestic banking sector's reliance on foreign funding because of the extensive evidence on the key role of local financial intermediaries in short-term treasury and interbank markets, as well as their significant dependence on the global funding market.

Two elements contribute to our choice of the external liability share of the domestic banking sector as a relevant measure of external exposure of a country. First, home financial intermediaries are the key players in the short-term home-currency bond market. Using data from Fang et al. (2025) and Hardy and Zhu (2023), we gather that domestic banks held, on average, around 30% of outstanding local currency government bonds in emerging economies in 2022.[17] The second key element is that home banks borrow a fraction of their liabilities from the global funding market in US dollars. Hahm et al. (2013) show that the share of external liabilities of the domestic banking sector is around 35% on average for the emerging economy reporting to the *BIS*.[18] In Appendix Figure A.2, we show that, despite the rise of non-bank investors, banks continue to play an important role in intermediating foreign capital flows in emerging markets.

To measure a country's external funding premium, we use the EMBI spread—the premium that a country pays on its dollar-denominated government bonds relative to US government bonds. EMBI includes all bonds with a maturity greater than 1 year.[19] The EMBI spread is a widely used measure in the emerging market business cycle literature (e.g. Uribe and Yue,

[17] Overall, Arslanalp and Tsuda (2014) show that domestic investors', including non-banks, holdings of local-currency bonds is around 60%. Besides, Fang et al. (2025) show that around 60% of sovereign debt (all maturities) are held by domestic investors, while Onen et al. (2023) show that this share is around 70% for longer-term sovereign bonds.

[18] di Giovanni et al. (2022) shows that, based on micro administrative regulatory data from Turkey on the universe of banks that underlines the aggregate data reported to *BIS*, this number is 30% for the average bank, where domestic banks international funding share in dollars is 25 percent and foreign banks operating domestically is 35 percent.

[19] Gopinath et al. (2025) showing that the dollar premium for sovereign bonds correlates with US monetary policy shocks and VIX.

Table 3: EMBI Spread and Emerging Economies Banks' Foreign-currency Borrowing Costs

	Dep. var.: EM banks' FC borrowing costs			
	Level spec.		First diff. spec.	
	(1)	(2)	(3)	(4)
EMBI spread	1.019***	1.328***	0.646***	0.550***
	(0.0494)	(0.0475)	(0.0462)	(0.0806)
R-squared	0.422	0.827	0.121	0.302
Observations	1467	1463	1452	1448
Countries	12	12	12	12
Country FE	✓	✓	✓	✓
Month FE		✓		✓

Notes: The table reports panel estimates a regression of emerging economies' banks foreign currency borrowing costs on the EMBI spread. Columns (1)-(2) specify the regression in levels. Columns (3)-(4) specify the regression in first differences. Data are at a monthly frequency. Appendix Table A.6 contains details on emerging economies' banks foreign currency borrowing costs. Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

2006), and it is available for a large number of emerging economies.[20]

Table 3 shows that the EMBI spread is strongly correlated with a measure of foreign-currency borrowing costs for banks in emerging economies, which we construct for a subset of countries and time periods. To build this monthly measure, we compile bond-level data on yields to maturity and amounts outstanding from both *Bloomberg* and *Datastream*, including all available bonds issued in foreign currency by private banks with maturities greater than one year and reliable yield information. Due to data limitations, the sample covers 12 emerging economies and begins in 2005. Appendix Table A.6 summarizes the sample and provides additional details on the data construction.

Next, we study whether the prevalence of the short-rate disconnect varies across countries with different external exposure and external premium. To this end, we separate emerging

[20] Appendix Table A.5 reports the median external premium and external exposure of each emerging economy.

Table 4: External Conditions and the Properties of Market Rates and Policy Rates

Panel A: External Premium

	Low Mean	High Mean	Low SD	High SD
$\text{corr}(\Delta i^M_{c,t}, \Delta i^P_{c,t})$	0.782	0.673	0.750	0.683
	[0.752, 0.809]	[0.620, 0.719]	[0.713, 0.783]	[0.638, 0.724]
$\text{sd}(i^M_{c,t} - i^P_{c,t})$	0.010	0.024	0.011	0.021
	[0.010, 0.011]	[0.023, 0.026]	[0.011, 0.012]	[0.020, 0.023]
No. of Countries	9	9	9	9
Country FE	✓	✓	✓	✓

Panel B: External Exposure

	Low Mean	High Mean	Low SD	High SD
$\text{corr}(\Delta i^M_{c,t}, \Delta i^P_{c,t})$	0.766	0.620	0.737	0.671
	[0.732, 0.795]	[0.565, 0.670]	[0.698, 0.772]	[0.624, 0.712]
$\text{sd}(i^M_{c,t} - i^P_{c,t})$	0.011	0.022	0.012	0.021
	[0.010, 0.012]	[0.021, 0.024]	[0.011, 0.012]	[0.020, 0.022]
No. of Countries	9	9	9	9
Country FE	✓	✓	✓	✓

Notes: The table reports panel estimates of the correlation between changes in market rates and changes in policy rates as well as of the standard deviation of the short-rate wedge, along with their respective 95% confidence intervals. Columns split the sample at the country-level median of EMBI (Panel A) or bank liabilities (Panel B), by mean and by standard deviation.

economies according to the incidence of these external factors and report the unconditional properties of policy and market rates across these sub-groups of emerging economies. Table 4 reveals that the disconnect between policy and market rates is significantly more prevalent across countries with large and volatile external premia (see Panel A), and with large and volatile external exposure (see Panel B). For these countries, changes in market rates are significantly less correlated with policy rate changes, and the short-rate wedges are significantly more volatile.

Table 5: The Influence of External Funding Conditions on the Short-Rate Wedge

	Dependent variable: Short-rate wedge					
External Premium	0.236^{***}		0.197^{***}	0.248^{***}		0.189^{***}
	(0.0261)		(0.0265)	(0.0344)		(0.0347)
External Exposure		0.0738^{***}	0.0596^{***}		0.0805^{***}	0.0696^{***}
		(0.00864)	(0.00874)		(0.00890)	(0.00906)
R-squared	0.242	0.239	0.258	0.307	0.317	0.327
Observations	2187	2187	2187	2187	2187	2187
Countries	18	18	18	18	18	18
Country FE	✓	✓	✓	✓	✓	✓
Month FE				✓	✓	✓

Notes: The table reports panel estimates of equation (4). Data are at a monthly frequency. These regressions feature country fixed effects, or country and time fixed effects. Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

We then explore whether movements in external factors influence the fluctuations in short-rate wedges. Table 5 reports the estimated coefficients of a panel regression of the short-rate wedge on the external funding premium as well as external exposure. The regression is at monthly frequency and includes country fixed effects, or country and month fixed effects. Formally, the regression reads:

$$i^M_{c,t} - i^P_{c,t} = \gamma_c + \gamma_t + \beta_1 \text{External Premium}_{c,t} + \beta_2 \text{External Exposure}_{c,t} + \epsilon_{c,t}. \tag{4}$$

The estimates in Table 5 point to a significant influence of external factors on the local short-rate wedge. Indeed, the difference between the *local* market rate and the *local* policy rate significantly comoves with the external funding premium, a measure that is heavily influenced by *global* financial conditions. A 10 percentage points increase in the EMBI spread is associated, on average, with around 2 percentage points increase in the short-term market rate relative to the policy rate. Thus, fluctuations in a country's external funding premium are reflected into the short-term market rate and thus contribute to its divergence from the policy rate. In addition, Table 5 indicates that the short-rate wedge widens with higher levels of banks' external exposure. Specifically, a 10 percentage points increase in a country's share of external liabilities corresponds to a 0.5–1 percentage points higher short-rate wedge. This relationship is both statistically and economically significant.

Importantly, we find that these estimates remain statistically and economically significant in a specification that includes time fixed effects, indicating that fluctuations in the short-rate wedge likely reflect foreign investors' reactions to country-specific conditions. Moreover, Appendix Figure A.3 shows that these external factors significantly influence fluctuations in the short-rate wedge above and beyond the role of macroeconomic conditions documented in Section 3.

5 A Model of Domestic Financial Intermediation in Emerging Economies

In Section 4 we documented a link between the short-rate wedge and external funding conditions. We now present a simple model that can rationalize these empirical patterns. The model outlines how the balance sheet of the local banking sector can transmit external financial conditions to local market rates. The model hinges on two empirically-relevant features of several emerging economies: (i) the key role of local financial intermediaries in the short-term local-currency bond market; (ii) these intermediaries' significant dependence on the global funding market.

Environment We start from the observation that short-term instruments are predominantly held by intermediaries in the country. We argue that these intermediaries, which we call "home banks," are the marginal investor in the treasury market and hence determine home-currency market rates. This assumption of the model is consistent with the fact that local banks are often designated market makers in treasury bond markets in many emerging economies, and that non-residents are often segmented out of short-term local bond markets of these economies (see institutional features discussed in De Leo et al., 2024).

Home Banks Banks in country c hold short-term market bonds ($B^M_{c,t+1}$) with gross returns in home currency $R^M_{c,t}$. On the liability side, home banks issue deposits to households ($D_{c,t+1}$) at the gross deposit rate $R^P_{c,t}$ in home currency, which coincides with the policy rate, or borrow from foreigners ($D^\star_{c,t+1}$) at the gross dollar interest rate $\hat{R}^\star_{c,t}$, which may differ from the international risk-free interest rate $R^\star_{c,t}$. Banks take borrowing rates as given.

We assume all financial contracts are short term and non-contingent, and that foreign financial contracts are all denominated in foreign currency. Thus, home banks' assets are in home currency but a fraction of their liabilities are in foreign currency. Consistent with the prevailing regulatory regimes in many emerging economies that limit currency mismatches on the balance sheet of financial intermediaries, we assume that home banks completely hedge their foreign-currency liability positions.

The banks' realized profits at $t+1$ are therefore:

$$\Pi^B_{c,t+1} = B^M_{c,t+1} - D_{c,t+1} - F_{c,t} D^\star_{c,t+1}, \tag{5}$$

where $F_{c,t}$ denotes the forward exchange rate, defined as the forward price of US dollars in terms of home currency of country c. Hedging of foreign currency positions implies that the banks' time-$t+1$ foreign-currency debt is converted into home currency at the forward rate $F_{c,t}$. The bank's balance sheet accounting identity reads

$$\frac{B^M_{c,t+1}}{R^M_{c,t}} = \frac{D_{c,t+1}}{R^P_{c,t}} + \frac{S_{c,t} D^\star_{c,t+1}}{\hat{R}^\star_{c,t}},$$

implying that time-t total assets equal time-t total liabilities, expressing the time-t dollar liability position in home currency at the spot exchange rate S_t.

To simplify the analysis, we abstract from modeling the investment and funding decisions of these banks, and assume they have some pre-existing financial positions, which are possibly time-varying. We use $\omega_{c,t}$ to denote the banks' share of external liabilities in total liabilities of country c at time t:

$$\omega_{c,t} = \frac{\frac{S_{c,t}D^{\star}_{c,t+1}}{\hat{R}^{\star}_{c,t}}}{\frac{D_{c,t+1}}{R^{P}_{c,t}} + \frac{S_{c,t}D^{\star}_{c,t+1}}{\hat{R}^{\star}_{c,t}}} = \frac{S_{c,t}D^{\star}_{c,t+1}}{B^{M}_{c,t+1}}\frac{R^{M}_{c,t}}{\hat{R}^{\star}_{c,t}}.$$

Using these definitions, home bank's profits can be written as:

$$\Pi^{B}_{c,t+1} \equiv \left(1-(1-\omega_{c,t})\frac{R^{P}_{c,t}}{R^{M}_{c,t}} - \omega_{c,t}\left(\frac{F_{c,t}}{S_{c,t}}\right)\frac{\hat{R}^{\star}_{c,t}}{R^{M}_{c,t}}\right)B^{M}_{c,t+1}. \tag{6}$$

Perfect competition across banks drives bank profits to zero in each period t, implying the following relationship between local market rates, policy rates and external borrowing rate:

$$R^{M}_{c,t} = (1-\omega_{c,t})R^{P}_{c,t} + \omega_{c,t}\left(\frac{F_{c,t}}{S_{c,t}}\right)\hat{R}^{\star}_{c,t}. \tag{7}$$

The local-currency short-term market rate $R^{M}_{c,t}$ reflects the marginal funding costs of home banks, that is a weighted average of local policy rates and (covered) external funding costs.

In our baseline setting, we assume that covered interest parity (CIP) holds for deposit rates, that is ${}^{F_{c,t}}/_{S_{c,t}}{}^{R^{\star}_{c,t}}/_{R^{P}_{c,t}} = 1$, consistent with forwards being supplied by an unconstrained intermediary that arbitrages across deposit markets (see Appendix B.1).[21] We note that while CIP holds for deposit rates, it does not hold for market rates, as our market segmentation assumptions imply that neither home nor global intermediaries can arbitrage away CIP deviations across home and foreign short-term bond market (see Appendix B.3). Thus, CIP in market rates fails and deviations comove with the external premium.[22]

CIP for deposit rates implies that equation (7) can be rewritten as:

[21] Should CIP not hold for deposit rates, CIP deviations in deposit rates would impact the funding costs of domestic banks and contribute to fluctuations in the local market rate as in Keller (2024) (see Appendix B.4).
[22] For evidence on CIP deviations in market rates in emerging economies see Kalemli-Ozcan and Varela (2021) and De Leo et al. (2024).

$$\frac{R^M_{c,t}}{R^P_{c,t}} - 1 = \omega_{c,t}\left(\frac{\hat{R}^\star_{c,t}}{R^\star_{c,t}} - 1\right). \tag{8}$$

An immediate implication of equation (8) is that the short-rate wedge of country c is time-varying and linked to external funding conditions. In particular, to a first-order approximation, the short-rate wedge is:

$$i^M_{c,t} - i^P_{c,t} \approx \omega_c\left(\hat{i}^\star_{c,t} - i^\star_t\right) + \left(\hat{i}^\star_c - i^\star\right)\omega_{c,t}. \tag{9}$$

where $i^M_{c,t} - i^P_{c,t} \approx {R^M_{c,t}}/{R^P_{c,t}} - 1$ and $\hat{i}^\star_{c,t} - i^\star_t \approx {\hat{R}^\star_{c,t}}/{R^\star_t} - 1$.[23] Model equation (9) can be mapped to regression equation (4). The short-rate wedge comoves with the external funding premium as long as the foreign liability share is positive ($\omega_c > 0$). A higher external premium increases the costs of funding of local banks and, in turn, they pass them to market rates in proportion to banks' external exposure, resulting in a higher short-rate wedge.[24] In addition, the short-rate wedge increases with banks' external exposure, as measured by the share of external borrowing relative to total borrowing, as long as the average external funding premium is positive ($\hat{i}^\star_c - i^\star > 0$, the empirically relevant case). This model can thus explain why country-time specific movements in external conditions are reflected in their local short-rate wedge, as documented in Table 5. It is also in line with the micro evidence on the transmission of the global financial cycle through local banks' funding conditions (di Giovanni et al., 2022; Fendoglu et al., 2019).[25]

A related implication of equation (9) is that short-term rates only partially reflect monetary policy changes. Using equation (9), we derive the share of market rate fluctuations due to

[23] We assume that the exogenous processes of $i^P_{c,t}$, $\hat{i}^\star_{c,t} - i^\star_t$, and $\omega_{c,t}$ are independent of each other. See Appendix B.2 for derivations.

[24] Bianchi and Lorenzoni (2022) propose a model in which time-varying external premium—due to changes in risk appetite of global intermediaries—is a primary source of economic fluctuations in emerging economies.

[25] See Fontanier (2023) for a general-equilibrium model that also gives rise to the short-rate disconnect.

local policy rate movements:

$$\frac{\mathrm{var}(i^P_{c,t})}{\mathrm{var}(i^M_{c,t})} = \frac{1}{1 + \left[\omega_c^2 \frac{\sigma^2_{\hat{i}^\star_c}}{\sigma^2_P} + \left(\hat{i}^\star_c - i^\star\right)^2 \frac{\sigma^2_{\omega_c}}{\sigma^2_P}\right]}, \tag{10}$$

where we assume that the exogenous processes of $i^P_{c,t}$, $\hat{i}^\star_{c,t} - i^\star_t$, and $\omega_{c,t}$ are independent of each other, and use $\sigma_{i^P_c}$, $\sigma_{\hat{i}^\star_c}$, and σ_{ω_c} to denote their respective standard deviations. In this model, fluctuations in the short-term market rate not only depend on domestic monetary policy, but also on factors that are outside of the control of local central banks. As long as local banks rely, at least in part, on external funding, i.e., $\omega_c > 0$, fluctuations in external financing premia or external exposure of the domestic banking sector also result in fluctuations in local market rates. This model can thus explain why countries with large and volatile external exposure or external financing premia tend to experience larger departures of market rates from their policy rates, as documented in Table 4.

We note that our partial-equilibrium model does not pin down expected changes in the exchange rate and, thus, equilibrium deviations from uncovered interest parity (UIP). It therefore abstracts from the question of who holds currency risk and how that risk is priced. From the perspective of this simple model, however, because domestic financial intermediaries completely hedge their currency mismatch, UIP deviations do not directly affect the market-policy rate disconnect. If intermediaries were instead not fully hedged or hedging were imperfect, UIP deviations could also affect domestic short-term market rates and broader financing conditions, as in the evidence presented in di Giovanni et al. (2022).

Discussion Our model is intentionally simple to illustrate a potential relationship between external funding and local market rates, while also highlighting possible challenges to the effectiveness of monetary policy. A key simplification is the assumption that external exposure and funding premia are exogenous. However, these external factors can, in reality, be correlated with domestic or external shocks, including changes in domestic and foreign monetary policy. A more detailed analysis that incorporates the underlying determinants of these external factors, as well as other forces constraining domestic monetary policy, could shed light on possible tradeoffs for monetary policy even if central banks take the short-rate wedge behavior into account.

6 Conclusions

Understanding how central banks manage monetary policy in emerging economies is critical given the complex and dynamic trade-offs they face.[26] Our study reveals that the effectiveness of monetary policy in many emerging economies is often impaired, as evidenced by the disconnect between policy rates and short-term market rates. Even though central banks respond to economic recessions by cutting policy rates—a countercyclical monetary policy stance—their stimulus is reflected into short-term market rates—the rates relevant for consumption and investment decisions—only imperfectly.

This disconnect is not uniform across all emerging markets, nor is it constant over time. We find that a portion of this heterogeneity depends on countries' domestic financial intermediaries' exposure to dollar funding and the cost associated with it. The short-rate disconnect wedge is markedly more volatile in emerging economies whose domestic financial intermediary sector has a large external exposure, as measured by intermediaries' external liabilities, and experiences a large and volatile external financing premia, as measured by the premium on its government dollar borrowing.

A policy implication of our research is that domestic financial intermediation matters for the determination of short-term market rates. Specifically, high external exposure of intermediaries combined with high spreads can lead to substantial deviations between market and policy rates. The comovement between market rates and policy rates can therefore be enhanced either through macroprudential policies that limit external exposure when external funding premia are high and/or through sound macro management policies that help reduce

[26] See, for example, Obstfeld (2015); Gourinchas (2018); Akinci and Queralto (2023); Kalemli-Ozcan (2019); Egorov and Mukhin (2023); Basu et al. (2025); Auclert et al. (2021); Itskhoki and Mukhin (2023); Fontanier and Simsek (2026).

the level of the external funding premia.

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Appendix for
"Monetary Policy and the Short-Rate Disconnect in Emerging Economies"

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A Additional Tables and Figures

Table A.1: Dataset

Country	Policy Rate	Market Rate	Inflation	GDP Growth	External Premium	External Exposure
A. Emerging Economies						
Armenia	1999q4 to 2014q4	2010q4 to 2014q4	1995q4 to 2014q4	2000q4 to 2014q4	2013q4 to 2014q4	2013q1 to 2014q4
Brazil	1994q3 to 1998q4; 1999q3 to 2018q4	1995q1 to 1998q4; 1999q3 to 2018q4	1994q3 to 1998q4; 1999q3 to 2018q4	1996q1 to 1998q4; 1999q3 to 2017q3	2003q2 to 2018q4	2003q1 to 2018q4
Egypt	2006q1 to 2018q4	2006q1 to 2018q4	1991q1 to 1991q3; 2001q1 to 2018q4	2003q1 to 2013q4	2003q2 to 2018q4	2006q1 to 2018q4
Hungary	1990q1 to 2018q4	1995q1 to 2018q4	1991q1 to 2018q4	1996q1 to 2018q3	2003q2 to 2018q4	2003q1 to 2018q3
India	1990q1 to 1991q2; 1995q3 to 2018q4	1998q1 to 2018q4	1991q1 to 1991q2; 1995q3 to 2018q4	2006q1 to 2017q4	2012q4 to 2018q4	2012q2 to 2018q4
Indonesia	2005q3 to 2018q4	2012q3 to 2018q4	1991q1 to 1997q2; 1999q2 to 2018q4	1999q2 to 2018q3	2004q2 to 2018q4	2003q1 to 2018q4
Korea	1999q2 to 2018q4	1999q2 to 2018q4	1991q1 to 1997q3; 1998q3 to 2018q4	1991q1 to 1997q3; 1998q3 to 2018q3	2003q2 to 2004q1	2003q1 to 2018q4

Country	Policy Rate	Market Rate	Inflation	GDP Growth	External Premium	External Exposure
Malaysia	1995q4 to 1998q3; 2005q3 to 2018q4	1995q1 to 1998q3; 2005q3 to 2018q4	1991q1 to 1998q3; 2005q3 to 2018q4	1991q1 to 1998q3; 2005q3 to 2017q1	2005q3 to 2018q4	2005q3 to 2018q4
Mexico	1998q4 to 2018q4	1996q2 to 2018q4	1991q1 to 1992q1; 1994q1 to 1994q4; 1996q2 to 2018q4	1991q1 to 1992q1; 1994q1 to 1994q4; 1996q2 to 2018q1	2003q2 to 2018q4	2003q1 to 2018q4
Philippines	1991q1 to 1995q2; 1998q1 to 2018q4	1995q1 to 1995q2; 1998q1 to 2018q4	1991q1 to 1995q2; 1998q1 to 2018q4	1991q1 to 1995q2; 1998q1 to 2018q2	1993q4 to 1995q2; 2003q2 to 2018q4	2001q4 to 2018q4
Poland	1995q2 to 2018q4	1995q2 to 2018q4	1995q2 to 2018q4	1996q1 to 2018q3	2003q2 to 2018q4	2003q1 to 2018q4
Romania	2003q1 to 2018q4	2001q2 to 2018q4	2001q2 to 2018q4	2001q2 to 2018q3	2012q1 to 2018q4	2003q1 to 2018q4
Russia	1999q4 to 2014q3; 2016q1 to 2018q4	2010q1 to 2014q3; 2016q1 to 2018q4	1999q4 to 2014q3; 2016q1 to 2018q4	1999q4 to 2014q3; 2016q1 to 2018q1	2003q2 to 2014q3; 2016q1 to 2018q4	2003q1 to 2014q3; 2016q1 to 2018q4
Serbia	2003q1 to 2014q4	2003q2 to 2014q4	2003q1 to 2014q4	2003q1 to 2014q4	2005q2 to 2014q4	2004q1 to 2014q4
South Africa	1995q1 to 2018q4	1995q1 to 2018q4	1995q1 to 2018q4	1995q1 to 2016q4	2003q2 to 2018q4	2003q1 to 2018q4
Tanzania	2000q1 to 2018q4	1995q1 to 2018q4	1991q1 to 1991q2; 1993q3 to 2018q4	2002q1 to 2013q3	2013q2 to 2018q4	2001q4 to 2018q4
Thailand	2000q2 to 2018q4	1999q4 to 2018q4	1998q1 to 2018q4	1998q1 to 2018q2	2003q2 to 2006q1	2003q1 to 2018q4

Country	Policy Rate	Market Rate	Inflation	GDP Growth	External Premium	External Exposure
Turkey	2003q2 to 2018q2	1998q4 to 2000q4; 2003q2 to 2013q3; 2014q4 to 2018q2	1998q1 to 2000q4; 2003q2 to 2018q2	1998q1 to 2000q4; 2003q2 to 2018q2	2003q2 to 2018q2	2003q2 to 2018q2
B. Advanced Economies						
Australia	1990q1 to 2018q4	2006q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q1		
Canada	1990q1 to 2018q4	1995q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2017q4		
Denmark	1990q1 to 1998q4	1994q1 to 1998q4	1991q1 to 1998q4	1996q1 to 1998q4		
Germany	1990q1 to 1998q4	1995q1 to 1998q4	1991q1 to 1998q4	1992q1 to 1998q4		
Iceland	1998q1 to 2018q4	1998q1 to 2018q4	1991q1 to 2018q4	1998q1 to 2018q3		
Israel	1993q3 to 2018q4	1995q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q2		
Japan	1990q1 to 2018q4	1995q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q2		
New Zealand	1990q1 to 2018q4	1994q3 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q2		
Norway	1990q1 to 2018q4	1995q2 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q3		
Sweden	1990q1 to 2018q4	1995q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q3		

Country	Policy Rate	Market Rate	Inflation	GDP Growth	External Premium	External Exposure
Switzerland	1990q1 to 2011q2; 2015q1 to 2018q4	1990q1 to 2011q2; 2015q1 to 2018q4	1991q1 to 2011q2; 2015q1 to 2018q4	1991q1 to 2011q2; 2015q1 to 2018q3		
United Kingdom	1990q1 to 2018q4	1990q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q3		
United States	1990q1 to 2018q4	1990q1 to 2018q4	1991q1 to 2018q4	1991q1 to 2018q3		

Table A.2: Estimated Central Banks' Reaction Function (IV–GMM)

	Emerging Economies	Advanced Economies
i^P_{t-1}	0.877***	0.935***
	(0.019)	(0.019)
π_t	0.100***	0.091***
	(0.019)	(0.023)
GDP growth$_t$	0.051***	0.099***
	(0.013)	(0.017)
No. of Countries	18	13
R-Squared	0.92	0.94
KP rk LM test (p-value)	0.00	0.00
Hansen J-Test (p-value)	0.35	0.27
Country FE	✓	✓

Notes: We estimate a two-step GMM regression with instrumental variables and country-fixed effects of eq. (1). GDP growth is instrumented using four annual lags of itself. The Kleibergen-Paap rk LM statistic tests for underidentification by assessing whether the instrumental variables are sufficiently correlated with the endogenous regressors (The null hypothesis of the Kleibergen-Paap rk LM test is that the model is underidentified). The Hansen J-statistic is an overidentification test that evaluates whether the instruments are valid, meaning they are uncorrelated with the regression error term (The null hypothesis of the Hansen J-Test is that all instruments are valid). Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A.3: Estimated Central Banks' Reaction Function (with Output Gap)

	Emerging Economies	Advanced Economies
i^P_{t-1}	0.849***	0.932***
	(0.009)	(0.008)
π_t	0.110***	0.047***
	(0.012)	(0.012)
Output gap$_t$	0.075***	0.062***
	(0.015)	(0.009)
R-Squared	0.94	0.95
No. of Countries	15	13
Country FE	✓	✓

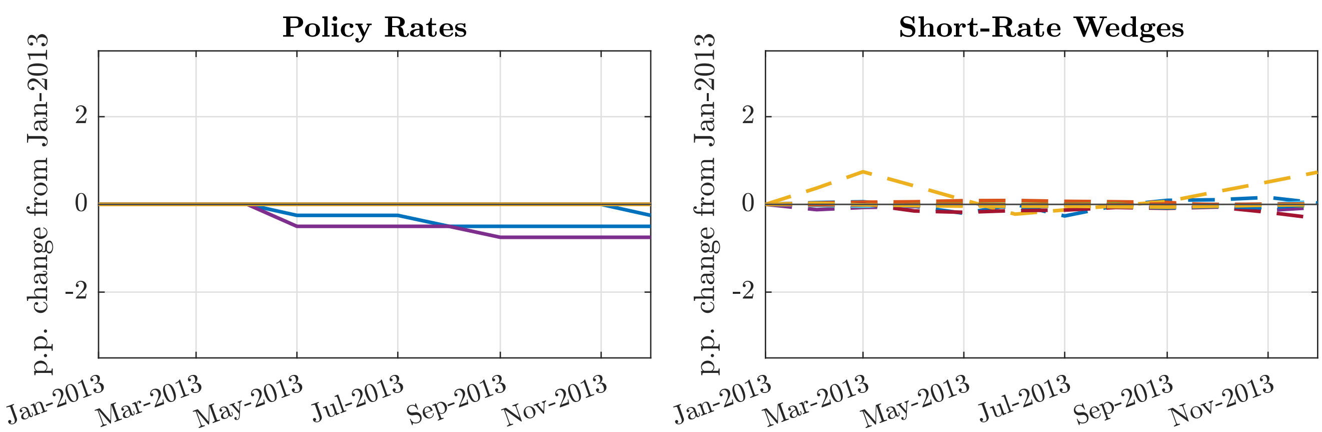
Notes: The table reports panel estimates of equation (1) by OLS. To construct quarterly output gap we apply spline interpolation to annual output gap data from IMF (2020, Chapter 3). Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Table A.4: Estimated Central Banks' Reaction Function (with Exchange Rate Depreciation)

	Emerging Economies	Advanced Economies
i^P_{t-1}	0.856***	0.912***
	(0.010)	(0.008)
π_t	0.085***	0.110***
	(0.013)	(0.013)
GDP growth$_t$	0.042***	0.077***
	(0.011)	(0.008)
FX growth$_t$	0.009***	−0.008***
	(0.003)	(0.002)
R-Squared	0.93	0.95
No. of Countries	18	13
Country FE	✓	✓

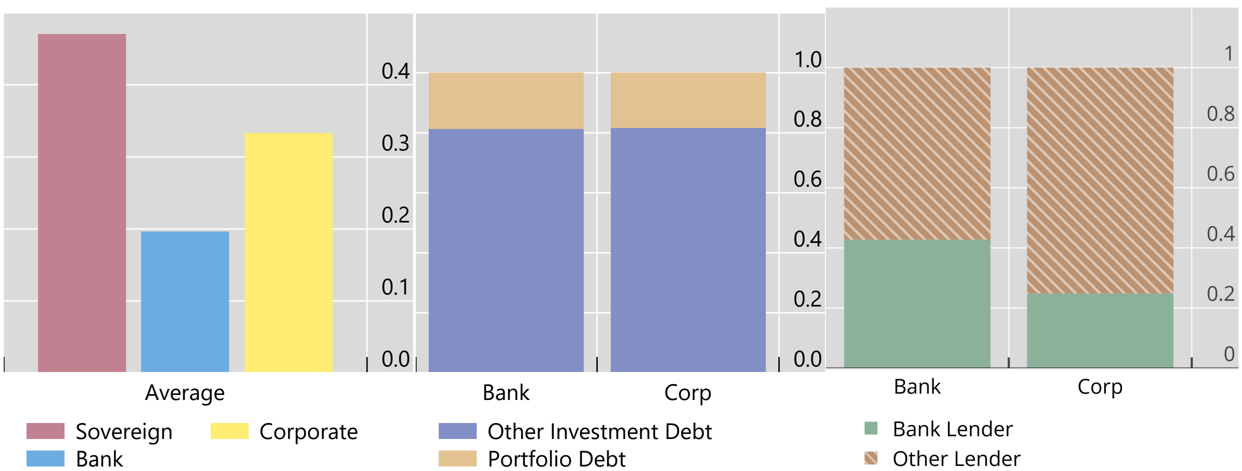
Notes: The table reports panel estimates of a Taylor Rule regression by OLS, where FX growth$_t$ is the year-over-year rate of country-c currency depreciation relative to the US dollar. Standard errors are reported in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$).

Figure A.1: Policy Rates and Market Rates of Advanced Economies around Taper Tantrum



Notes: The figure reports the p.p. change in policy rates (left panel) and the short-rate wedge (right panel) of advanced economies from January to December 2013.

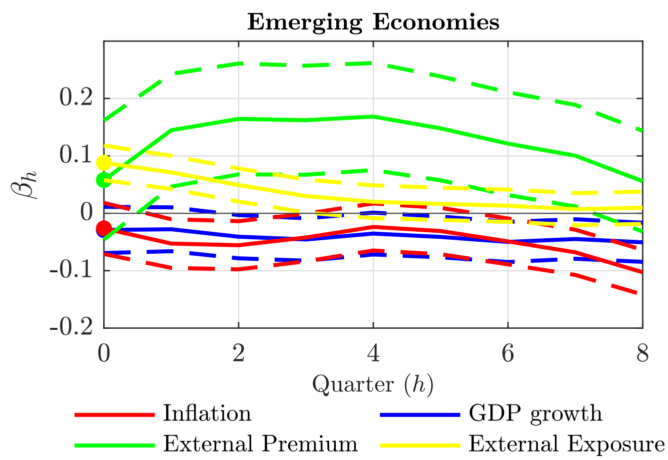
Figure A.2: Facts about the External Debt of Emerging Economies as of 2022



(a) Share of External Debt **(b)** Shares of Instruments **(c)** Shares of Bond Investors

Notes: The source of the data for these figures is Avdjiev et al. (2022). See also Fang et al. (2025), Hardy and Zhu (2023), and Arslanalp and Tsuda (2014). The data are stocks in 2022:Q4 for 34 emerging economies.
Panel (a) shows that most of the foreign capital is borrowed by the sovereign of the country, followed by corporates and then banks. Historically, banks and corporates had equal shares, and banks had even higher shares if one includes the 1980s and 1990s (Avdjiev et al., 2022). Here, we plot the latest year available to show that banks are still important intermediaries notwithstanding changing patterns in global liquidity where non-bank lenders acquire an increasingly important role and domestic corporates issue more international bonds as EMs increasingly join corporate bond indices.
Panel (b) zooms into the blue (bank) and yellow (corporate) bars in panel (a) and documents that when these borrowers borrow, they mainly borrow using loans (purple) and less so using bonds (brown).
Panel (c) zooms into that brown bond part of panel (b) and reports the type of investor for the "Portfolio debt" in panel (b). Even though a large part of the portfolio flows come from non-bank lenders (brown-white stripes), as also documented by the literature (e.g., Avdjiev et al., 2020), a non-negligible part shown in green in panel (c) comes from global banks. Global banks are also the lenders accounting for the "Other Investment Debt", i.e., loans, section in panel (b).

Figure A.3: Short-Rate Wedge, Macroeconomic and External Financial Conditions



Notes: The figure reports the panel estimates of β_h's in an extended version of regression equation (2) that includes our measures of external premium and external exposure, along with 95% confidence intervals. These regressions feature country fixed effects. Data are at a quarterly frequency.

Table A.5: Emerging Economies' Median External Premium and Exposure

Country	External Premium (%)	External Exposure (%)
Armenia	3.25	33.44
Brazil	2.39	7.35
Egypt	3.12	1.27
Hungary	1.65	27.10
India	1.52	7.19
Indonesia	2.30	6.35
Korea	0.46	8.70
Malaysia	1.27	8.75
Mexico	1.87	7.10
Philippines	1.77	8.20
Poland	0.84	15.06
Romania	1.91	22.38
Russia	2.07	15.78
Serbia	3.49	28.48
South Africa	1.89	7.56
Tanzania	3.39	11.13
Thailand	0.21	4.87
Turkey	2.64	15.74
Median	1.90	8.72

Notes: The table reports the median values for external period and external exposure over the relevant sample period for each country.

Table A.6: Emerging Economies Banks' Borrowing Costs (Foreign Currency)

Country	Sample	Average borrowing costs (fgn. curr, %)	Banks covered (avg. per month)	Bonds covered (avg. per month)	USD bn covered
Brazil	2005m11–2018m12	6.79	4 (1.8)	9 (2.6)	3.3
Hungary	2005m08–2018m12	6.11	5 (3.4)	17 (6.0)	5.2
India	2005m04–2018m12	5.48	6 (3.9)	21 (7.1)	6.7
Indonesia	2005m09–2018m03	5.11	3 (1.5)	6 (1.7)	1.3
Malaysia	2005m08–2018m12	4.59	6 (3.0)	19 (4.8)	6.9
Mexico	2005m04–2018m12	5.77	5 (2.9)	12 (4.8)	8.7
Philippines	2006m06–2018m12	5.08	6 (2.1)	14 (3.6)	4.3
Poland	2011m02–2018m12	1.91	3 (2.1)	9 (3.0)	4.4
Romania	2006m08–2013m11	4.28	1 (1.0)	3 (1.5)	0.5
Russia	2005m09–2018m12	6.83	13 (6.9)	47 (13.1)	28.5
South Africa	2007m07–2016m12	4.21	3 (1.7)	3 (1.7)	0.9
Turkey	2007m02–2018m07	6.16	10 (5.3)	30 (11.3)	17.0

Notes: We construct a measure of emerging economies banks' foreign currency borrowing costs by compiling bond-level data on yields-to-maturity and amounts outstanding from *Bloomberg* and *Datastream*, covering the period since 2005. For each country, we include the maximum number of USD-denominated bonds available with reliable yield information. Due to data limitations, we restrict the sample for Hungary, Poland, and Romania to Euro-denominated bonds only. To construct borrowing costs for each country, we compute a weighted average of the yields-to-maturity across all available bonds, using amounts outstanding as weights. We exclude bonds issued by central banks and fully state-owned banks, to focus on private sector borrowing costs. We also drop bonds with less than one year remaining to maturity, as data tends to become noisy and unreliable. The final sample thus captures long-term foreign currency borrowing costs for private banks across a range of emerging markets.

B Derivations and Extensions of Model of Section 5

B.1 Forward market and the market for dollar funding

In this section we elaborate on the key assumptions about the structure of the partial equilibrium model of Section 5.

Forward Market First, home banks demand forward to hedge their foreign-currency liabilities. Their forward demand is inelastic, given the baseline assumption that foreign-currency liability shares are exogenous. Second, we assume that there is an unconstrained intermediary supplying forward, while arbitraging across deposit and forward/spot markets. Thus, this arbitrage enforces CIP to hold across deposit rates. That is:

$$\frac{F_{c,t}}{S_{c,t}}\frac{R^{\star}_{c,t}}{R^{P}_{c,t}} = 1 \tag{B.1}$$

Market for Dollar Funding First, home banks demand foreign-currency (dollar) funding at rate $\hat{R}^{\star}_{c,t}$. The demand for dollar funding is inelastic, given the baseline assumption that foreign-currency liability shares are exogenous. Second, we assume that there is a global investor borrowing at dollar deposit rate $R^{\star}_{t}$ and lending to emerging economies' banks at dollar rate $\hat{R}^{\star}_{c,t}$. We assume that the global investor, when supplying dollar funding to emerging economies, applies a time-varying premium so that $\frac{\hat{R}^{\star}_{c,t}}{R^{\star}_{t}} > 1$ and time varying.[27] The wedge between $\hat{R}^{\star}_{c,t}$ and $R^{\star}_{t}$ is a reduced-form object that can reflect, for example, a credit premium.

B.2 Market Rates and Short-Rate Wedge in Baseline Model

We first use the CIP condition $\frac{F_{c,t}}{S_{c,t}}\frac{R^{\star}_{c,t}}{R^{P}_{c,t}} = 1$ in the equation for the equilibrium market rate, eq. (7):

$$i^{M}_{c,t} - i^{P}_{c,t} = \omega_{c,t}\left(\hat{i}^{\star}_{c,t} - i^{\star}_{t}\right) \tag{B.2}$$

[27] Equivalently $\hat{i}^{\star}_{c,t} - i^{\star}_{t} > 0$ and time varying.

where $i^M_{c,t} - i^P_{c,t} \approx {}^{R^M_{c,t}}/_{R^P_{c,t}} - 1$ and $\hat{i}^\star_{c,t} - i^\star_t \approx {}^{\hat{R}^\star_{c,t}}/_{R^\star_{c,t}} - 1$. Then, we take the first-order approximation of equation (B.2):

$$i^M_{c,t} \approx i^P_{c,t} + \left[\left(\hat{i}^\star_c - i^\star \right) \omega_{c,t} + \omega_c \left(\hat{i}^\star_{c,t} - i^\star_t \right) \right] \tag{B.3}$$

The first-order approximation of the short-rate wedge, equation (9) in Section 5, is obtained by rearranging (B.3).

Then, assuming that the exogenous processes of $i^P_{c,t}$, $\hat{i}^\star_{c,t} - i^\star_t$, and $\omega_{c,t}$ are independent of each other and using $\sigma_{i^P_c}$, $\sigma_{\hat{i}^\star_c}$, and σ_{ω_c} to denote their respective standard deviations, the share of variance of the policy rate in the overall variance of the market rate is:

$$\frac{\mathrm{var}(i^P_{c,t})}{\mathrm{var}(i^M_{c,t})} = \frac{1}{1 + \left[\omega_c^2 \frac{\sigma^2_{\hat{i}^\star_c}}{\sigma^2_P} + \left(\hat{i}^\star_c - i^\star \right)^2 \frac{\sigma^2_{\omega_c}}{\sigma^2_P} \right]}$$

This is equation (10) in Section 5.

B.3 CIP Deviations in Market Rates

While covered interest parity (CIP) holds for deposit rates, we show that CIP fails for market rates in the baseline model.

Using CIP in deposit rates (B.1) into the equilibrium home market rate (8) we obtain:

$$\frac{F_{c,t}}{S_{c,t}} \frac{R^\star_t}{R^M_{c,t}} = \frac{1}{1 + \omega \left(\frac{\hat{R}^\star_{c,t}}{R^\star_t} - 1 \right)}. \tag{B.4}$$

Equation (B.4) implies that CIP in market rates fails and deviations are related to external borrowing rates. CIP deviations in market rates emerge in our model with segmented market for the following reasons. First, only home banks can access the home bond market (and thus determine R^M). This assumption is consistent with the observation that, in many emerging economies, local banks have an advantage in accessing the cash market relative to foreign investors (Keller, 2024; De Leo et al., 2024). Second, home banks cannot borrow at the international deposit rate ($R^\star_t$) but only their country-specific external borrowing rate ($\hat{R}^\star_{c,t} > R^\star_t$). Third, home banks borrow a fraction of their liabilities externally ($\omega_{c,t} > 0$). These assumptions imply that there neither home nor global intermediaries can arbitrage CIP deviations across home and foreign short-term bond market.

B.4 Extended Model with CIP Deviations in Deposit Rates

In the baseline model, we assume that there is an unconstrained intermediary supplying forward, while arbitraging across deposit and forward/spot markets, and thus enforcing CIP to hold across deposit rates (Appendix B.1). Suppose, instead, that the intermediary supply forwards is constrained (e.g. by regulation) and does not arbitrage away CIP deviations in deposit markets. Using the log approximation, define CIP deviations in deposit rates, using ξ_t, as:

$$\xi_{c,t} = i^\star_t - (i^P_{c,t} - (f_{c,t} - s_{c,t}))$$

where $s_{c,t}$ and $f_{c,t}$ are the spot and forward exchange rates—defined as home-currency per US dollar. A negative CIP deviation implies that synthetic dollar borrowing $i^P_{c,t} - (f_{c,t} - s_{c,t})$ is more expensive than cash dollar borrowing $i^\star_t$.

Under these circumstances, the short-rate wedge, to a first order, becomes:

$$i^M_{c,t} - i^P_{c,t} = \omega_{c,t}\left(\xi_{c,t} + \hat{i}^\star_{c,t} - i^\star_t\right). \tag{B.5}$$

Relative to the baseline equation (B.2), equation (B.5) implies that the short-rate wedge would comove with CIP deviations. Deviations from CIP would impact the funding costs of domestic banks, leading to fluctuations in the required return on the domestic market bond. A negative CIP deviation lowers the cost of covered dollar borrowing (the relevant cost for the bank) and thus lowers the market rate, relative to the policy rate.

In a previous version of this paper, we empirically confirmed that the short-rate wedge exhibits a correlation with the CIP deviations for a subset of emerging economies of Table 5 for which we could construct reliable CIP deviations. This finding aligns with recent evidence from Keller (2024) suggesting that banks in Peru engage in arbitrage when faced with CIP deviations.