

Kamin, Steven; Vakil, Aatman

**Working Paper**

## Why emerging markets weathered federal reserve tightening so well

AEI Economics Working Paper Series, No. 2025-05

**Provided in Cooperation with:**

American Enterprise Institute (AEI), Washington, DC

*Suggested Citation:* Kamin, Steven; Vakil, Aatman (2025) : Why emerging markets weathered federal reserve tightening so well, AEI Economics Working Paper Series, No. 2025-05, American Enterprise Institute (AEI), Washington, DC

This Version is available at:

<https://hdl.handle.net/10419/324803>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



# Why Emerging Markets Weathered Federal Reserve Tightening So Well

Steven B. Kamin

*American Enterprise Institute*

Aatman Vakil

*American Enterprise Institute*

AEI Economics Working Paper 2025-05

May 2025

# Why Emerging Markets Weathered Fed Tightening So Well

Steven Kamin and Aatman Vakil<sup>1</sup>

May 29, 2025

## Abstract

The steep rise in US interest rates that started in 2022 led many observers to anticipate severe difficulties for emerging market economies (EMEs). Unlike after the Volcker disinflation of the early 1980s or the bond market turmoil of 1994, however, most EMEs weathered the Fed’s monetary tightening in 2022-23 relatively well. In particular, EME dollar credit spreads, an indicator of potential financial distress, rose only moderately in those years before dropping to historically low levels in 2024. To explain these developments, we estimate monthly regressions of EME spreads over the period 2006-2024 on measures of US monetary policy as well as US financial conditions: the VIX volatility index, the foreign exchange value of the dollar, and US corporate high-yield spreads. Following Hoek et al. (2022) and Arteta et al. (2022), we find that “monetary shocks”—increases in US Treasury yields prompted by concerns about rising inflation or hawkish Fed behavior—boost EME spreads, as expected. However, those monetary shocks account for almost none of the variation in spreads in the 1½ decades leading up to the COVID-19 pandemic and contribute only moderately to the rise in spreads in 2022-23. Thus, one reason that the EMEs weathered Fed tightening so well is that, simply put, Fed tightening is no longer as injurious to them as commonly believed; this likely reflects improvements in EME policies since the 1980s and 1990s that have bolstered their resilience. A second reason why EME spreads remained relatively contained in the face of rising interest rates is that US corporate credit markets remained buoyant, and their confidence spilled over to EMEs. We show that US high-yield spreads accounted for the lion’s share of the fluctuations in EME spreads over the past couple of decades, dominating not only the effects of monetary shocks but also changes in the VIX and the dollar.

---

<sup>1</sup> We are grateful to Jasper Hoek and Emre Yoldas for very helpful discussions and advice.

## I. Introduction

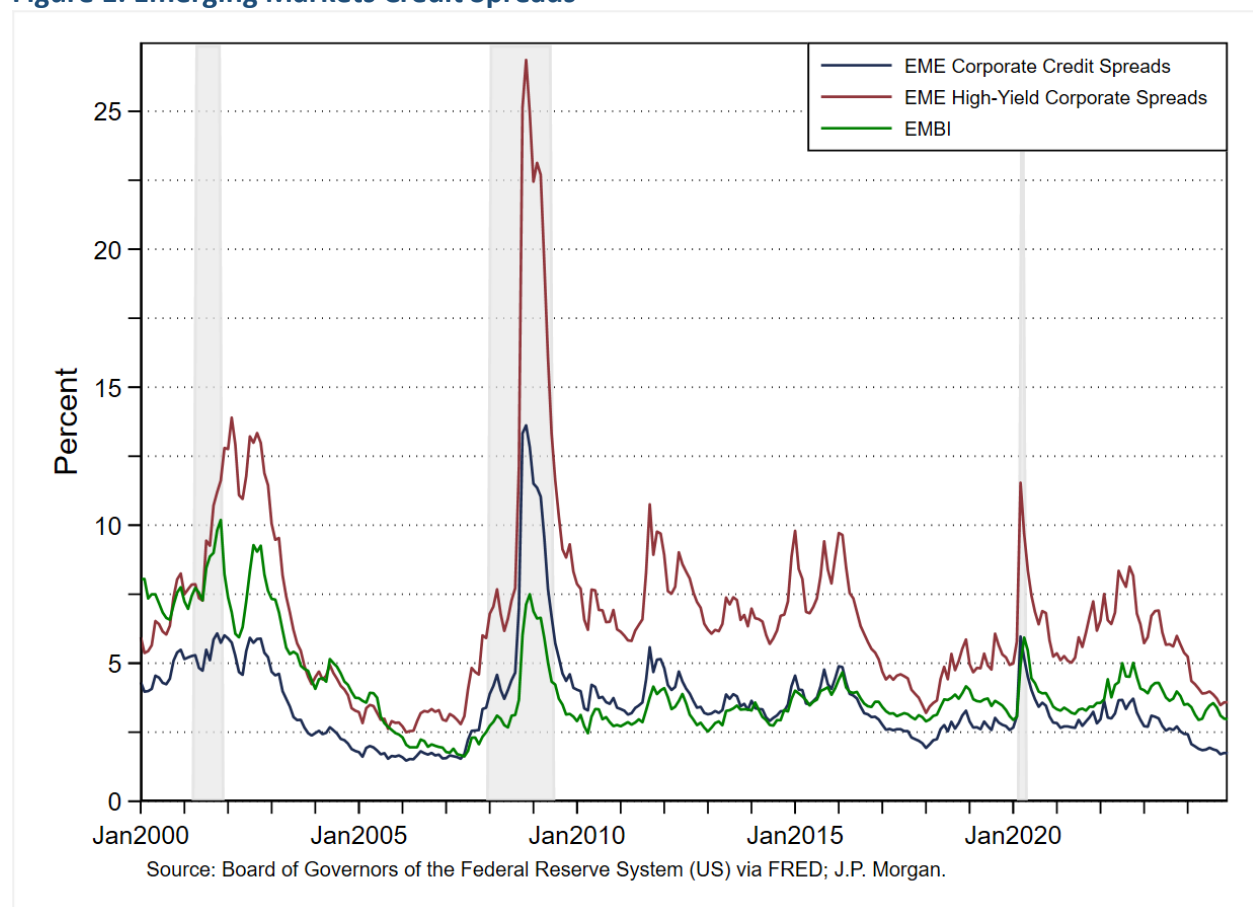
The steep rise in US interest rates that started in 2022 led many observers to anticipate severe difficulties for emerging market economies (EMEs). After all, the tightening of monetary policy by the Federal Reserve had triggered the debt crisis of the early 1980s, the Mexican “Tequila crisis” of 1994-95, and the “taper tantrum” of 2013. These experiences fueled the emergence of a conventional wisdom, held by academics and EME policymakers alike, that “spillovers” of Fed policy posed exceptional challenges to the financial stability of emerging market economies -- indeed, Fed policy was the key driver of a “global financial cycle” (Rey 2013).

In the event, however, the rise in US interest rates in response to the post-pandemic surge in inflation proved less challenging for EMEs than was generally anticipated. To be sure, many so-called “frontier” economies, who had gained access to global capital markets more recently and accumulated debt too quickly, were cut off from external credit, and several of them—including Sri Lanka, Ghana, and Zambia—were forced to default. And economies throughout the developing world posted disappointingly slow recoveries from the 2020 pandemic recession. But even so, the more traditional and well-established EMEs managed to avoid the “sudden stops” of capital flows, financial turbulence, and default that had accompanied earlier EME crises. As Kalemli-Özcan and Unsal (2024) noted: “Contrary to historical episodes, the 2022–2023 tightening of US monetary policy has not yet triggered financial crisis in emerging markets.”

The financial resilience of the EMEs can be seen most readily in Figure 1 below. The figure plots credit spreads for three different groups: EME sovereign bond issuers (EMBI), EME

corporate bond issuers, and EME high-yield corporate bond issuers. Credit spreads, the difference between the dollar bond yields paid by the issuer and US Treasury yields, are a measure of investors' judgement of the likelihood that the issuer will default—they are a key barometer of the issuer's access to international capital markets. Spreads for all three issuer groups soared during the global financial crisis (GFC) of 2008-09 and then again during the pandemic panic of early 2020. Later in 2020, they receded but rose again in 2022, coincident with Fed tightening and Russia's invasion of Ukraine. But the spreads generally remained below levels reached during earlier stress periods for EMEs. Moreover, since 2023, those spreads fell back to relatively low levels, even as US interest rates remained very high.

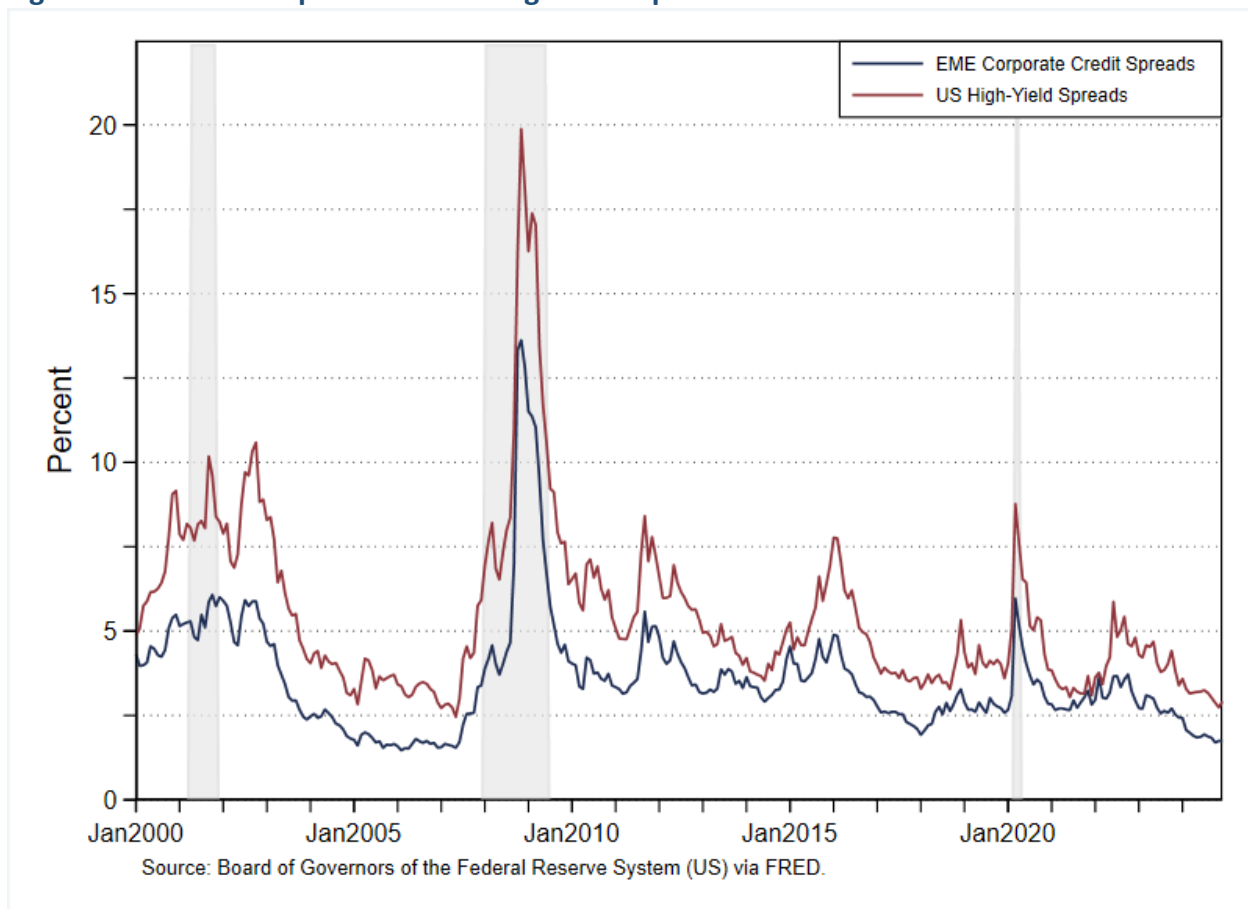
**Figure 1. Emerging Markets Credit Spreads**



What accounts for the surprising financial resilience of EMEs during the past several years? In this paper, we put forward two complementary explanations. The first is that the tone of US corporate credit markets has remained buoyant in the face of rising interest rates. Credit markets are globally integrated, and the confidence and optimism of US investors in domestic credit markets systematically spills over to foreign markets, including in EMEs. This is apparent in Figure 2 below, which shows the very tight correlation between US high-yield corporate spreads and EME spreads. In fact, in econometric results described below, we show that US high-yield corporate spreads are the most important determinants of emerging markets spreads – they explain more of the variation in EME spreads than US Treasury yields, the value of the dollar, or a measure of general investor uncertainty and risk aversion, the VIX. It is surprising that this linkage has not received more attention by researchers and policymakers.

Figure 2 also shows how both spreads have declined to historically low levels since 2023 despite US interest rates that remained quite elevated, especially at longer maturities. Put simply, the buoyancy of US credit markets and the risk-loving attitude of global investors has buoyed emerging markets as well, alleviating financial stresses that might have weighed on EMEs as the Fed tightened policy. We cut off the analysis at the end of 2024 in order to abstract from the effects of President Trump's trade policies, which likely will require additional analysis.

**Figure 2. EME Credit Spreads and US High Yield Spreads**



The second reason why the EMEs have weathered the storm of recent Fed tightening as well as they have is that, put simply, Fed tightening is not as injurious as commonly believed, and it hasn't been so for the past couple of decades. Note that in Figure 2 above, the sharpest increases in EME spreads were prompted by the global financial crisis (2008-2009) and the COVID-19 panic of 2020, neither of which were triggered by Fed tightening. Conversely, the Fed's tightening in 2003-2005, the "taper tantrum" in 2013, and the normalization of interest rates in 2017-18 did almost nothing to move the needle on EME spreads. As we will show below, Fed tightening in response to concerns about inflation—the key motive for tightening in 2022-2023—does lead to higher EME spreads. However, such episodes have been infrequent

in the past couple of decades, and when they have occurred, their effect on EME spreads has generally been small. So although Fed tightening may have triggered the debt crisis of the 1980s and the Mexican Tequila crisis in 1995, both better EME fundamentals and more measured Fed policies likely have substantially reduced the disruptive effects of US monetary tightening.

To support these arguments, we estimate monthly regressions of EME spreads—the aggregate measures shown in Figure 1 above—over the period 2006–2024 on measures of US monetary policy as well as measures of US financial conditions: the VIX volatility index, the foreign exchange value of the dollar, and the US high-yield spread shown in Figure 2. Following Hoek et al. (2022) and Arteta et al. (2022), we distinguish between “monetary shocks” and “growth shocks”. Monetary shocks are increases in US Treasury yields prompted by concerns about rising inflation, and are identified by accompanying declines in US stock prices; growth shocks are increases in US yields prompted by buoyant economic growth, and are identified by accompanying increases in stock prices. We focus on monetary shocks, as these were the shocks that drove the rise in US interest rates in 2022-2023. We find that these boost EME corporate spreads, as expected, as do increases in the VIX, the dollar, and, especially, US high-yield spreads.<sup>2</sup>

We then use our estimated equations to decompose the path of EME spreads into the contributions of the various determinants noted above. We find that US monetary shocks accounted for relatively little of the variations in EME spreads during most of the sample

---

<sup>2</sup> Despite the fact that the EMBI index of sovereign spreads is well correlated with the EME corporate spread measures, it is not estimated to rise in response to positive US monetary shocks. It is unclear why, and we leave this for future analysis.



period, and only had a noticeable effect during the recent 2022-23 cycle. Conversely, US high-yield spreads were the most important drivers for EME spreads during the sample period. They accounted for most of the surge in EME spreads during the global financial crisis and COVID-19 panic, they added to the moderate rise in spreads during the 2022-23 tightening cycle, and they accounted for most of the big decline in spreads in 2024.

Our models, estimated over 2006-2024, correctly predict or even under-predict the rise in EME spreads during the 2022-23 monetary tightening period, both using in-sample and out-of-sample simulations. This suggests that whatever factors in place to bolster EME resilience in the face of Fed tightening were probably already in place for much of the sample period. In their Brookings Paper on this topic, Kalemli-Özcan and Unsal (2024) argue that improvements over the past couple of decades in EME monetary policy credibility, along with their reduced dependence on foreign-currency debt, helped them weather the tightening of Fed policy. Those reforms undoubtedly were helpful. However, the evidence from our models suggests that EMEs likely were benefitting from improvements in fiscal, monetary, and exchange rate policies that had already occurred by the 2000s.

Section II below places our research in the context of the broader literature on US monetary policy and EME spreads. Section III describes the econometric model we develop, while in Section IV, the model is used to explain the evolution of EME spreads over time, especially during the Fed's 2022-23 tightening cycle. Section V addresses the structural stability of the model coefficients, and Section VI concludes.

## **II. The Contribution of our Research to the Literature**

There is a vast and growing literature on the spillovers of US monetary policy to EMEs, including their impacts on the full range of EME financial variables (e.g., exchange rates, dollar credit spreads, local-currency bond yields, stock prices) and macroeconomic indicators (GDP growth, inflation, trade balance, capital flows, etc.). We will not review that literature here, but good summaries may be found in Kalemli-Özcan and Unsal (2024) and Arteta et al. (2022).

Research on the effects of US monetary policy on EME credit spreads has evolved in parallel with this broader literature. Eichengreen and Mody (1998) and Kamin and von Kleist (1999) estimate regressions of EME new-issue sovereign bond spreads on measures of advanced-economy Treasury yields, finding mixed results regarding whether higher advanced-economy yields raise or lower EME spreads. Ferrucci (2003) and Bellas et al. (2010) estimate panel regressions for the separate EMBI bond spreads of different EMEs; they, too, find mixed evidence on the effect of US yields on EME spreads.

The adoption of event-study approaches to this issue has led to clearer identification of the effects of US interest rates, probably because fewer extraneous developments come in the way of the relationship between US rates and EME spreads. Gilchrist et al. (2019), Hoek et al. (2022), IMF (2021) and Engler et al. (2023) all focus on changes in US Treasury yields from before to after Fed monetary policy announcements; all except for IMF(2021) find a positive and statistically significant effect on changes in EME sovereign dollar bond spreads.

Finally, several recent studies have gauged the effect of US monetary policy on EME spreads, distinguishing between monetary and growth shocks as discussed in the introduction. Hoek et al. (2022) and Engler et al. (2023) use the FOMC event-study approach described above

and distinguish monetary and growth shocks by the direction of accompanying stock price changes; they find that monetary shocks significantly boost EME spreads while growth shocks exert little effect. Conversely, using a structural VAR to identify growth and monetary shocks and panel local projection models to estimate the effects of these shocks on EMEs, Arteta et al. (2015, 2022) find that growth shocks significantly lower EME spreads while monetary shocks either raise them or have little effect.

Our research builds on this earlier work by also distinguishing between monetary and growth shocks, using the direction of accompanying movements in stock prices for identification. A key practical contribution of our research is to use our model to decompose movements in EME spreads in order to identify the drivers of those spreads during key episodes, including the global financial crisis (2009-2009), the COVID-19 panic of 2020, and the Fed tightening episode of 2022-2023. This exercise produces a significant finding: Contrary to conventional wisdom, US monetary policies have been a relatively unimportant driver of EME spreads during the past couple of decades. Despite the plethora of research on US monetary policy spillovers to EMEs, very few papers have made this point—one likely explanation for this is that most researchers have stopped at estimating the direction and size of the impact of Fed policies on EMEs, and they have not gone on to use their models to assess the contribution of Fed policies to the evolution of EME outcomes. An exception is an unpublished working paper by Rogers et al. (2025), which estimates a structural VAR model of the global financial cycle, a measure of the tone of global financial markets. Consistent with our own results for EME spreads, they find that monetary shocks lead to tighter financial markets, but they account for only a small share of variations in global markets.

A second and related contribution of our research is to highlight the importance of US corporate credit spreads as a prominent driver of EME spreads, and one that is more important than US monetary shocks. The role of US credit markets in influencing EMEs has only recently received attention from researchers. Gilchrest et al. (2021) and Obstfeld and Zhou (2022) both use local projection analysis to find that increases in the excess bond premium (EBP) measure developed by Gilchrest and Zakrajšek (2012), essentially a function of US corporate bond spreads, significantly raise sovereign bond spreads. Caballero and Upper (2023) identify US high yield spreads as one of relatively few variables whose increase significantly boosts the probability of substantial financial pressures in EMEs. Kalemli-Özcan and Unsal (2024) show that increases in the EBP lead to higher inflation and lower capital inflows in EMEs. Rogers et al. (2025) find that EBPs account for the greatest share of the variation in the tone of global financial markets. None of these studies trace the historical contribution of US corporate spreads to the evolution of EME spreads over time.

### III. An Econometric Model of US Spillovers to EM Spreads

In this section, we characterize the main channels through which changes in US financial conditions spill over to emerging market spreads. We consider both changes in US interest rates and changes in other aspects of US financial conditions, including implied volatility in equity markets as gauged by the VIX, the foreign exchange value of the dollar, and the US corporate high-yield spreads discussed above.

#### III.1. Monetary and Growth Shocks

Table 1 below presents the main estimation results. The dependent variable is the monthly change in EME corporate spreads. In the top panel, the measure of US interest rates is the 2-year US Treasury yield, a gauge of expected monetary policy over the medium term. The bottom panel uses the 10-year US Treasury yield, which reflects both the expected path of short-term interest rates controlled by the Federal Reserve as well as a term premium to compensate investors for volatility and risks. Appendix Tables 1a and 1b present analogous estimation results for the index of EME high-yield corporate spreads and the EMBI index of sovereign spreads. The equations are estimated on monthly data from January 2006 through December 2024.<sup>3</sup>

Starting with column (1) in both panels, the coefficient on the US yield is negative and statistically significantly different from zero. This is the opposite sign that we would expect. Rising interest rates and tightening US monetary policy are often a response to rising expectations of inflation or, perhaps, a shift in the Fed's monetary strategy toward a more

---

<sup>3</sup> The start date for the estimation is based on the start date for the Federal Reserve series on the value of the dollar against advanced-economy currencies.

hawkish stance. Such a monetary tightening should lead to greater financial pressures on EMEs and rising EME spreads. Not only do higher interest rates boost the cost to EMEs of servicing dollar debt, but they also reduce US economic growth and thus imports from EMEs, boost the value of the dollar (which raises the local-currency value of dollar debt), and depress investor sentiment. In previous research, my colleagues and I labelled such movements “monetary shocks” (Hoek, Kamin, and Yoldas, 2022; Arteta, Kamin, and Ruch, 2022).

However, monetary shocks are not the only events driving US interest rates upwards. Rising US interest rates may also reflect improving prospects for US economic growth, and such instances would likely be associated with greater imports from EMEs and greater investor confidence. These positive developments could outweigh the negative effects of US higher interest rates on EMEs, leading to EME credit spreads to decline, rather than rise, on such occasions. In our previous research, my colleagues and I labeled these events as “growth shocks.”

**Table 1: Regressions of EME Corporate Spreads on US Treasury Yields***Panel A: Based on 2-Year Yields*

|  | EME Corporate Spreads, Monthly Changes |                                  |                                  |                                  |                                  |                                  |                                   |
|--|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
|  | (1)<br>OLS<br>2006m1-<br>2024m12       | (2)<br>OLS<br>2006m1-<br>2024m12 | (3)<br>OLS<br>2006m1-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m2-<br>2024m12 | (7)<br>TSLS<br>2006m2-<br>2024m12 |
| US 2-year Treasury Yield, monthly change | -0.86***<br>(0.28)                     |                                  |                                  |                                  |                                  |                                  |                                   |
| Growth Shocks (US 2yr Yield)             |  | -1.53***<br>(0.45)               |                                  |                                  |                                  |                                  |                                   |
| Monetary Shocks (US 2yr Yield)           |  | 0.13<br>(0.14)                   | 0.13<br>(0.14)                   | -0.57**<br>(0.24)                | -0.95***<br>(0.34)               | -0.48***<br>(0.18)               | 0.13<br>(0.10)                    |
| VIX, monthly change                      |  |                                  |                                  | 0.07***<br>(0.02)                | 0.05***<br>(0.01)                | 0.01<br>(0.01)                   | 0.01<br>(0.01)                    |
| US Dollar Index, monthly percent change  |  |                                  |                                  |                                  | 0.10**<br>(0.04)                 | 0.04*<br>(0.02)                  | 0.04*<br>(0.02)                   |
| US High Yield Spreads, monthly change    |  |                                  |                                  |                                  |                                  | 0.57***<br>(0.13)                | 0.57***<br>(0.13)                 |
| Intercept                                | -0.00<br>(0.04)                        | 0.01<br>(0.04)                   | 0.00<br>(0.04)                   | -0.01<br>(0.03)                  | -0.02<br>(0.03)                  | -0.01<br>(0.02)                  | 0.00<br>(0.02)                    |
| Observations                             | 228                                    | 228                              | 228                              | 228                              | 227                              | 227                              | 227                               |
| R-squared                                | 0.11                                   | 0.20                             | 0.00                             | 0.32                             | 0.40                             | 0.73                             | 0.73                              |

Robust standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

*Panel B: Based on 10-Year Yields*

|   | EME Corporate Spreads, Monthly Changes |                                  |                                  |                                  |                                  |                                  |                                   |
|---|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
|   | (1)<br>OLS<br>2006m1-<br>2024m12       | (2)<br>OLS<br>2006m1-<br>2024m12 | (3)<br>OLS<br>2006m1-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m2-<br>2024m12 | (7)<br>TSLS<br>2006m2-<br>2024m12 |
| US 10-year Treasury Yield, monthly change | -0.52***<br>(0.16)                     |                                  |                                  |                                  |                                  |                                  |                                   |
| Growth Shocks (US 10yr Yield)             |  | -1.09***<br>(0.21)               |                                  |                                  |                                  |                                  |                                   |
| Monetary Shocks (US 10yr Yield)           |  | 0.25<br>(0.26)                   | 0.24<br>(0.25)                   | -0.61***<br>(0.22)               | -0.92***<br>(0.28)               | -0.47***<br>(0.13)               | 0.24**<br>(0.12)                  |
| VIX, monthly change                       |  |                                  |                                  | 0.07***<br>(0.02)                | 0.06***<br>(0.01)                | 0.01<br>(0.01)                   | 0.01<br>(0.01)                    |
| US Dollar Index, monthly percent change   |  |                                  |                                  |                                  | 0.10**<br>(0.04)                 | 0.04**<br>(0.02)                 | 0.04**<br>(0.02)                  |
| US High Yield Spreads, monthly change     |  |                                  |                                  |                                  |                                  | 0.57***<br>(0.14)                | 0.57***<br>(0.14)                 |
| Intercept                                 | 0.00<br>(0.04)                         | 0.01<br>(0.04)                   | 0.00<br>(0.04)                   | -0.01<br>(0.03)                  | -0.02<br>(0.03)                  | -0.01<br>(0.02)                  | 0.00<br>(0.02)                    |
| Observations                              | 228                                    | 228                              | 228                              | 228                              | 227                              | 227                              | 227                               |
| R-squared                                 | 0.05                                   | 0.12                             | 0.00                             | 0.33                             | 0.41                             | 0.73                             | 0.73                              |

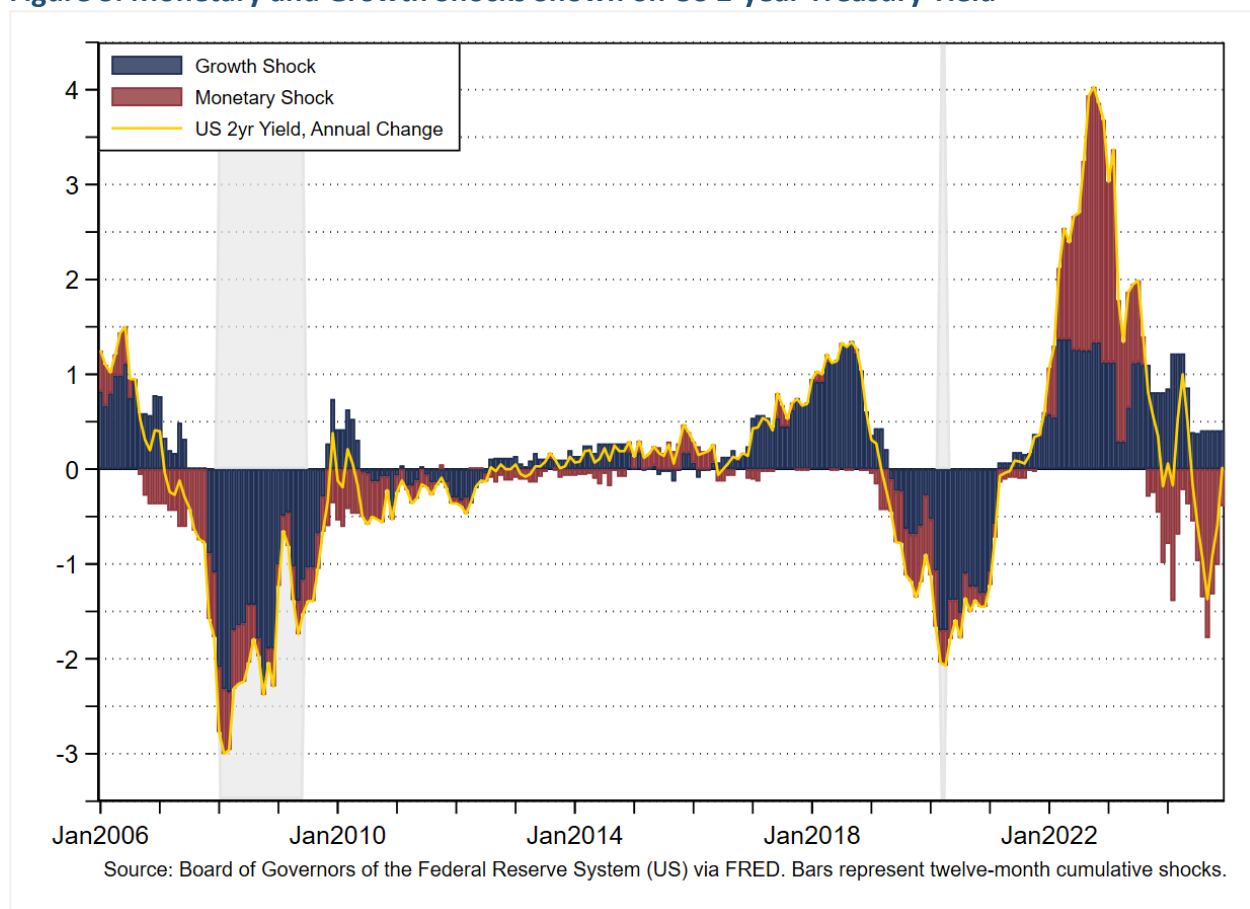
Robust standard errors in parentheses. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

The coefficients on Treasury yields shown in column (1) of the table therefore conflate the effects of monetary shocks with those of growth shocks. Based on these estimation results, which suggest that increases in yields lower EME spreads on average, it appears that growth shocks dominate monetary shocks in their effect on spreads.

A more precise understanding of how US interest rates affect EME spreads, however, requires distinguishing between monetary and growth shocks. To do so, we follow Hoek et al. (2022) and use the behavior of stock prices as an instrument. We assume that increases (decreases) in interest rates driven by growth shocks would tend to boost (lower) stock prices, whereas increases (decreases) in interest rates driven by monetary shocks would tend to lower (raise) stock prices. We then categorize all monthly changes in US yields as either monetary or growth shocks, depending on how S&P 500 stock prices move during the same months. These shocks, calculated for 2-year Treasury yields and expressed as moving 12-month cumulative sums, are shown in Figure 3 below. Notably, movements in Treasury yields are dominated by growth shocks until the most recent tightening cycle starting in 2022. An analogous chart for 10-year yields is shown in Appendix Figure 1.



**Figure 3. Monetary and Growth Shocks Shown on US 2-year Treasury Yield**



Returning to Table 1, the second column in the two panels replaces the single explanatory variable for Treasury yields with the time series for the two shocks described above. The coefficient on growth shocks is strongly significant and negative, as expected. The coefficient on monetary shocks is positive, albeit not statistically significant. Notably, the  $R^2$ s of the equations roughly double relative to using the 2-year and 10-year yields themselves. However, they are still relatively low at about 20 percent and 12 percent, respectively.

Column (3) drops the growth shocks variable from the equations here and in subsequent columns. The reasoning is that the measured effect of the growth shocks on EM spreads reflects the beneficial effects of the factors driving the rise in yields—improved

economic prospects and more optimistic investor sentiment—which offset the adverse effects of the rise in yields. We will shortly introduce additional explanatory variables to capture the effect of those factors more directly. (In fact, we will show that once those additional variables are included, the measured effect of the growth shocks largely disappears.) Conversely, the factors driving yields upwards during monetary shocks—news of rising inflation, or more hawkish statements or actions by the Federal Reserve—are unlikely by themselves to affect EME spreads; instead, the measured effects of monetary shocks on EME spreads should mainly reflect the implications of the rise in interest rates themselves, which increase the cost of debt service, push up the dollar, or depress investor sentiment.

In the event, because, by construction, the measured monetary and growth shocks are orthogonal to each other, the dropping of growth shocks in column (3) leaves the coefficient on monetary shocks unchanged. However, the  $R^2$  of the equations drops to zero, again indicating the monetary shocks explain little of the variation in EME spreads. These results are little changed when EME high-yield spreads or EMBI spreads are the dependent variable, as shown in Appendix Tables 1a and 1b.

### **III.2. Additional US Financial Variables**

Column (4) of Table 1 adds as an explanatory variable changes in the level of the VIX, a measure of uncertainty and risk aversion in the stock market. Because emerging market assets traditionally have been viewed as higher risk than US domestic assets, a rise in the VIX might be expected to widen EME spreads. Indeed, the coefficient on the VIX is positive and statistically significant in both panels of Table 1, and the  $R^2$ s rise substantially.

Note that one of the ways in which a rise in US Treasury yields driven by a monetary shock might be expected to widen EME spreads is by raising risk aversion and thus the VIX. With the VIX now held constant, the coefficient on monetary shocks turns negative. We believe this result is spurious, reflecting that a key transmission channel for monetary shocks is being cut off. We will address this concern shortly.

Column (5) of Table 1 adds as an explanatory variable the change in the value of the dollar. As noted above, a higher dollar makes it more expensive to repay dollar-denominated debt and this increases the likelihood of default. Additionally, to the extent that increases in the dollar engender expectations of further dollar appreciation, this could lead to capital outflows to the US that further increase financial pressures in EMEs. Shousha (2019) and Obstfeld and Zhou (2022), among others, identify the dollar as a key driver of EM financial conditions. We use the Federal Reserve's index of the dollar's value against the currencies of advanced economies in order to avoid any endogeneity of dollar exchange rates against EMEs with respect to EME spreads. As in the case of the VIX, the dollar is believed to be one of the channels of transmission through which monetary shocks might affect EME spreads, so its coefficient measures the effect of its variation separate from movements in Treasury yields. The coefficient is positive and statistically significant, indicating that for every 1 percent rise in the value of the dollar, EME spreads widen by 10 basis points; as well, the  $R^2$  of the equations rises further with its addition.

Column (6) adds the US corporate high-yield spread. As noted in the introduction, because global bond markets are highly integrated, shocks to US corporate bond spread naturally spill over via portfolio balance channels to EME spreads. On top of that, risky EME

bonds may be considered relatively close substitutes for US high-yield corporate bonds, and this would hold even more for EME corporate spreads than for EMBI sovereign spreads. Finally, US high-yield spreads may better capture changes in investor risk aversion than the VIX, providing another reason why they could help explain (if not cause) changes in EME spreads. Indeed, the coefficients on both the VIX and the dollar shrink substantially in column (6), whereas the coefficients on US high-yield spreads are large and highly significant; a 100 basis point rise in these spreads leads to a 57 basis point rise in EME spreads. Moreover, the  $R^2$  rises substantially further with the addition of the US high-yield spread, suggesting that variations in that spread that are independent of monetary policy explain most of the variation in EME spreads, at least for corporate bonds.

In Appendix Tables 2a, b, and c, we repeat the estimations described above for all three of the EME spread variables, but include the growth shock variable dropped from columns (3) through (6). They show that once the US high-yield spread is added to the equations, the coefficient on growth shocks becomes either tiny and insignificant (for US 2-year yields) or significantly positive (for 10-year yields), while adding little to the  $R^2$  of the equations. This confirms that the VIX, dollar, and especially the US high-yield spread effectively capture the forces driving growth shocks, so that those growth shocks can be safely deleted from the models.

### **III.3. Re-capturing the role of US monetary shocks**

In Table 1 above, once the VIX, dollar, and US high-yield spreads are added as explanatory variables, the all-in impact of monetary shocks cannot be measured correctly, as

these shocks affect emerging market spreads, in part, by affecting those other financial variables. In order to estimate that all-in impact, column (7) presents the results of a form of two-stage least squares regression. Changes in the VIX, dollar, and US high-yield spreads are separately regressed on the time series for monetary shocks. (The estimation results for these estimates are shown in Appendix Table 3.) The residuals from these regressions are then used instead of the actual values of the VIX, dollar, and US high-yield spreads in the regressions for EME spreads. As these residuals will be uncorrelated with the monetary shocks, their estimated effects on EME yields will represent the effects of variations in the VIX, dollar, and US high-yield spread that do not reflect the impact of changes in Treasury yields.

The results of the two-stage least-squares (TSLS) estimation in column (7) present no surprises. The coefficient on the monetary shock is the same as in columns (2) and (3), since it is uncorrelated with the residuals for the VIX, dollar, and US high-yield spread. The coefficients on the latter three variables are the same as in column (6), since in both columns those coefficients measure the effect of those variables on emerging market spreads, holding monetary shocks constant. However, the standard errors on the monetary shocks coefficient shrink compared to in column (3), as more of the variation in emerging market spreads is captured by the additional explanatory variables. As a result, the coefficient on monetary shocks in Table 1 becomes significantly different from zero for 10-year yields, and even more significant in Appendix Table 1a for high-yield EM spreads. It is unclear why the coefficients on monetary shocks in the EMBI regressions, in Appendix Table 1b, remain negative, especially considering that, as shown in Figure 1, the EMBI spread is well-correlated with the EME corporate spread variables. This will require further investigation in future work.

## IV. The Impact of the 2022-23 US Tightening Cycle

In this section, we use the econometric models shown in Table 1, column (7), to decompose movements in EME spreads into the respective contributions of the factors discussed above. Figure 4 below compares the paths of EME spreads to the in-sample predictions of the models and the respective contributions to those predictions of the explanatory variables. To facilitate interpretation, the monthly changes of both actual and predicted EME spreads are cumulated over the preceding 12 months, so they represent year-over-year changes in spreads. Appendix Figures 2a and 2b present analogous calculations for EME high-yield and EMBI spreads.

Several points are worth noting. As already suggested by the high  $R^2$ s for the models, they do a good job of tracking actual spreads over the sample period, including during the recent Fed tightening cycle starting in 2022. As also suggested by the model estimates, most of the variation in EM spreads reflects movements in US high yield spreads. By comparison, movements in the VIX, the dollar, and monetary shocks play a much smaller role in the evolution of EME spreads.

These charts provide two clear answers to the question: why did emerging market economies weather the recent US monetary tightening cycle so well? First, US financial conditions did not tighten greatly during the initial phases of the Fed's tightening phase and then loosened substantially later in the cycle.<sup>4</sup> Second, over the 2006-2024 sample period,

---

<sup>4</sup> More specifically, the residual from a regression of US high-yield spreads on monetary shocks did not rise that much and then fell substantially. By the same token, the VIX residual went negative during the tightening cycle, also holding down EME spreads; although the VIX itself rose substantially in 2022-2023, it rose less than predicted by its regression on monetary shocks.

monetary shocks are estimated to have been a relatively weak and unimportant driver of EME spreads. Therefore, despite the 2022-2023 period experiencing the largest monetary shocks in the sample, their effect on spreads was relatively small. It appears that however much emerging market economies may have been vulnerable to Fed tightening during the 1980s (the Latin American debt crisis) and the 1990s (the Mexican “Tequila” crisis), by the period of our estimation sample, that vulnerability had been much reduced.

To provide more insight into developments during the 2022-2023 tightening cycle, Figure 5 compares the *level* of EME spreads to the predicted level of these spreads, as calculated by cumulating the predicted monthly *changes* in these spreads and adding them to the actual level of spreads in December 2021. It shows actual EME spreads moving broadly in concert with the model predictions through 2022 and 2023—their trajectory is a bit higher than the predictions of the model using 2-year Treasury yields and a bit lower than the predictions of the model using 10-year yields. However, starting in 2024, actual EME spreads appear to move consistently below the predictions of both models. A similar pattern is seen for EME high-yield spreads shown in Appendix Figure 3a.<sup>5</sup>

We will address the structural stability of the model equations in the next section below. However, at first blush, it does not appear that the relatively contained response of EME spreads to the Fed’s tightening cycle in 2022-23 reflects any substantial reduction in EME vulnerabilities during the sample period – spreads rose during those years about as much as

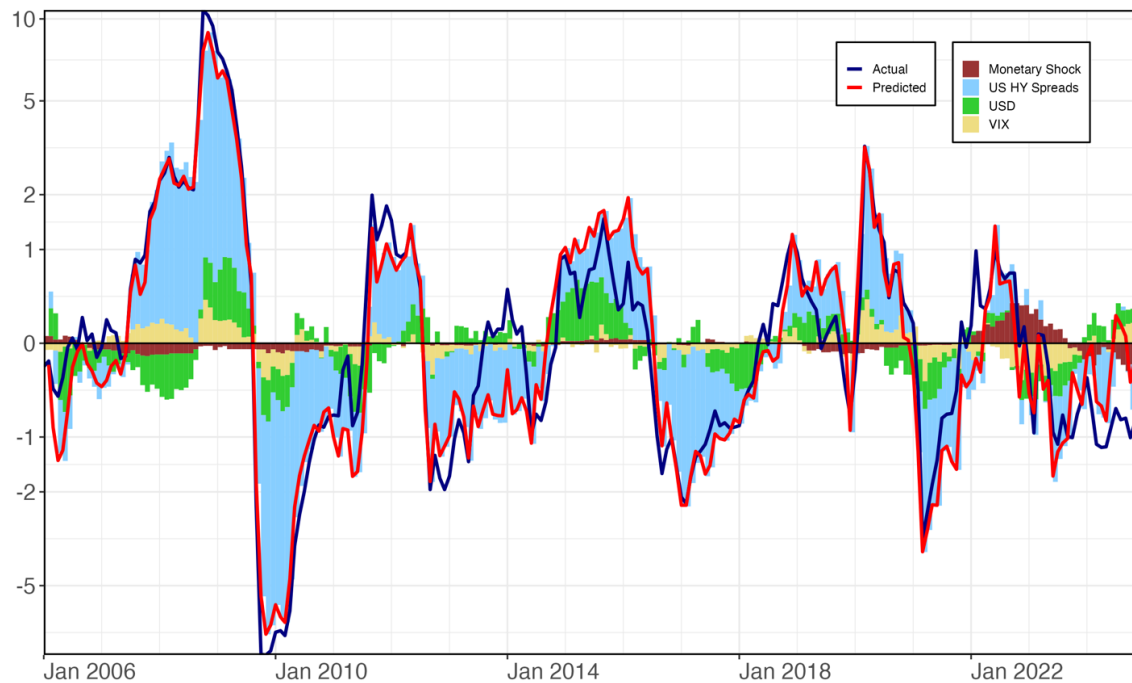
---

<sup>5</sup> The EMBI is shown in Appendix Figure 3b. The model fails to track the large rise in spreads in 2022, reinforcing our view that the negative coefficient on monetary shocks is spurious. Therefore, we drop exercises using the EMBI model in the rest of the paper, though they are available on request.

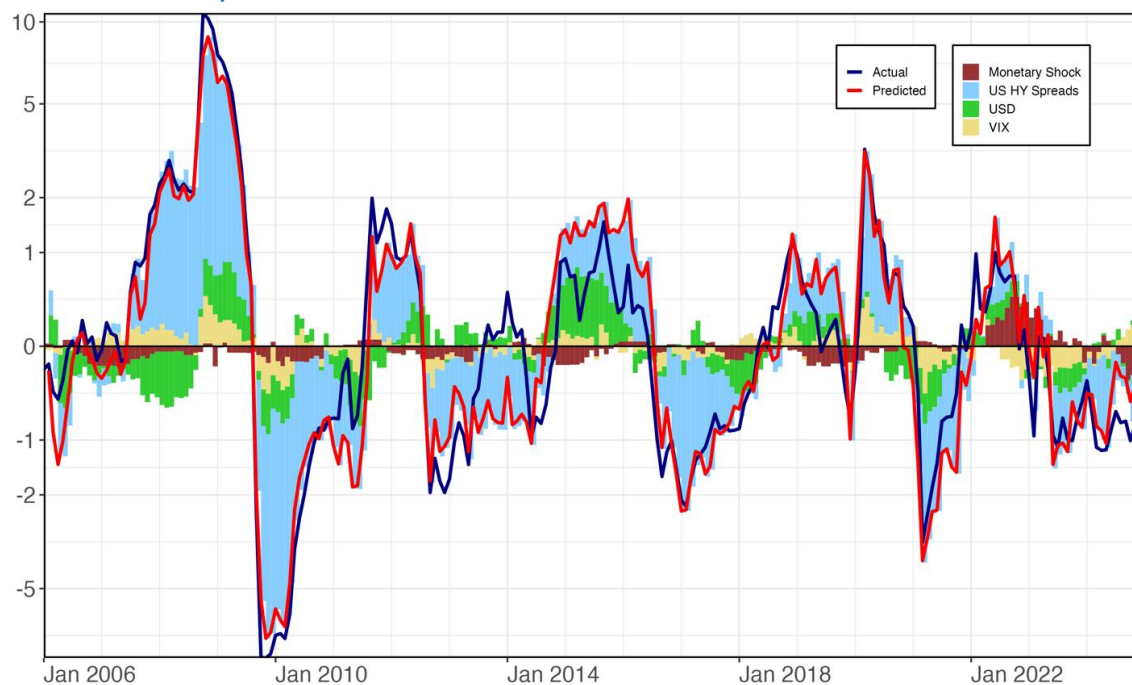
predicted by model estimated over the entire 2006-2024 sample period. It is not clear why spreads then undershot the models during 2024. We leave that for future research.

**Figure 4. Model-based Decompositions of the Evolution of EM Corporate Spreads**

*Panel A: Monetary Shocks Based on 2-Year Yields*



*Panel B: Monetary Shocks Based on 10-Year Yields*



Note: The plots use a log scale.



Figure 5. Predicted and Actual EME Spreads During Recent Tightening Cycle



## V. Robustness and Stability Tests

### V.1 Stability over time

The charts in Figures 4 and 5 indicate that EME spreads during the Fed’s tightening cycle were well predicted by the model until 2024, when they fell below the in-sample predictions. This suggests that any shift in the relationship between these spreads and their determinants was probably recent and relatively small. To address this issue more directly, Figure 6 presents recursive estimates of the model coefficients over the sample period. The figure shows the estimated coefficients and 95 percent confidence intervals as the TSLS models are estimated for an initial sample period of January 2006 through January 2007, which is then progressively expanded through to the present. We remove the global financial crisis (GFC) data points from the graph since they are outliers. Appendix Figure 4 presents the analogous chart for EME high-yield spreads.

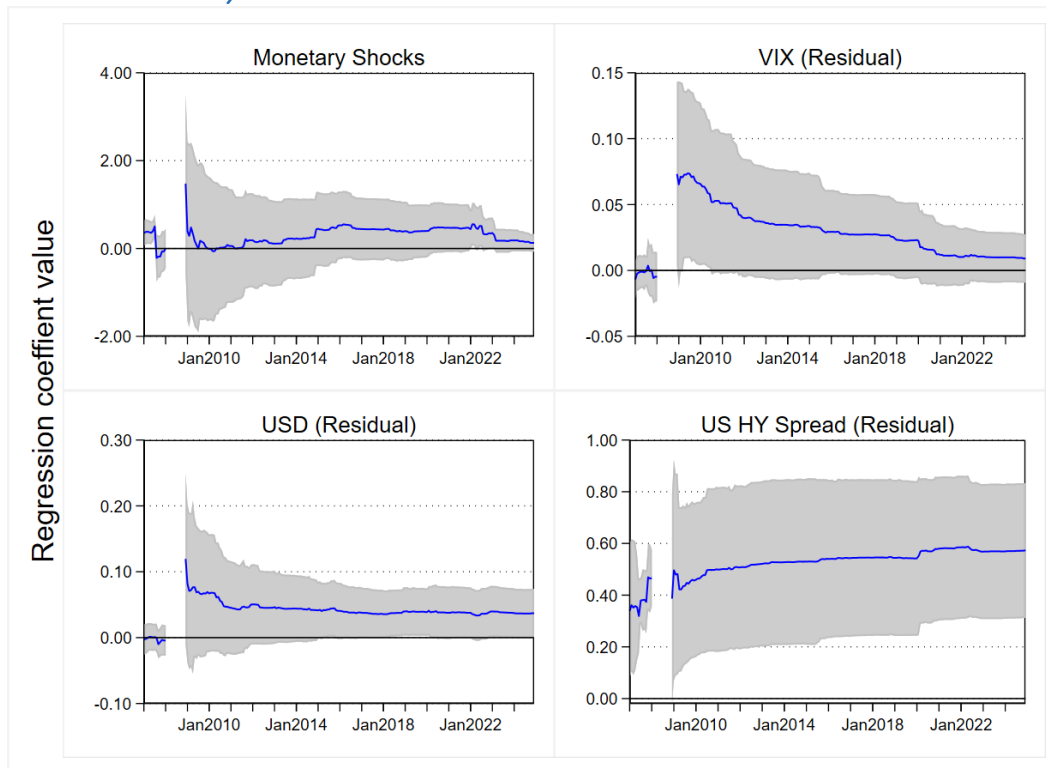
Figure 6 suggests that, aside the VIX, whose coefficient declines over the sample period, the coefficients on the other explanatory variables remain broadly stable over most of the sample period. However, the coefficient on monetary shocks does appear to notch downwards starting around 2022. To gain more insight into this, Table 2, below, divides the sample period into the pre-2020 and 2020-24 period and estimates the model for EME spreads separately for each sub-period.<sup>6</sup> A third equation adds dummy variables for the second sub-period, by themselves and interacted with the explanatory variables, in order to test for any statistically significant differences in coefficients between the two sub-periods. Appendix Table 4 presents the analogous estimates for EME high-yield spreads.

---

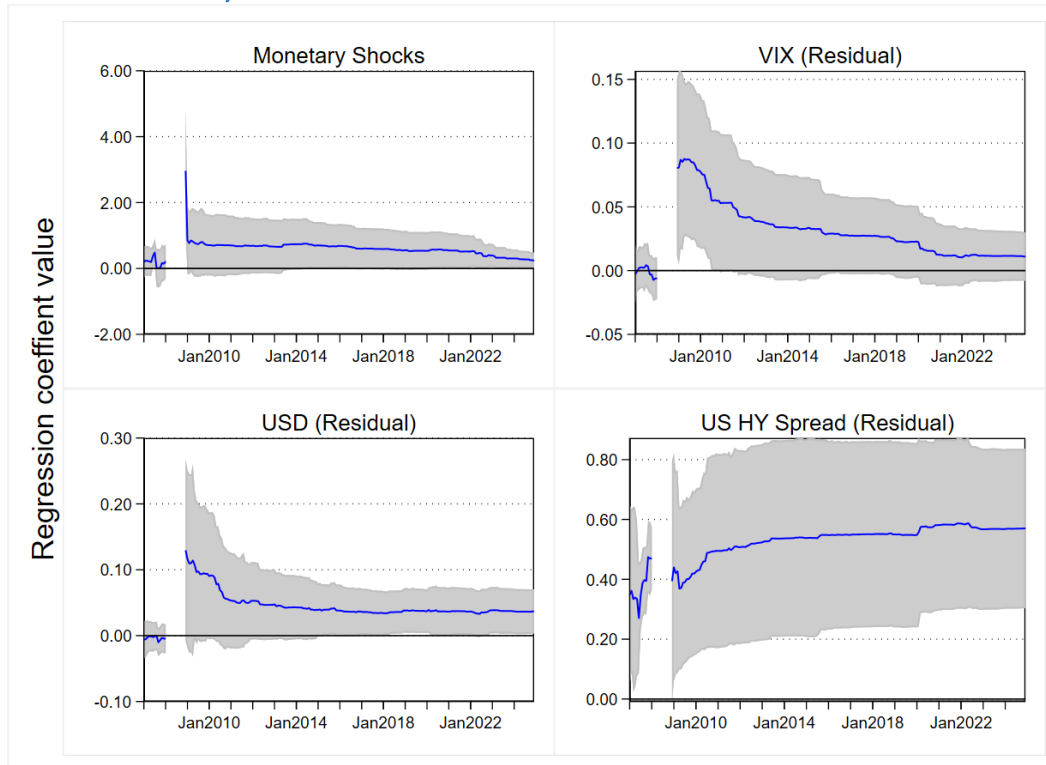
<sup>6</sup> We start the second sub-period in 2020 rather than 2022 in order to ensure a sufficient number of observations.

**Figure 6. Recursive Estimates of the TSLS Models**

*Panel A: Monetary Shocks Based on 2-Year Yields*



*Panel B: Monetary Shocks Based on 10-Year Yields*



The estimates in Table 2 suggest that most of the explanatory power of monetary shocks, the VIX, and the dollar disappeared by the time of the second sub-period, 2020-2024. Most of the changes in these coefficients from the first to the second sub-period are not statistically significant, but that may reflect the low degree of precision of the estimates. Conversely, the coefficients on the US high-yield spread remain remarkably stable.

**Table 2. TSLS Estimates, 2006-19 and 2020-24, EME Corporate Spreads**

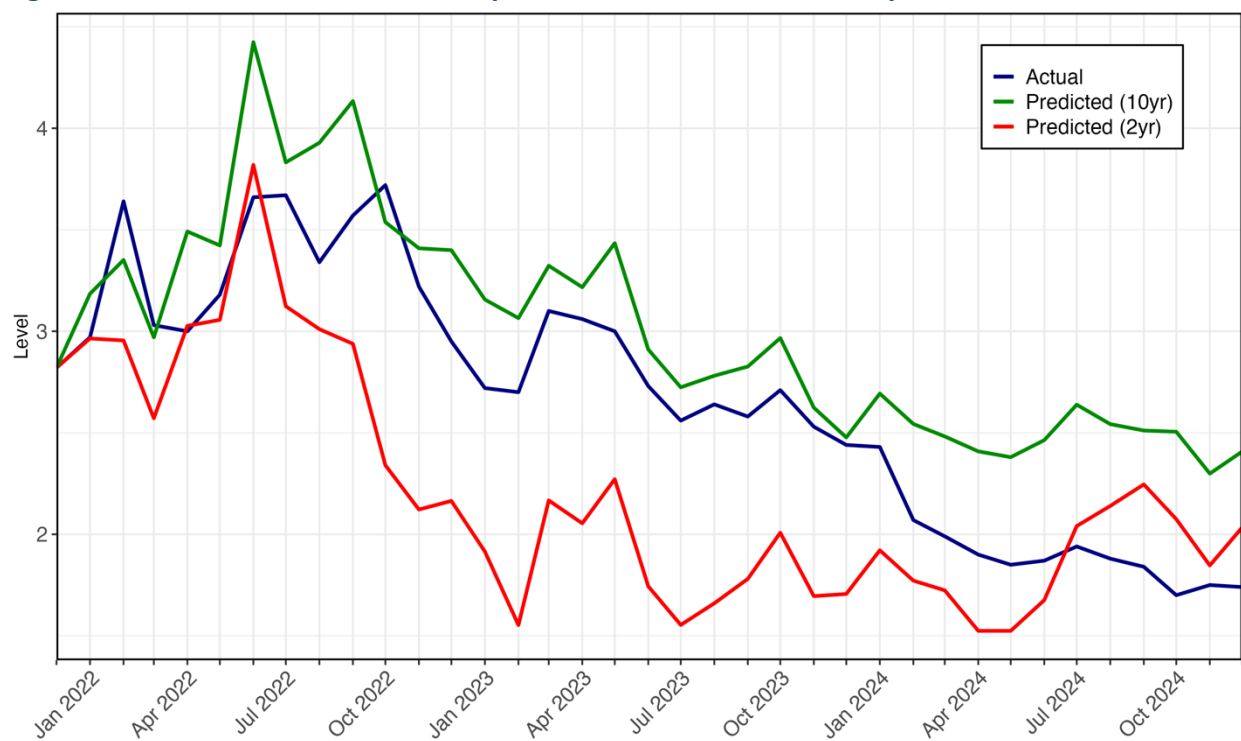
|  | EME Corporate Spreads, Monthly Changes |                            |                            |                            |                            |                            |
|--|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|  | Using US 2yr Yield                     |                            |                            | Using US 10yr Yield        |                            |                            |
|  | (1)                                    | (2)                        | (3)                        | (4)                        | (5)                        | (6)                        |
|  | TSLS<br>2006m2-<br>2019m12             | TSLS<br>2020m1-<br>2024m12 | TSLS<br>2006m2-<br>2024m12 | TSLS<br>2006m2-<br>2019m12 | TSLS<br>2020m1-<br>2024m12 | TSLS<br>2006m2-<br>2024m12 |
| Monetary Shocks                                    | 0.40<br>(0.31)                         | 0.07<br>(0.10)             | 0.40<br>(0.31)             | 0.54*<br>(0.29)            | 0.07<br>(0.11)             | 0.54*<br>(0.29)            |
| VIX monthly change,<br>residuals                   | 0.02<br>(0.01)                         | -0.00<br>(0.01)            | 0.02<br>(0.01)             | 0.02<br>(0.01)             | -0.00<br>(0.01)            | 0.02<br>(0.01)             |
| USD monthly percent change,<br>residuals           | 0.04**<br>(0.02)                       | -0.00<br>(0.03)            | 0.04**<br>(0.02)           | 0.04**<br>(0.02)           | 0.01<br>(0.03)             | 0.04**<br>(0.02)           |
| US HY Spreads monthly change,<br>residuals         | 0.54***<br>(0.15)                      | 0.60***<br>(0.14)          | 0.54***<br>(0.15)          | 0.55***<br>(0.16)          | 0.59***<br>(0.14)          | 0.55***<br>(0.16)          |
| Dummy = 1 after 2020m1                             |  |                            | -0.03<br>(0.04)            |                            |                            | -0.03<br>(0.04)            |
| Monetary Shocks X Dummy                            |  |                            | -0.33<br>(0.33)            |                            |                            | -0.46<br>(0.31)            |
| VIX monthly change,<br>Residuals X Dummy           |  |                            | -0.03*<br>(0.02)           |                            |                            | -0.02<br>(0.02)            |
| USD monthly percent change,<br>Residuals X Dummy   |  |                            | -0.04<br>(0.03)            |                            |                            | -0.03<br>(0.03)            |
| US HY Spreads monthly change,<br>Residuals X Dummy |  |                            | 0.06<br>(0.21)             |                            |                            | 0.04<br>(0.21)             |
| Intercept  | 0.01<br>(0.03)                         | -0.02<br>(0.03)            | 0.01<br>(0.03)             | 0.02<br>(0.03)             | -0.02<br>(0.03)            | 0.02<br>(0.03)             |
| Observations                                       | 167                                    | 60                         | 227                        | 167                        | 60                         | 227                        |
| R-squared  | 0.75                                   | 0.73                       | 0.75                       | 0.75                       | 0.74                       | 0.75                       |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Columns 3 and 6 divide the overall analysis period (2006m2 – 2024m12) by interacting explanatory variables with a dummy set to 1 after 2020m1.

What do the changes in coefficients on monetary shocks, the VIX, and the dollar imply for the prediction of the models? To assess that, we re-compute the forecast shown in Figure

5, but using the coefficients estimates from the earlier 2006-2019 sub-period sample. These are shown in Figure 7, while the analogous calculations for EME high-yield spreads are presented in Appendix Figure 5. Broadly speaking, the figures for EME general and high-yield spreads show the models again correctly predicting the surge in spreads during 2022 reasonably well. The models again overpredict spreads later in the cycle, but, again, not until 2024.<sup>7</sup>

**Figure 7. Actual and Predicted EME Spreads based on 2006-19 Sample Period**



<sup>7</sup> We also tried splitting the sample period more evenly, between 2006-2014 and 2015-2024. This split of the sample period results in a similar decline from the first to the second period in the coefficients on monetary shocks, the VIX, and the dollar. And, as in the case using the coefficients from the 2006-2019 period, the model estimated over the 2006-2014 period continues to broadly track the rise in EME spreads in 2022-2023 while overpredicting them in 2024. These results are available on request.

All told, the evidence from the recursive regressions, split-sample estimations, and out-of-sample simulations suggest that EME spreads may have become less sensitive to US monetary shocks and other financial conditions in recent years. Even so, the models estimated over earlier periods do not substantially overpredict the rise in EME spreads during the Fed's 2022-2023 tightening cycle (though they fail to track how low spreads fell subsequently in 2024). These considerations suggest that the relatively benign movements in EME spreads during the Fed's recent tightening cycle do not owe to improvements in fundamentals and reductions in vulnerabilities among EMEs during the past couple of decades. Rather, the failure of EME spreads to rise more substantially in response to Fed tightening in 2022-2023 more likely reflected the positive tone of US financial markets over the period, combined with the fact that, simply put, US monetary shocks are not as injurious to EMEs as is conventionally believed.

This is not to say that fundamentals and vulnerability are not important determinants of the reaction of EME spreads to US monetary policy shocks. Numerous studies indicate that countries with greater vulnerabilities exhibit greater responses to changes in US interest rates. And, for that matter, in this paper we show that EME high-yield corporate spreads show much greater response to US monetary shocks than EME general corporate spreads. However, it could be that the biggest strides in economic reform among EMEs—inflation targeting, reduction in fiscal deficits, more flexible exchange rates—were made before or in the early period of our 2006-2024 sample period.

## V.2 Robustness to crisis episodes

Finally, inspection of Figure 5 might suggest that a great deal of the explanatory power of high-yield spreads comes from the outsized movements around the GFC and the COVID-19 panic of 2020. Table 3 presents TSLS estimates of the model for all three EM spread measures, excluding observations from 2008-09 and 2020. The coefficients remain broadly unchanged from the full-sample estimates, albeit somewhat lower.

**Table 3. TSLS Estimates Excluding the GFC and COVID-19 Panics**

|  | EME Corporate Spreads         |                               |                               |                               | EME High Yield Spreads        |                               |                               |                               |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  | US 2yr Yield                  |                               | US 10yr Yield                 |                               | US 2yr Yield                  |                               | US 10yr Yield                 |                               |
|  | Full Sample                   | Exc. GFC, COVID               | Full Sample                   | Exc. GFC, COVID               | Full Sample                   | Exc. GFC, COVID               | Full Sample                   | Exc. GFC, COVID               |
|  | (1)<br>TSLS<br>2006m2-2024m12 | (2)<br>TSLS<br>2006m2-2024m12 | (3)<br>TSLS<br>2006m2-2024m12 | (4)<br>TSLS<br>2006m2-2024m12 | (5)<br>TSLS<br>2006m2-2024m12 | (6)<br>TSLS<br>2006m2-2024m12 | (7)<br>TSLS<br>2006m2-2024m12 | (8)<br>TSLS<br>2006m2-2024m12 |
| Monetary Shocks                            | 0.13<br>(0.10)                | 0.12<br>(0.09)                | 0.24**<br>(0.12)              | 0.11<br>(0.09)                | 0.53***<br>(0.19)             | 0.48***<br>(0.18)             | 0.75***<br>(0.24)             | 0.42**<br>(0.19)              |
| VIX,<br>monthly change                     | 0.01<br>(0.01)                | 0.01<br>(0.00)                | 0.01<br>(0.01)                | 0.01*<br>(0.00)               | 0.01<br>(0.01)                | 0.01<br>(0.01)                | 0.02<br>(0.02)                | 0.01<br>(0.01)                |
| US Dollar Index,<br>monthly percent change | 0.04*<br>(0.02)               | 0.02**<br>(0.01)              | 0.04**<br>(0.02)              | 0.02**<br>(0.01)              | 0.07*<br>(0.04)               | 0.05**<br>(0.02)              | 0.07**<br>(0.03)              | 0.05**<br>(0.02)              |
| US High Yield Spreads,<br>monthly change   | 0.57***<br>(0.13)             | 0.43***<br>(0.04)             | 0.57***<br>(0.14)             | 0.43***<br>(0.04)             | 1.22***<br>(0.24)             | 0.90***<br>(0.07)             | 1.22***<br>(0.25)             | 0.90***<br>(0.07)             |
| Intercept                                  | 0.00<br>(0.02)                | -0.00<br>(0.01)               | 0.00<br>(0.02)                | -0.00<br>(0.01)               | 0.01<br>(0.04)                | -0.01<br>(0.03)               | 0.01<br>(0.04)                | -0.01<br>(0.03)               |
| Observations                               | 227                           | 191                           | 227                           | 191                           | 227                           | 191                           | 227                           | 191                           |
| R-squared                                  | 0.73                          | 0.66                          | 0.73                          | 0.66                          | 0.76                          | 0.65                          | 0.76                          | 0.65                          |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Sample excludes 2008, 2009, and 2020.

## VI. Conclusion

In this paper, we address the reasons why EMEs weathered the storm of Fed tightening in 2022-23 as well as they did. We estimate monthly regressions of EME spreads, an indicator of potential financial distress, over the period 2006-2024 on measures of US monetary policy as well as US financial conditions: the VIX volatility index, the foreign exchange value of the dollar, and US high-yield spreads. Following Hoek et al. (2022) and Arteta et al. (2022), we focus on the effects of “monetary shocks”—increases in US Treasury yields prompted by concerns about rising inflation or hawkish Fed behavior—as these were the shocks that drove the rise in US interest rates in 2022-2023. We then use our estimated equations to decompose the path of EME spreads into the contributions of their various determinants.

We find that US monetary shocks accounted for relatively little of the variations in EME spreads during most of the sample period, and only had a noticeable effect during the recent 2022-23 cycle. Conversely, US high-yield spreads were the most important drivers for EME spreads during the sample period, including the big decline in spreads in 2024. We conclude that an important reason why EME spreads remained relatively contained in the face of rising interest rates is that US corporate credit markets remained buoyant, and their confidence spilled over to EMEs. A second reason why the EMEs held up so well is simply that Fed tightening is no longer as injurious as commonly believed.

Our models correctly predict or even under-predict the rise in EME spreads during the 2022-23 monetary tightening period. Accordingly, the relatively moderate rise in spreads during the Fed’s tightening did not come as a surprise to the model, estimated over the 2006-2024 period or even during earlier sub-periods. This suggests that the improvements in



credibility and in foreign exchange exposure over the past couple of decades cited by Kalemli-Özcan and Unsal (2024), while undoubtedly helpful, were probably not the main reason why the EMEs weathered the Fed's tightening so well. Most likely, the EMEs benefitted from improvements in the fiscal, monetary, and exchange rate policies that had already taken place by the 2000s.

Our findings point to two areas for the further research. First, it would be useful to delve deeper into the reasons why US financial conditions, and especially corporate spreads, remained so accommodative during the Fed's tightening cycle and then became so buoyant, even as interest rates remained high. Second, more analysis is needed to examine the changes in EME economic policies that led their economies to become so resilient by the early 2000s.

## VII. References

- Arteta, Carlos, M. Ayhan Kose, Franziska Ohnsorge, and Marc Stocker. 2015. *The Coming US Interest Rate Tightening Cycle: Smooth Sailing or Stormy Waters?* Washington, DC: World Bank.
- Arteta, Carlos, Steven B. Kamin, and Ulrich Ruch. 2022. "How Do Rising US Interest Rates Affect Emerging and Developing Economies? It Depends." *World Bank Policy Research Working Paper No. 10258*, December.
- Bellas, Dimitri, Michael Papaioannou, and Iva Petrova. 2010. "Determinants of Emerging Market Sovereign Bond Spreads: Fundamentals vs Financial Stress." *IMF Working Paper WP/10/281*, December.
- Caballero, Julian, and Christian Upper. 2023. "What Happens to EMEs When US Yields Go Up." *BIS Working Paper No. 1081*, March.
- Eichengreen, Barry, and Ashoka Mody. 1998. "What Explains Changing Spreads on Emerging Market Debt: Fundamentals or Market Sentiment?" *NBER Working Paper No. 6408*, February.
- Engler, Philipp, Robert Piazza, and Galen Sher. 2023. "Spillover to Emerging Markets from US Economic News and Monetary Policy." *IMF Working Paper WP/23/107*, May.
- Ferrucci, Gianluigi. 2003. "Empirical Determinants of Emerging Market Economies' Sovereign Bond Spreads." *Bank of England Working Paper No. 205*.
- Gilchrist, Simon, and Egon Zakrajšek. 2012. "Credit Spreads and Business Cycle Fluctuations." *American Economic Review* 102 (4): 1692–1720.
- Gilchrist, Simon, Bin Wei, Vivian Z. Yue, and Egon Zakrajšek. 2021. "Credit Spread Dynamics through the COVID-19 Crisis." *NBER Working Paper No. 29501*, November.
- Hoek, Jasper, Steven B. Kamin, and Emre Yoldas. 2022. "Are Higher US Interest Rates Always Bad News for Emerging Markets?" *Journal of International Economics* 137 (July). <https://www.sciencedirect.com/science/article/pii/S0022199622000174>.
- International Monetary Fund. 2021. "Shifting Gears: Monetary Policy Spillovers During the Recovery from COVID-19." In *World Economic Outlook*, April. Washington, DC: International Monetary Fund.
- Kamin, Steven B., and Karsten von Kleist. 1999. "The Evolution and Determinants of Emerging Market Credit Spreads in the 1990s." *Federal Reserve Board International Finance Discussion Papers No. 653*, November.
- Kalemli-Özcan, Şebnem, and Filiz D. Unsal. 2024. "Global Transmission of FED Hikes: The Role of Policy Credibility and Balance Sheets." *NBER Working Paper No. 32329*, April.
- Obstfeld, Maurice, and Haonan Zhou. 2022. "The Global Dollar Cycle." *Brookings Papers on Economic Activity* 2022 (2): 361–447.

Rey, Hélène. 2013. "Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence." In Economic Policy Symposium Proceedings – Jackson Hole, 285–333. Kansas City: Federal Reserve Bank of Kansas City. [http://www.helenerey.eu/RP.aspx?pid=Published-Papers\\_en-GB&aid=147802013\\_67186463733](http://www.helenerey.eu/RP.aspx?pid=Published-Papers_en-GB&aid=147802013_67186463733).

Rogers, John, Bo Sun, and Wenbin Wu. 2025. "Drivers of the Global Financial Cycle." Unpublished working paper, January.

Shousha, Samer. 2019. "The Dollar and Emerging Market Economies: Financial Vulnerabilities Meet the International Trade System." International Finance Discussion Papers No. 1258.

## VIII. Appendix Tables

**Appendix Table 1a: Regressions of EME High Yield Spreads on US Treasury Yields**

**Panel A: Based on 2-Year Yields**

|  | EME High Yield Spreads, Monthly Changes |                    |                    |                    |                    |                    |                    |
|--|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|  | (1)                                     | (2)                | (3)                | (4)                | (5)                | (6)                | (7)                |
|  | OLS                                     | OLS                | OLS                | OLS                | OLS                | OLS                | TSLS               |
|  | 2006m1-<br>2024m12                      | 2006m1-<br>2024m12 | 2006m1-<br>2024m12 | 2006m1-<br>2024m12 | 2006m2-<br>2024m12 | 2006m2-<br>2024m12 | 2006m2-<br>2024m12 |
| US 2-year Treasury Yield, monthly change | -1.65***<br>(0.57)                      |                    |                    |                    |                    |                    |                    |
| Growth Shocks (US 2yr Yield)             |   | -3.13***<br>(0.92) |                    |                    |                    |                    |                    |
| Monetary Shocks (US 2yr Yield)           |   | 0.53*<br>(0.31)    | 0.53*<br>(0.31)    | -0.90*<br>(0.50)   | -1.67**<br>(0.70)  | -0.68**<br>(0.33)  | 0.53***<br>(0.19)  |
| VIX, monthly change                      |   |                    |                    | 0.13***<br>(0.04)  | 0.11***<br>(0.03)  | 0.01<br>(0.01)     | 0.01<br>(0.01)     |
| US Dollar Index, monthly percent change  |   |                    |                    |                    | 0.20**<br>(0.08)   | 0.07*<br>(0.04)    | 0.07*<br>(0.04)    |
| US High Yield Spreads, monthly change    |   |                    |                    |                    |                    | 1.22***<br>(0.24)  | 1.22***<br>(0.24)  |
| Intercept                                | 0.00<br>(0.08)                          | 0.03<br>(0.08)     | 0.01<br>(0.08)     | -0.01<br>(0.07)    | -0.03<br>(0.06)    | -0.01<br>(0.04)    | 0.01<br>(0.04)     |
| Observations                             | 228                                     | 228                | 228                | 228                | 227                | 227                | 227                |
| R-squared                                | 0.09                                    | 0.20               | 0.00               | 0.32               | 0.40               | 0.76               | 0.76               |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Panel B: Based on 10-Year Yields**

|   | EME High Yield Spreads, Monthly Changes |                    |                    |                    |                    |                    |                    |
|---|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|   | (1)                                     | (2)                | (3)                | (4)                | (5)                | (6)                | (7)                |
|   | OLS                                     | OLS                | OLS                | OLS                | OLS                | OLS                | TSLS               |
|   | 2006m1-<br>2024m12                      | 2006m1-<br>2024m12 | 2006m1-<br>2024m12 | 2006m1-<br>2024m12 | 2006m2-<br>2024m12 | 2006m2-<br>2024m12 | 2006m2-<br>2024m12 |
| US 10-year Treasury Yield, monthly change | -1.02***<br>(0.33)                      |                    |                    |                    |                    |                    |                    |
| Growth Shocks (US 10yr Yield)             |   | -2.35***<br>(0.37) |                    |                    |                    |                    |                    |
| Monetary Shocks (US 10yr Yield)           |   | 0.75<br>(0.53)     | 0.75<br>(0.52)     | -0.98**<br>(0.44)  | -1.61***<br>(0.56) | -0.67***<br>(0.25) | 0.75***<br>(0.24)  |
| VIX, monthly change                       |   |                    |                    | 0.14***<br>(0.04)  | 0.11***<br>(0.03)  | 0.02<br>(0.02)     | 0.02<br>(0.02)     |
| US Dollar Index, monthly percent change   |   |                    |                    |                    | 0.20**<br>(0.08)   | 0.07**<br>(0.03)   | 0.07**<br>(0.03)   |
| US High Yield Spreads, monthly change     |   |                    |                    |                    |                    | 1.22***<br>(0.25)  | 1.22***<br>(0.25)  |
| Intercept                                 | 0.00<br>(0.08)                          | 0.03<br>(0.08)     | 0.01<br>(0.08)     | -0.01<br>(0.07)    | -0.03<br>(0.06)    | -0.01<br>(0.04)    | 0.01<br>(0.04)     |
| Observations                              | 228                                     | 228                | 228                | 228                | 227                | 227                | 227                |
| R-squared                                 | 0.04                                    | 0.14               | 0.01               | 0.32               | 0.41               | 0.76               | 0.76               |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Appendix Table 1b: Regressions of EMBI Spreads on US Treasury Yields

### Panel A: Based on 2-Year Yields

|  | EMBI Spreads, Monthly Changes |                           |                           |                           |                           |                           |                            |
|--|-------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
|  | (1)                           | (2)                       | (3)                       | (4)                       | (5)                       | (6)                       | (7)                        |
|  | OLS<br>2006m1-<br>2024m12     | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m2-<br>2024m12 | OLS<br>2006m2-<br>2024m12 | TSLS<br>2006m2-<br>2024m12 |
| US 2-year Treasury Yield, monthly change | -0.44***<br>(0.16)            |                           |                           |                           |                           |                           |                            |
| Growth Shocks (US 2yr Yield)             |                               | -0.60**<br>(0.26)         |                           |                           |                           |                           |                            |
| Monetary Shocks (US 2yr Yield)           |                               | -0.20*<br>(0.11)          | -0.20*<br>(0.11)          | -0.33**<br>(0.15)         | -0.51***<br>(0.18)        | -0.25**<br>(0.11)         | -0.20**<br>(0.10)          |
| VIX, monthly change                      |                               |                           |                           | 0.01<br>(0.01)            | 0.01<br>(0.01)            | -0.02***<br>(0.01)        | -0.02***<br>(0.01)         |
| US Dollar Index, monthly percent change  |                               |                           |                           |                           | 0.05**<br>(0.02)          | 0.01<br>(0.01)            | 0.01<br>(0.01)             |
| US High Yield Spreads, monthly change    |                               |                           |                           |                           |                           | 0.32***<br>(0.05)         | 0.32***<br>(0.05)          |
| Intercept                                | 0.00<br>(0.02)                | 0.00<br>(0.02)            | 0.00<br>(0.02)            | -0.00<br>(0.02)           | -0.01<br>(0.02)           | 0.00<br>(0.02)            | 0.00<br>(0.02)             |
| Observations                             | 228                           | 228                       | 228                       | 228                       | 227                       | 227                       | 227                        |
| R-squared                                | 0.09                          | 0.11                      | 0.01                      | 0.04                      | 0.11                      | 0.44                      | 0.44                       |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### Panel B: Based on 10-Year Yields

|   | EMBI, Monthly Changes     |                           |                           |                           |                           |                           |                            |
|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
|   | (1)                       | (2)                       | (3)                       | (4)                       | (5)                       | (6)                       | (7)                        |
|   | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m1-<br>2024m12 | OLS<br>2006m2-<br>2024m12 | OLS<br>2006m2-<br>2024m12 | TSLS<br>2006m2-<br>2024m12 |
| US 10-year Treasury Yield, monthly change | -0.38***<br>(0.11)        |                           |                           |                           |                           |                           |                            |
| Growth Shocks (US 10yr Yield)             |                           | -0.53***<br>(0.15)        |                           |                           |                           |                           |                            |
| Monetary Shocks (US 10yr Yield)           |                           | -0.17<br>(0.14)           | -0.17<br>(0.14)           | -0.33**<br>(0.15)         | -0.48***<br>(0.17)        | -0.23*<br>(0.13)          | -0.17<br>(0.12)            |
| VIX, monthly change                       |                           |                           |                           | 0.01<br>(0.01)            | 0.01<br>(0.01)            | -0.02***<br>(0.01)        | -0.02***<br>(0.01)         |
| US Dollar Index, monthly percent change   |                           |                           |                           |                           | 0.05***<br>(0.02)         | 0.01<br>(0.01)            | 0.01<br>(0.01)             |
| US High Yield Spreads, monthly change     |                           |                           |                           |                           |                           | 0.32***<br>(0.05)         | 0.32***<br>(0.05)          |
| Intercept                                 | 0.00<br>(0.02)            | 0.01<br>(0.02)            | 0.00<br>(0.02)            | -0.00<br>(0.02)           | -0.01<br>(0.02)           | 0.00<br>(0.02)            | 0.00<br>(0.02)             |
| Observations                              | 228                       | 228                       | 228                       | 228                       | 227                       | 227                       | 227                        |
| R-squared                                 | 0.08                      | 0.10                      | 0.01                      | 0.04                      | 0.11                      | 0.44                      | 0.44                       |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 2a: Regressions of EME Corporate Spreads on US Treasury Yields, With Growth Shocks**

|  | EME Corporate Spreads, monthly changes |                                  |                                  |                                  |                                  |                                  |
|--|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|  | Using US 2yr Yields                    |                                  |                                  | Using US 10yr Yields             |                                  |                                  |
|  | (1)<br>OLS<br>2006m1-<br>2024m12       | (2)<br>OLS<br>2006m2-<br>2024m12 | (3)<br>OLS<br>2006m2-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m2-<br>2024m12 |
| Growth Shocks                              | -0.89***<br>(0.23)                     | -1.02***<br>(0.24)               | 0.02<br>(0.16)                   | -0.45*<br>(0.24)                 | -0.40*<br>(0.24)                 | 0.60*<br>(0.36)                  |
| Monetary Shocks                            | -0.44**<br>(0.21)                      | -0.83***<br>(0.30)               | -0.48***<br>(0.18)               | -0.52**<br>(0.23)                | -0.83***<br>(0.31)               | -0.54***<br>(0.15)               |
| VIX,<br>monthly change                     | 0.05***<br>(0.02)                      | 0.04***<br>(0.01)                | 0.01<br>(0.01)                   | 0.06***<br>(0.02)                | 0.05***<br>(0.02)                | 0.01<br>(0.01)                   |
| US Dollar Index, monthly<br>percent change |  | 0.11***<br>(0.04)                | 0.04**<br>(0.02)                 |                                  | 0.10**<br>(0.04)                 | 0.03**<br>(0.01)                 |
| US High Yield Spreads,<br>monthly change   |  |                                  | 0.58***<br>(0.14)                |                                  |                                  | 0.65***<br>(0.14)                |
| Intercept                                  | 0.00<br>(0.03)                         | -0.01<br>(0.03)                  | -0.01<br>(0.02)                  | -0.00<br>(0.03)                  | -0.01<br>(0.03)                  | -0.01<br>(0.02)                  |
| Observations                               | 228                                    | 227                              | 227                              | 228                              | 227                              | 227                              |
| R-squared                                  | 0.38                                   | 0.48                             | 0.73                             | 0.34                             | 0.42                             | 0.76                             |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 2b: Regressions of EME High Yield Spreads on US Treasury Yields, With Growth Shocks**

|  | EME High Yield Spreads, monthly changes |                                  |                                  |                                  |                                  |                                  |
|--|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|  | Using US 2yr Yields                     |                                  |                                  | Using US 10yr Yields             |                                  |                                  |
|  | (1)<br>OLS<br>2006m1-<br>2024m12        | (2)<br>OLS<br>2006m2-<br>2024m12 | (3)<br>OLS<br>2006m2-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m2-<br>2024m12 |
| Growth Shocks                              | -1.82***<br>(0.51)                      | -2.08***<br>(0.52)               | 0.17<br>(0.31)                   | -1.07**<br>(0.52)                | -0.97*<br>(0.51)                 | 1.14*<br>(0.69)                  |
| Monetary Shocks                            | -0.63<br>(0.45)                         | -1.43**<br>(0.63)                | -0.68**<br>(0.34)                | -0.77<br>(0.47)                  | -1.41**<br>(0.62)                | -0.79***<br>(0.28)               |
| VIX,<br>monthly change                     | 0.11***<br>(0.03)                       | 0.07***<br>(0.02)                | 0.01<br>(0.02)                   | 0.12***<br>(0.04)                | 0.10***<br>(0.03)                | 0.02<br>(0.01)                   |
| US Dollar Index, monthly<br>percent change |   | 0.22***<br>(0.08)                | 0.07**<br>(0.03)                 |                                  | 0.20**<br>(0.08)                 | 0.06**<br>(0.03)                 |
| US High Yield Spreads,<br>monthly change   |   |                                  | 1.24***<br>(0.26)                |                                  |                                  | 1.37***<br>(0.27)                |
| Intercept                                  | 0.01<br>(0.07)                          | -0.02<br>(0.05)                  | -0.01<br>(0.04)                  | 0.00<br>(0.06)                   | -0.02<br>(0.05)                  | -0.02<br>(0.04)                  |
| Observations                               | 228                                     | 227                              | 227                              | 228                              | 227                              | 227                              |
| R-squared                                  | 0.37                                    | 0.48                             | 0.76                             | 0.35                             | 0.43                             | 0.78                             |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 2c: Regressions of EMBI on US Treasury Yields, With Growth Shocks**

|  | EMBI, monthly changes            |                                  |                                  |                                  |                                  |                                  |
|--|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|  | Using US 2yr Yields              |                                  |                                  | Using US 10yr Yields             |                                  |                                  |
|  | (1)<br>OLS<br>2006m1-<br>2024m12 | (2)<br>OLS<br>2006m2-<br>2024m12 | (3)<br>OLS<br>2006m2-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m2-<br>2024m12 |
| Growth Shocks                              | -0.55**<br>(0.23)                | -0.61***<br>(0.23)               | -0.03<br>(0.16)                  | -0.47**<br>(0.18)                | -0.44**<br>(0.18)                | 0.07<br>(0.15)                   |
| Monetary Shocks                            | -0.25*<br>(0.14)                 | -0.44***<br>(0.16)               | -0.25**<br>(0.11)                | -0.24<br>(0.16)                  | -0.39**<br>(0.18)                | -0.24*<br>(0.13)                 |
| VIX,<br>monthly change                     | 0.00<br>(0.01)                   | -0.00<br>(0.01)                  | -0.02***<br>(0.01)               | 0.01<br>(0.01)                   | 0.00<br>(0.01)                   | -0.02***<br>(0.01)               |
| US Dollar Index, monthly<br>percent change |                                  | 0.05***<br>(0.02)                | 0.01<br>(0.01)                   |                                  | 0.05**<br>(0.02)                 | 0.01<br>(0.01)                   |
| US High Yield Spreads,<br>monthly change   |                                  |                                  | 0.32***<br>(0.05)                |                                  |                                  | 0.33***<br>(0.06)                |
| Intercept                                  | 0.00<br>(0.02)                   | -0.00<br>(0.02)                  | 0.00<br>(0.02)                   | 0.00<br>(0.02)                   | -0.00<br>(0.02)                  | -0.00<br>(0.02)                  |
| Observations                               | 228                              | 227                              | 227                              | 228                              | 227                              | 227                              |
| R-squared                                  | 0.11                             | 0.19                             | 0.44                             | 0.10                             | 0.16                             | 0.44                             |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 3: First-Stage Regressions for TSLS in Table 1**

|                 | VIX,<br>monthly<br>change        | USD,<br>monthly %<br>change      | US HY,<br>monthly<br>change      | VIX,<br>monthly<br>change        | USD,<br>monthly<br>% change      | US HY,<br>monthly<br>change      |
|-----------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|                 | Using US 2yr Yield               |                                  |                                  | Using US 10yr Yield              |                                  |                                  |
|                 | (1)<br>OLS<br>2006m1-<br>2024m12 | (2)<br>OLS<br>2006m2-<br>2024m12 | (3)<br>OLS<br>2006m1-<br>2024m12 | (4)<br>OLS<br>2006m1-<br>2024m12 | (5)<br>OLS<br>2006m2-<br>2024m12 | (6)<br>OLS<br>2006m1-<br>2024m12 |
| Monetary Shocks | 10.63***<br>(1.99)               | 5.27***<br>(0.66)                | 0.56**<br>(0.23)                 | 12.43***<br>(1.63)               | 4.80***<br>(0.57)                | 0.71**<br>(0.33)                 |
| Intercept       | 0.09<br>(0.34)                   | 0.14<br>(0.13)                   | 0.00<br>(0.05)                   | 0.13<br>(0.33)                   | 0.15<br>(0.13)                   | 0.00<br>(0.05)                   |
| Observations    | 228                              | 227                              | 228                              | 228                              | 227                              | 228                              |
| R-squared       | 0.08                             | 0.14                             | 0.01                             | 0.14                             | 0.15                             | 0.02                             |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 4: TSLS Estimates, 2006-19 and 2020-24, EME High Yield Spreads**

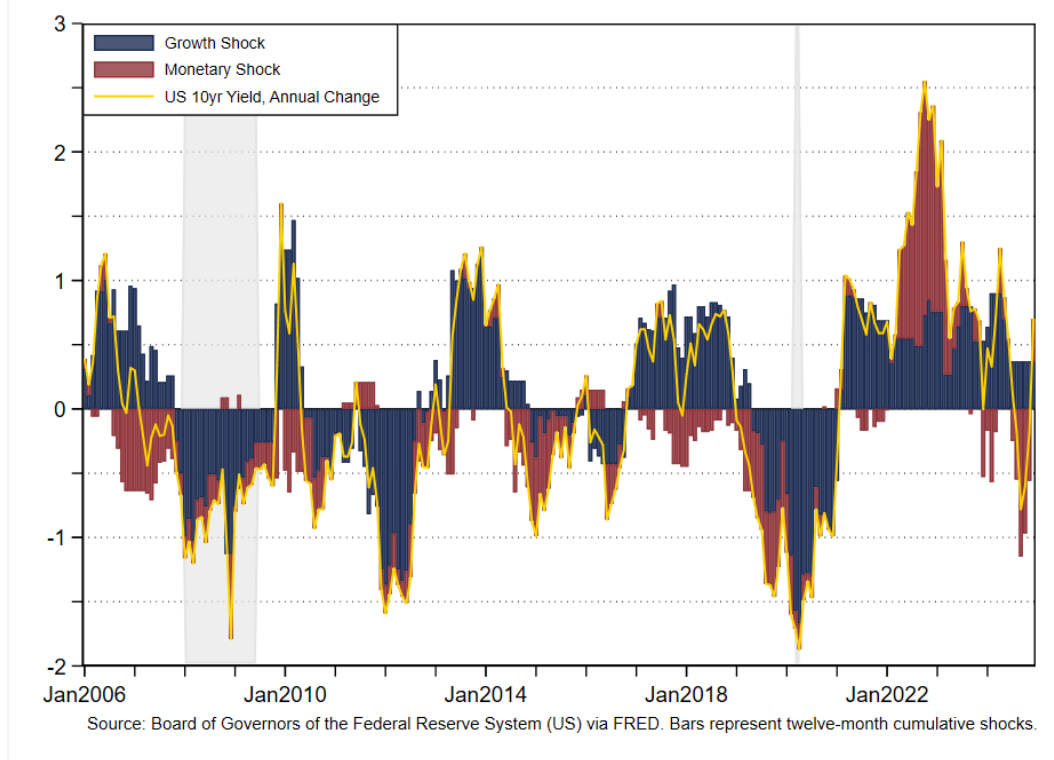
|                               | EME High Yield Spreads, Monthly Changes |                                   |                                   |                                   |                                   |                                   |
|-------------------------------|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|                               | Using US 2yr Yield                      |                                   |                                   | Using US 10yr Yield               |                                   |                                   |
|                               | (1)<br>TSLS<br>2006m2-<br>2019m12       | (2)<br>TSLS<br>2020m1-<br>2024m12 | (3)<br>TSLS<br>2006m2-<br>2024m12 | (4)<br>TSLS<br>2006m2-<br>2019m12 | (5)<br>TSLS<br>2020m1-<br>2024m12 | (6)<br>TSLS<br>2006m2-<br>2024m12 |
| Monetary Shocks               | 1.13*                                   | 0.39**                            | 1.13*                             | 1.29**                            | 0.43*                             | 1.29**                            |
|                               | (0.59)                                  | (0.19)                            | (0.59)                            | (0.54)                            | (0.25)                            | (0.54)                            |
| VIX monthly change,           | 0.04                                    | -0.01                             | 0.04                              | 0.04                              | -0.00                             | 0.04                              |
| residuals                     | (0.02)                                  | (0.01)                            | (0.02)                            | (0.02)                            | (0.01)                            | (0.02)                            |
| USD monthly percent change,   | 0.07**                                  | 0.02                              | 0.07**                            | 0.07**                            | 0.03                              | 0.07**                            |
| residuals                     | (0.04)                                  | (0.06)                            | (0.04)                            | (0.03)                            | (0.05)                            | (0.03)                            |
| US HY Spreads monthly change, | 1.17***                                 | 1.27***                           | 1.17***                           | 1.18***                           | 1.25***                           | 1.18***                           |
| residuals                     | (0.27)                                  | (0.22)                            | (0.28)                            | (0.28)                            | (0.22)                            | (0.29)                            |
| Dummy = 1 after 2020m1        |   |                                   | -0.06                             |                                   |                                   | -0.07                             |
|                               |   |                                   | (0.08)                            |                                   |                                   | (0.08)                            |
| Monetary Shocks X Dummy       |   |                                   | -0.74                             |                                   |                                   | -0.85                             |
|                               |   |                                   | (0.62)                            |                                   |                                   | (0.60)                            |
| VIX monthly change,           |   |                                   | -0.04*                            |                                   |                                   | -0.04                             |
| Residuals X Dummy             |   |                                   | (0.03)                            |                                   |                                   | (0.03)                            |
| USD monthly percent change,   |   |                                   | -0.06                             |                                   |                                   | -0.04                             |
| Residuals X Dummy             |   |                                   | (0.07)                            |                                   |                                   | (0.06)                            |
| US HY Spreads monthly change, |   |                                   | 0.10                              |                                   |                                   | 0.07                              |
| Residuals X Dummy             |   |                                   | (0.35)                            |                                   |                                   | (0.36)                            |
| Intercept                     | 0.03                                    | -0.03                             | 0.03                              | 0.04                              | -0.03                             | 0.04                              |
|                               | (0.05)                                  | (0.06)                            | (0.05)                            | (0.06)                            | (0.06)                            | (0.06)                            |
| Observations                  | 167                                     | 60                                | 227                               | 167                               | 60                                | 227                               |
| R-squared                     | 0.76                                    | 0.78                              | 0.77                              | 0.76                              | 0.79                              | 0.77                              |

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Columns 3 and 6 divide the overall analysis period (2006m2 – 2024m12) by interacting explanatory variables with a dummy set to 1 after 2020m1.



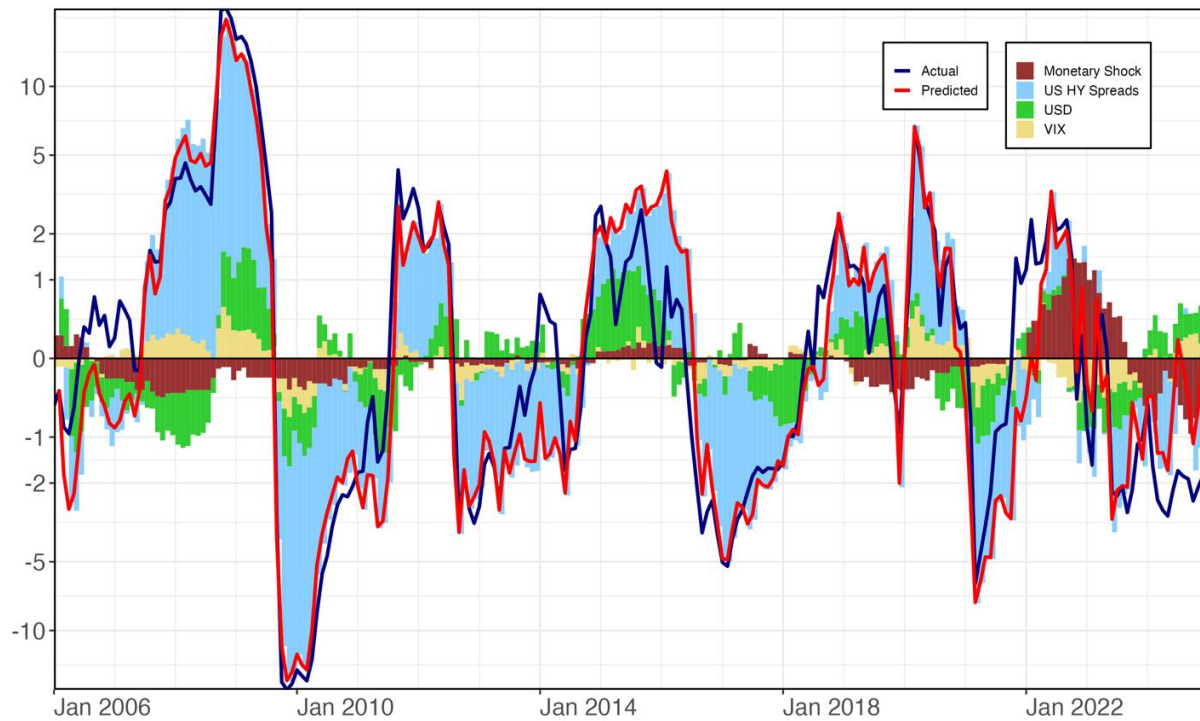
## IX. Appendix: Figures

Appendix Figure 1. Monetary and Growth Shocks Based on US 10-year Treasury Yield

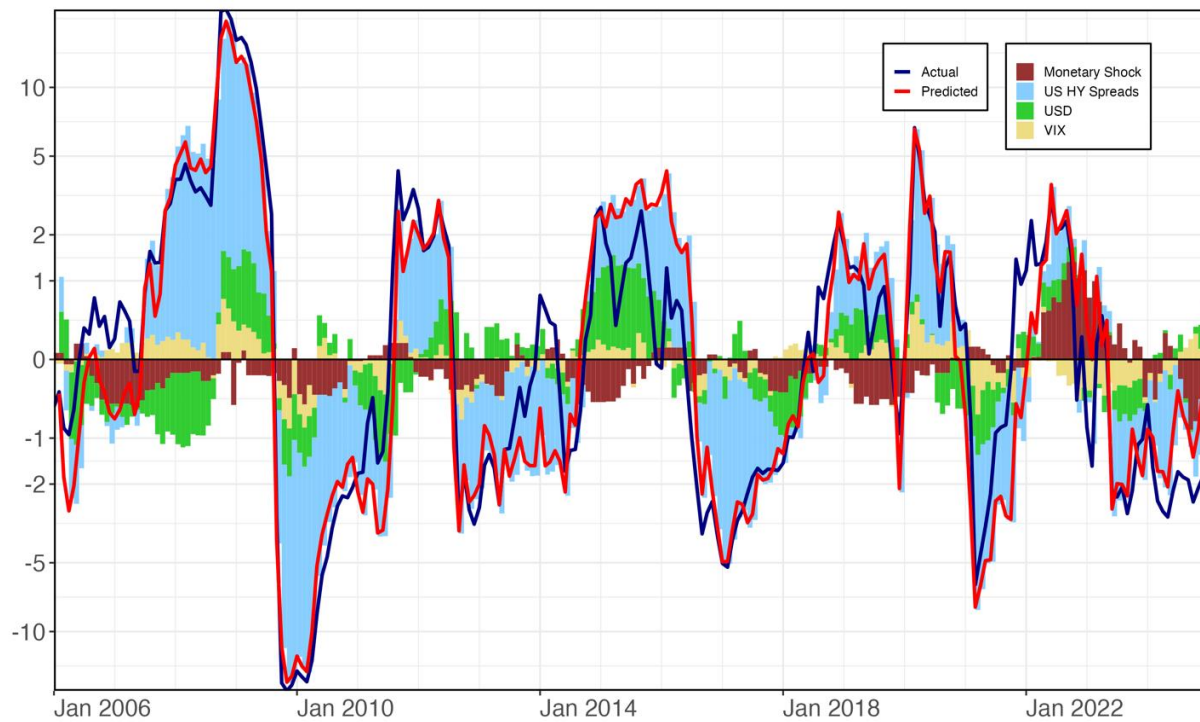


## Appendix Figure 2a. Model-Based Decompositions of Evolution of EME High Yield Spreads

*Panel A: Monetary Shocks Based on 2-Year Yields*



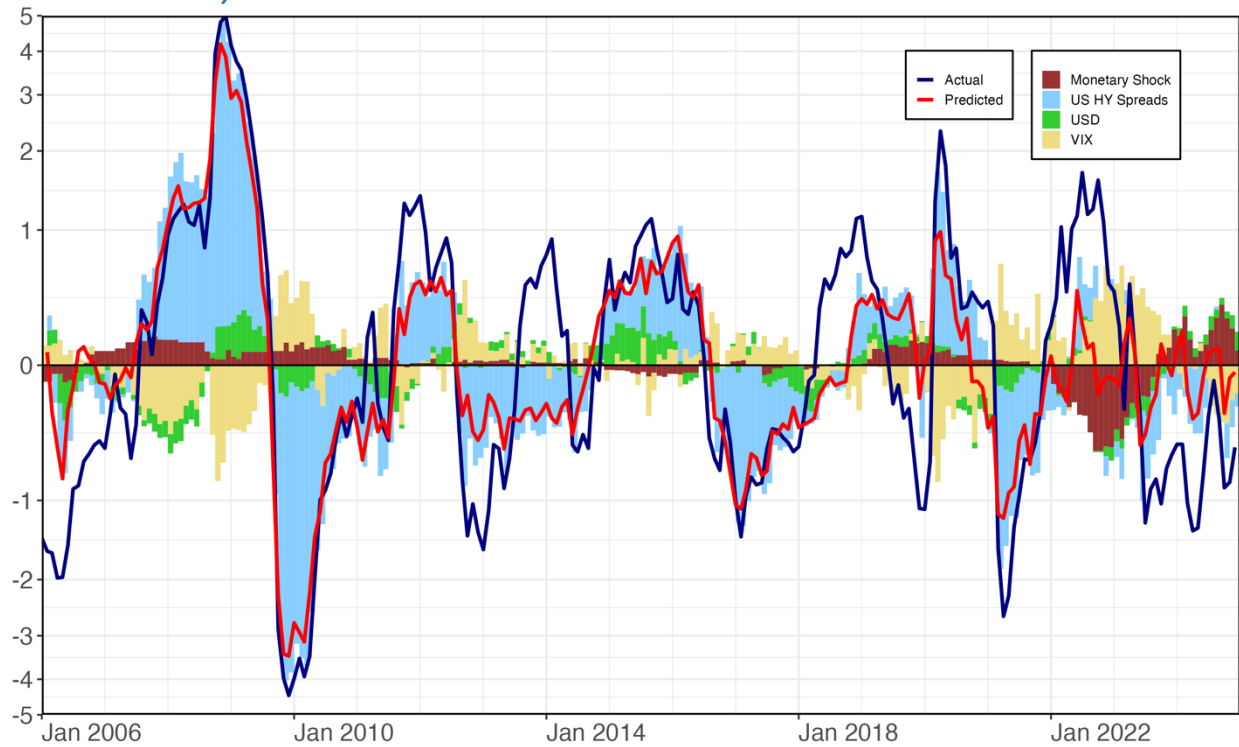
*Panel B: Monetary Shocks Based on 10-Year Yields*



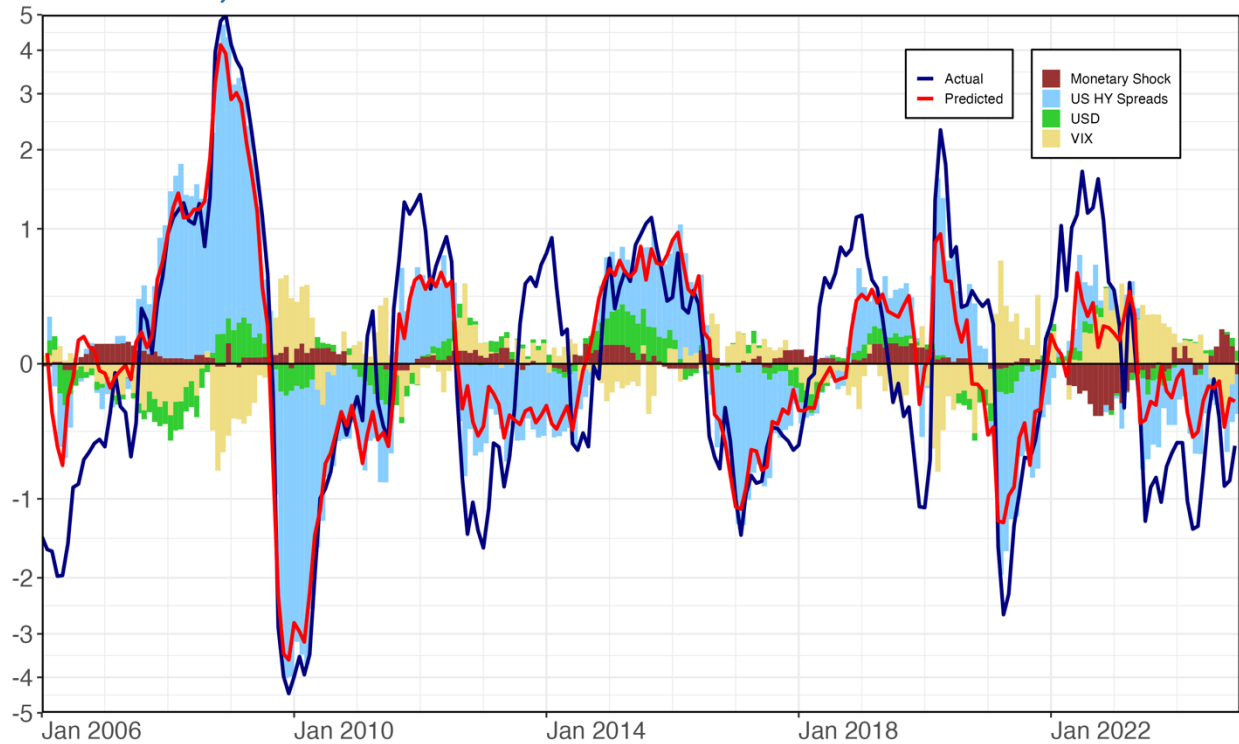
Note: The plots use a log scale.

## Appendix Figure 2b. Model-Based Decompositions of Evolution of EMBI

*Panel A: Monetary Shocks Based on 2-Year Yields*

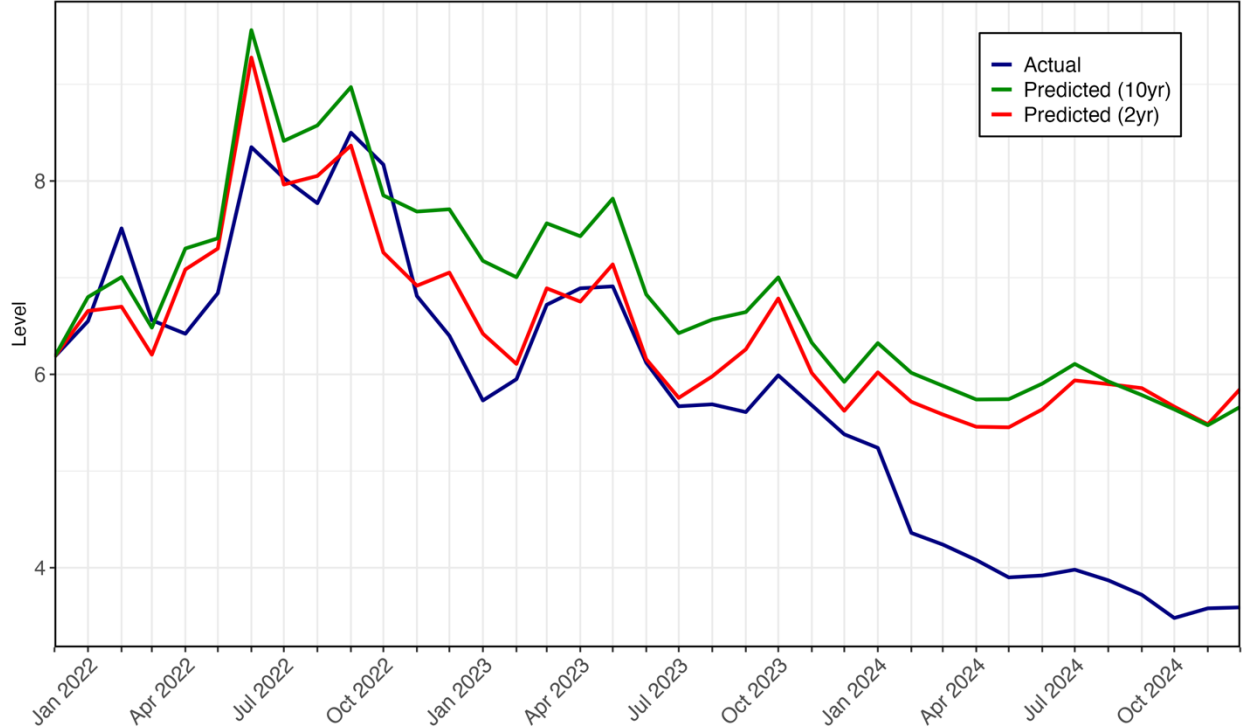


*Panel B: Monetary Shocks Based on 10-Year Yields*

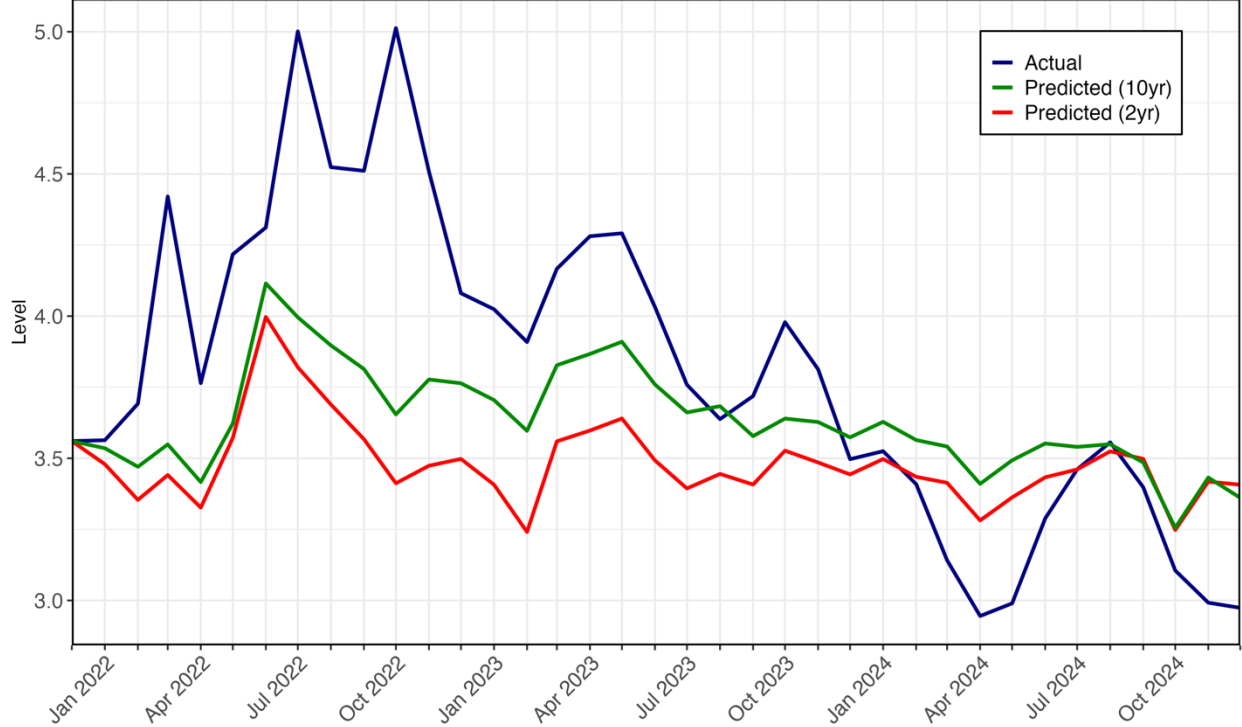


Note: The plots use a log scale.

Appendix Figure 3a. Actual and Predicted EME High Yield Spreads during Tightening Cycle

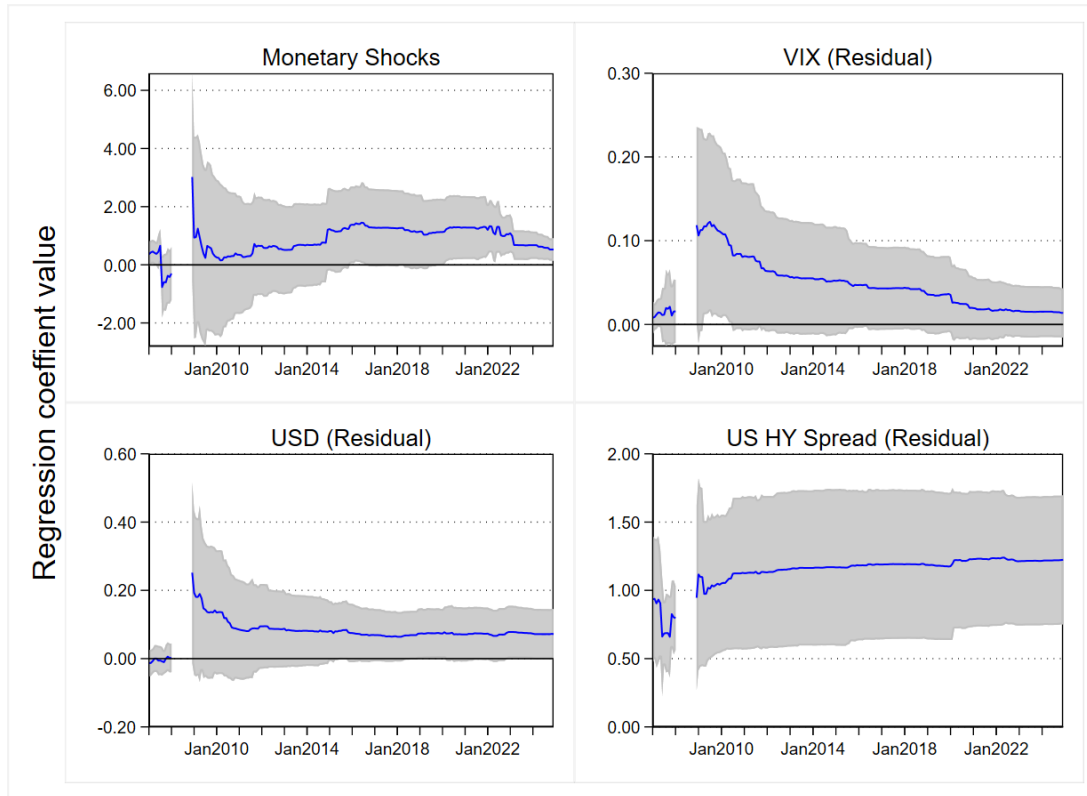


Appendix Figure 3b. Actual and Predicted EMBI Spreads during Tightening Cycle

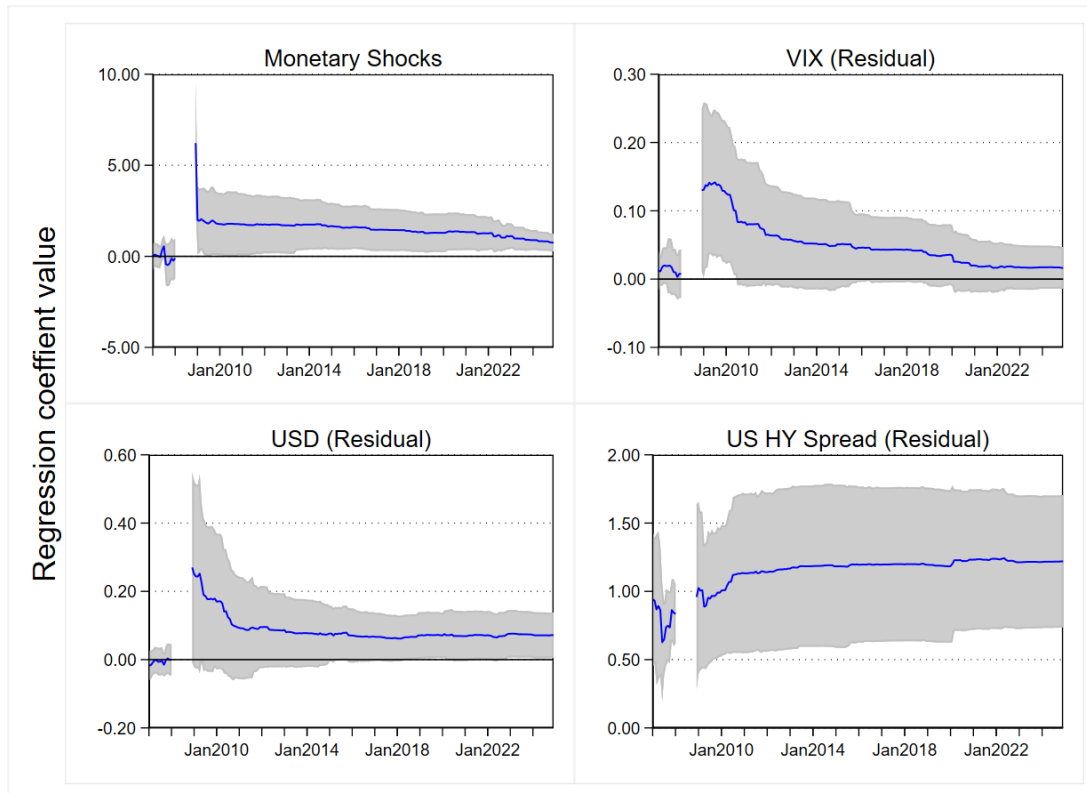


## Appendix Figure 4. Recursive Estimates of the TSLS Estimates of EME High Yield Spreads

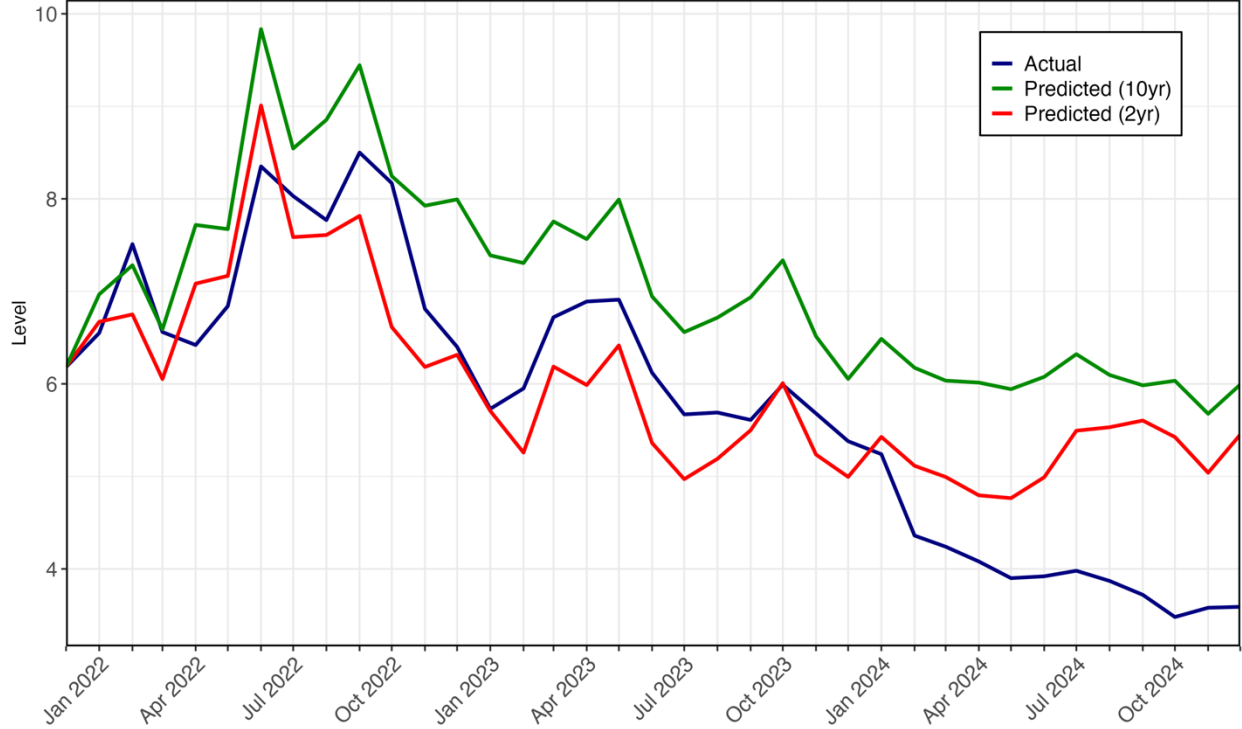
### Panel A: Based on 2-Year Yields



### Panel B: Based on 10-Year Yields



Appendix Figure 5. Actual and Predicted EME High Yield Spreads based on 2006-19 Sample Period



## X. Appendix: Data Sources

| Variable  | Source   |
|---|--|
| S&P 500   | S&P Global, accessed through CEIC                              |
| EMBI  | J.P. Morgan, Morgan Markets                                    |
| EME Corporate Spreads                                 | Ice Data Indices, LLC via FRED                                 |
| EME High Yield Spreads                                | Ice Data Indices, LLC via FRED                                 |
| US High Yield Spreads                                 | Ice Data Indices, LLC via FRED                                 |
| Nominal Advanced Foreign Economies<br>US Dollar Index | Board of Governors of the Federal Reserve System (US) via FRED |
| CBOE Volatility Index: VIX                            | Chicago Board Options Exchange via FRED                        |
| US 2-Year Treasury Yield                              | Board of Governors of the Federal Reserve System (US) via FRED |
| US 10-Year Treasury Yield                             | Board of Governors of the Federal Reserve System (US) via FRED |