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Please cite paper as:

Hoek, Jasper, Steve Kamin, and Emre Yoldas (2020). When is Bad News Good News? U.S. Monetary Policy, Macroeconomic News, and Financial Conditions in Emerging Markets. International Finance Discussion Papers 1269.

<https://doi.org/10.17016/IFDP.2020.1269>



International Finance Discussion Papers

Board of Governors of the Federal Reserve System

Number 1269

January 2020

Board of Governors of the Federal Reserve System

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When is Bad News Good News? U.S. Monetary Policy, Macroeconomic News, and Financial Conditions in Emerging Markets

Jasper Hoek, Steve Kamin, and Emre Yoldas*

January 14, 2020

Abstract

Rises in U.S. interest rates are often thought to generate adverse spillovers to emerging market economies (EMEs). We show that what appears to be bad news for EMEs might actually be good news, or at least not-so-bad news, depending on the source of the rise in U.S. interest rates. We present evidence that higher U.S. interest rates stemming from stronger U.S. growth generate only modest spillovers, while those stemming from a more hawkish Fed policy stance or inflationary pressures can lead to significant tightening of EME financial conditions. Our identification of the sources of U.S. rate changes is based on high-frequency moves in U.S. Treasury yields and stock prices around FOMC announcements and U.S. employment report releases. We interpret positive comovements of stocks and interest rates around these events as growth shocks and negative comovements as monetary shocks, and estimate the effect of these shocks on emerging market asset prices. For economies with greater macroeconomic vulnerabilities, the difference between the impact of monetary and growth shocks is magnified. In fact, for EMEs with very low levels of vulnerability, a growth-driven rise in U.S. interest rates may even ease financial conditions in some markets.

Keywords: Monetary Policy, Spillovers, Emerging Markets, Growth Shock, Monetary Shock, Financial Conditions.

JEL Codes: E5, F3.

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1. Introduction

A large and growing literature focuses on cross-border spillovers from Federal Reserve (Fed) policy and finds material effects on foreign financial conditions, especially in emerging market economies (EMEs).¹ The analysis typically focuses on the effects of monetary policy “shocks,” that is, changes in the monetary policy stance that do not represent a direct response to changes in the U.S. macroeconomic environment. This approach provides an incomplete assessment of how U.S. monetary policy actions spill over to foreign economies, however, because these policy actions do not occur in a vacuum, but usually represent responses to macroeconomic shocks. Depending on the shocks prompting Fed actions, the spillovers may differ. Thus, what appears to be bad news for EMEs—that is, a rise in U.S. interest rates—might actually be good news, or at least not-so-bad news, depending on why the rise in interest rates occurred.

Starting from the framework of a standard Taylor-rule, we can envisage three distinct reasons why the Fed might alter its monetary policy stance. Consider a rise in in the U.S. policy interest rate. This could reflect, first, a hawkish shift in the Fed’s reaction function, that is, a pure monetary policy shock. Such a development would likely tighten financial conditions and weigh on economic activity abroad, both because of the spillover of tighter U.S. financial conditions, and because higher U.S. interest rates would tend to weaken the U.S. economy and thus reduce its imports from its trading partners. Second, a rise in policy rates could reflect a positive shock to inflation, a key variable in the reaction function; as in the case of the “hawkish shift,” this would likely also tighten financial conditions and dampen economic activity abroad. Third, higher U.S. interest rates could be driven by stronger economic activity, the other key

¹ See Claessens, Stracca, and Warnock (2016) for a comprehensive survey of the literature on cross-border spillovers. Ammer, De Pooter, Erceg and Kamin (2016) provide an overview of different economic channels through which spillovers operate.

variable in the reaction function; in this case, they would be expected to weigh less on foreign financial assets, as negative spillovers from higher interest rates would be at least partly offset by positive spillovers from higher U.S. growth and imports.

Our paper seeks to test these conjectures by using high-frequency data to analyze the effects on EME asset prices of U.S. monetary policy and macroeconomic news events. For convenience, let us define shocks to the Fed’s reaction function and shocks to interest rates prompted by concerns about higher inflation as “monetary shocks,” since they are both conjectured to have similar effects on EMEs. And let us define changes to policy interest rates made in response to changes in the outlook for economic activity as “growth shocks.”² Thus, we seek to determine whether U.S. monetary shocks have different effects on EMEs than U.S. growth shocks.

To identify these different types of shocks, we employ an event-study approach, focusing on how expected interest rates, measured by the 2-year U.S. Treasury yield, respond to FOMC policy announcements and U.S. employment-report releases. Following on previous research into the information effects of central bank communications, we infer the implications of FOMC announcements or employment-report releases by examining the subsequent co-movement of two-year yields (an indicator of expected monetary policy) and U.S. equity prices (an indicator of expected U.S. economic growth once yields are controlled for).³

Consider, for example, an FOMC announcement leading to both a rise in interest rates and a rise in equity prices. This could occur if market participants interpreted the FOMC’s move as signaling that it saw greater strength in the economy than private forecasters had previously

² Stronger growth can be associated with higher inflation. Therefore, monetary shocks driven by higher inflation are cases where inflationary pressures either dominate growth effects, or emerge from a negative supply shock that reduces growth, or emerge independently from growth.

³ See Nakamura and Steinsson (2018), Cieslak and Schrimpf (2019), and Jarocinski and Karadi (2019).

judged, and this could lead markets to push stock prices upward—we categorize this event as a growth shock. Conversely, a post-FOMC rise in interest rates that was accompanied by a fall in equity prices would more likely reflect a monetary shock: markets would have interpreted the rise in interest rates as reflecting a hawkish shift or inflation fears, either of which would have led investors to downgrade their expectations for growth and push stock prices downward.

Thus, we categorize all events where interest rates and equity prices move in the same direction, whether following FOMC announcements or payroll releases, as growth shocks, and all events where they move in opposite directions as monetary shocks. We then compare the response of EME asset prices—exchange rates, local currency bond yields, CDS spreads, and equities—to these different shocks. In particular, we estimate panel regressions of changes in EME asset prices around FOMC announcements or employment releases on changes in U.S. 2-year yields.

We also divide our monetary shock category into cases reflecting changes in the Federal Reserve reaction function and those reflecting increased inflation concerns. Focusing on FOMC meetings alone (not employment releases), cases where inflation compensation from Treasury Inflation-Protected Securities (TIPS) moved in the same direction as interest rates are considered to reflect inflation concerns; for example, the markets inferred from Fed tightening that it was worried about inflation, and thus they revised upwards their inflation predictions. Cases where inflation compensation moved in opposite directions are considered to reflect shifts in the Fed reaction function; for example, markets inferred from Fed tightening that it had become more hawkish, implying higher interest rates but lower inflation in the future. With observations sorted into these buckets, we estimate the reaction of EME asset prices to all three shocks: reaction-function, inflation, and growth.

Finally, it is well known that EMEs with greater financial and macroeconomic vulnerabilities display greater sensitivity to U.S. monetary and financial developments (see, among others, Ahmed, Coulibaly, and Zlate, 2017). Is this sensitivity more apparent for monetary or growth shocks? To address this question, we estimate panel regressions that include interactions between changes in U.S. interest rates and a measure of the fundamental vulnerability of each EME in the sample.

Our key findings are as follows:

- Before separating FOMC announcements and payroll releases into growth and monetary shocks, we evaluated how EME asset prices responded on average to FOMC announcements and payroll releases. We found that EME asset prices generally decline less in response to rises in U.S. interest rates associated with employment releases (probably because they are interpreted as growth shocks) than those associated with FOMC announcements (which likely are interpreted as monetary shocks).
- The difference between EME asset price responses to identified monetary shocks and growth shocks is even more pronounced. Currencies, CDS spreads, and equities exhibit weak responses to increases in U.S. interest rates stemming from growth shocks – whether associated with FOMC announcements or employment releases – but large and significant responses to higher rates stemming from monetary shocks.
- When we divide the FOMC-announcement observations identified as monetary shocks into those pertaining to observed shifts in reaction functions and those pertaining to

inflation shocks, the latter appear to generally exert stronger negative impacts on EME asset prices.

- Increases in an EME's macroeconomic vulnerabilities make its asset prices more sensitive to both monetary and growth shocks, but this interaction effect is large and statistically significant only for monetary shocks. In fact, for economies with very low levels of vulnerability, U.S. growth shocks may even boost some of their asset prices.
- Our estimates of the different spillovers associated with growth and monetary shocks can be used to interpret past movements in EME asset prices. Our models suggest that the relatively muted response of EME asset prices to U.S. monetary policy tightening in 2018 owed to that tightening being driven more by stronger U.S. growth than by a more hawkish Fed or concerns about inflationary pressures.

As noted at the beginning of this paper, most prior research has focused on the spillover effects of exogenous shocks to monetary policy. To our knowledge, our research is the first to distinguish between effects of growth and monetary shocks (whether shocks to inflation or changes in the Fed's reaction function) on EME asset prices using high frequency data. Accordingly, the findings summarized above are novel, and should prove valuable in understanding and anticipating the effects of future U.S. monetary policies.

The plan of the remainder of this paper is as follows. Section 2 reviews the prior literature on this topic, while Section 3 describes the data and research design. Section 4 summarizes our main findings, and Section 5 uses these findings to assess the role of growth versus monetary shocks in the recent Fed tightening cycle. Section 6 concludes.

2. Literature review

Cross-border spillovers from U.S. monetary policy to financial asset prices are well documented in the literature and such findings predate the GFC. For example, Ehrmann and Fratzscher (2009) and Hausman and Wongswan (2011) find significant effects of Fed policy on equity prices and other assets.⁴ In addition, some studies examine the spillovers from U.S. macroeconomic data releases, see for example Robitaille and Roush (2006) and Andritzky, Bannister, and Tamirisa (2007).

Since the GFC, there has been considerably more research focused on monetary policy spillovers. Event studies that isolate FOMC surprises and estimate their impact on foreign financial markets include Rogers, Scotti and Wright (2014), Bauer and Neely (2014), Glick and Leduc (2015), Neely (2015), Curcuru, Kamin, Li, and Rodriguez (2018), and Gilchrist, Yue, and Zakrajsek (2019). Other strands of the research focus on effects of U.S. policy shocks on capital flows, such as Fratzscher, Lo Duca and Straub (2017). Finally, a growing literature focuses on monetary policy spillovers working through the bank lending channel following the seminal work of Bruno and Shin (2015) (see for example Brauning and Ivashina (2019) among others).⁵ Most of these papers concur that a monetary policy tightening (loosening) shock in the United States leads to tighter (looser) financial conditions, reduced (increased) asset prices, and lower (higher) economic activity abroad.

There is also growing evidence for the role of country characteristics in determining response of EMEs to foreign shocks. Chen, Mancini-Grifolli and Sahay (2014), Takáts and Vela (2014), Ahmed, Coulibaly and Zlate (2017), Mishra, Moriyama, N'Diaye and Nguyen (2014),

⁴ See also Craine and Martin (2008), Frankel, Schmukler and Servén (2008) and Bluedorn and Bowdler (2011).

⁵ An important channel for this spillover is fluctuations in cost of foreign currency borrowing by EME firms; a stronger U.S. dollar increases debt servicing costs and vice versa. Akinci and Queralto (2019) build a two-country New Keynesian model featuring this balance sheet channel and find that it magnifies effects of a Fed rate hike.

and Bowman, Londono and Saprizza (2015) all find that spillovers from U.S. monetary policy are smaller for countries with stronger fundamentals.

Nonetheless, some studies find a limited role for fundamentals. Eichengreen and Gupta (2015) and Aizenman, Binici and Hutchinson (2016) find that better fundamentals did not insulate EMEs during the taper tantrum, while Kearns, Schrimpf, and Xia (2019) find that macroeconomic variables do not help explain the strength of spillovers from seven advanced economy central banks.

Little research has focused on the topic of our paper: how foreign spillovers from monetary policy differ, depending on the shocks to which monetary policy is responding. One exception is Iacoviello and Navarro (2018), who estimate VAR models and find that pure U.S. monetary shocks depress GDP in both advanced and emerging market economies; conversely, U.S. growth shocks boost output in advanced economies, but lower them in emerging market economies as negative effects of higher U.S. interest rates dominate. However, VAR analyses by Canova (2005) and Feldkircher and Huber (2016), while also finding negative spillovers abroad from U.S. monetary shocks, do not find evidence of adverse spillovers from U.S. demand shocks. Finally, Avdjiev and Hale (2019) find that increases in the federal funds rate are more likely to depress cross-border bank lending to emerging markets during periods of stagnant lending and when increases in the funds rate are driven by deviations from the Taylor rule rather than changes in macroeconomic fundamentals.

Our research entails not only examining EME asset price movements, but also categorizing U.S. surprises based on the information revealed by financial markets. Some recent papers exploit the premise advanced by Romer and Romer (2000) that market participants think either that the central bank has some private information regarding economic fundamentals or

that the central bank's viewpoint causes market participants to update their own beliefs.

Nakamura and Steinsson (2018) use high-frequency data to identify FOMC surprises and show that analysts tend to revise their growth forecasts higher on the back of unexpected increases in real yields, which they interpret as evidence of information effects.

Cieslak and Schrimpf (2019) categorize as monetary news announcements that are associated with negative comovement between stock prices and bond yields, while they categorize growth news and risk premium shocks as events that push stock prices and yields in the same direction. They find that non-monetary news dominate more than half of the information content of central bank communications. Their approach forms the basis for our own classification of monetary and growth shocks.

Finally, Jarocinski and Karadi (2019) use high-frequency changes in stock prices and bond yields to explore information effects in Fed and ECB communications. They find that about a third of FOMC meetings and about half of ECB meetings can be classified as information-effect dominated events. They also show that announcements dominated by information effects have different macroeconomic effects than those dominated by monetary news.

3. Data

To construct our measures of monetary and growth shocks, we use data on 2-year U.S. Treasury yields as a measure of the expected Fed policy path, the S&P 500 stock index as a measure of investor expectations of future profitability and growth after controlling for discount rates, and 5-year Treasury Inflation-Protected Securities (TIPS) as a measure of expected inflation.⁶ In

⁶ Although the 2-year yield offers a good proxy for the expected path of monetary policy at the zero lower bound, it may be limited by calendar- or threshold-based forward guidance covering a period close to two years. Moreover, unconventional policies intended to directly affect longer-term rates may not be reflected in this measure. However,

particular, we use the change in these variables during a one-hour window spanning the release of FOMC statements and U.S. employment reports. As bond and equity prices reflect all publicly available information prior to the release of these events, we assume that changes in the prices of these assets in this narrow window reflect only the surprise associated with the news. We exclude the global financial crisis from our sample and focus on the period from January 2010 to March 2019; prior to then, fewer EME asset prices are available.

To capture changes in EME financial conditions, we consider prices for four types of assets for 22 EMEs as dependent variables in our regressions: exchange rates, sovereign CDS premiums for dollar bonds, 10-year local-currency bond yields, and equity prices.⁷ All EME asset price changes are based on end-of-day values in Bloomberg (Markit in the case of CDS spreads) and we use a 2-day window from the day before the event to the day after. This relatively wide window is necessary to allow us to capture market reactions in different asset segments in all time zones.⁸ Obviously, there are other drivers of EME asset prices over these 2-day windows besides FOMC communications and employment reports, such as domestic or global economic news and communications by central banks other than the Fed. Our identifying assumption is that those drivers are orthogonal to our identified shocks.

To explore the role of country characteristics, we interact shocks with country vulnerability rankings devised by Ahmed, Coulibaly, and Zlate (2017). For each year in our sample, we first order EMEs according to six indicators of vulnerability: current account deficit

as emphasized by Gilchrist, Lopez-Salido, and Zakrajsek (2015), there is a strong connection between surprises in the 2-year rate and longer-term rates around FOMC meetings during the ZLB period. Nonetheless, as a robustness check, we produced all our results restricting the sample to the period from December 2015 onward, when the federal funds rate was no longer constrained by the ZLB. Our results were generally in line with the results we present in the paper, albeit less precisely estimated given the shorter sample. These results are available from the authors upon request.

⁷ For a list of countries and other details regarding data see the appendix.

⁸ As employment reports are typically released on Fridays, the 2-day window for employment releases goes over the weekend.

as a percent of GDP, gross government debt as a percent of GDP, average annual inflation over the past three years, the five-year change in bank credit to the private sector as a share of GDP, the ratio of external debt to exports, and the ratio of foreign exchange reserves to GDP. We then average the rankings across indicators for each EME to come up with a country vulnerability rank. With 22 EMEs in our sample, the values can theoretically range from 1 (least vulnerable) to 22 (most vulnerable) if a country ranks highest or lowest for all six components of the index. In practice, the vulnerability rank ranges from 4.5 to 19.5 in our sample.

4. Results

4.1 *Spillovers from FOMC meetings vs. U.S. employment reports*

For initial data analysis, we first compare spillovers from FOMC announcements and U.S. employment reports, without breaking down those events into monetary shocks and growth shocks. Based on our assumption that movements in stock prices signal changes in expectations for economic growth after controlling for discount rates, we find evidence that FOMC events are dominated by monetary news and employment reports are dominated by growth news. When we regress changes in stock prices on interest rate surprises on FOMC days, we get a statistically significant slope coefficient of -4.1 , as can be seen in panel a of Figure 1. The same regression estimated on employment-report days yields a highly statistically significant positive slope coefficient of 4.4 (panel b).⁹

⁹ This latter outcome is consistent with subdued inflationary pressures in the post-GFC period. In particular, increases in interest rates following employment releases tended to reflect large payroll increases rather than high wage increases (which might have boosted interest rates while lowering profits and stock prices). Moreover, because inflation fears have been muted, markets generally have not expected monetary policy tightening in response to jobs growth to be sharp enough to dampen growth prospects.

To gauge spillovers to EMEs from FOMC announcements and employment reports, we estimate panel regressions, reported in Table 1, in which EME asset prices are regressed on U.S. interest rate surprises. The four sets of two columns in the table show the effects on the four EME asset prices we consider—exchange rates, CDS spreads, local-currency bond yields, and equity prices. The first and second columns in each set show the effect of changes in the 2-year Treasury yield on these assets around FOMC meetings and employment-report releases, respectively. As shown in the first column in Table 1, EME currencies depreciate, on average, 11.7 percent against the dollar for every 100 basis-point interest rate surprise around FOMC meetings.¹⁰ In addition, as shown in columns 3, 5, and 7 of the table, CDS spreads rise 76 basis points, bond yields increase 0.96 percentage points, and stock prices decline almost 10 percent.¹¹ All told, these results indicate that surprise increases in U.S. interest rates associated with FOMC statements lead to a notable tightening of EME financial conditions.

By comparison, as shown in columns 2, 4, 6, and 8 of Table 1, an equivalent rise in U.S. yields around U.S. employment-report releases produce much smaller spillovers. Currencies, equity prices, and CDS move much less, and the effects are statistically insignificant for the latter two indicators. Only bond yields respond by a similar and statistically significant amount to U.S. employment-report surprises as FOMC surprises.

Overall, these results are consistent with the notion that higher U.S. interest rates in response to expectations of stronger U.S. growth have less adverse spillovers to EMEs than those associated with more hawkish Fed actions and communications.

¹⁰ Exchange rates are measured in foreign currency per dollar, so a positive number indicates appreciation of the U.S. dollar (and depreciation of EME currencies).

¹¹ These responses may seem very large, but a 100 basis-point surprise in the 2-year Treasury yield is also very large. Indeed, the standard deviation of our surprise measure around FOMC meetings and employment reports is close to 3.5 basis points. Nakamura and Steinsson (2018) use a similar measure based on federal funds futures prices and report a standard deviation close to 5 basis points.

To provide a benchmark for comparison, we also estimate the effect of changes in the 2-year yield on comparable U.S. assets: U.S. high-yield CDS spreads, the 10-year Treasury yield, and the S&P 500 index.¹² These results, presented in Table 1a, are broadly comparable to those of EME assets: U.S. risky assets rise substantially more in response to FOMC surprises than employment-report surprises.

4.2 *Spillovers from monetary news vs. growth news*

In the central part of our analysis, we compare the effects on EMEs of monetary and growth shocks resulting from both FOMC and employment announcements. Starting with FOMC announcements, markets may interpret a monetary tightening as reflecting the Fed’s expectations of stronger growth, rather than worries about inflation or a hawkish shift in its reaction function. Assuming that stronger expected growth boosts future profits and dividends, the rise in interest rates following such communications should be coupled with higher stock prices (see Cieslak and Schrimpf, 2019). Thus, we classify FOMC announcements around which interest rates and stock prices move in the same direction as ones in which “growth shocks” dominate, while “monetary shocks” are ones in which interest rates and stock prices move in opposite directions.

We use the same approach to classifying U.S. employment releases. We would describe an employment report as revealing growth news if both interest rates and stock prices rose (or fell) in response. But higher U.S. interest rates associated with employment-report releases need not necessarily be driven by positive growth news. For example, a negative supply shock—i.e., higher-than-expected wages coupled with lower-than-expected jobs—could signal higher inflation while reducing real profits and incomes, thereby depressing stock prices. Alternatively,

¹² Since U.S. assets are denominated in dollars, there is no comparable asset to EME currencies.

an employment report could entail only a modest positive jobs surprise, but if the Fed were already on the cusp of raising interest rates, and/or if markets believed the positive jobs report could lead to sufficient monetary tightening, then stock prices could fall as the benefits from higher growth were offset by the rise in the interest rate used to discount future profits. We would classify either of these events as monetary shocks, distinguishing them from growth shocks in which interest rates and stock prices move in the same direction.

The scatterplots in Figure 2 (reproduced from Figure 1, but with the quadrants labeled) show how our classification scheme categorizes the observations in our sample into those in which growth news dominated and those in which monetary news dominated. The majority of FOMC meetings in the sample are classified as “monetary shock” (54 out of 74 as shown in the top panel) while employment-report releases are distributed more evenly between growth and monetary news days (66 and 45 out of 111 reports, respectively as can be seen in the bottom panel).

To assess how spillovers to EME asset prices differ depending on the type of information conveyed in these events, we augment the panel regressions in the previous section by interacting the change in the 2-year U.S. Treasury yield with dummies indicating whether growth news or monetary news dominated the event in question. The results are presented in Table 2. FOMC statements in which growth news dominate have smaller or even positive spillovers to EME assets, in contrast to those in which monetary news dominate. For example, as seen in column 1, the average EME exchange rate depreciates 14 percent in response to a 100 basis-point surprise associated with monetary news compared to a statistically insignificant 3.5 percent in response to comparable growth news. A similar result holds for other EME assets.

Strikingly, once we distinguish between growth and monetary news, spillovers from employment reports (shown in columns 2, 4, 6, and 8) are broadly similar to those from FOMC announcements. Movements in exchange rates, CDS spreads, bond yields, and equity prices associated with monetary news are much larger than those arising in response to growth news.

In sum, our analysis distinguishing between growth and monetary shocks from FOMC events and employment reports leads to a similar conclusion as that comparing the average effects of the two events. Higher U.S. interest rates driven by monetary news lead to a substantial tightening of EME financial conditions while those arising from growth news lead to a modest, albeit still negative, effect.

To provide a benchmark for comparison, Table 2a again presents analogous results with comparable U.S. assets as the dependent variable. And, again, as with EME assets, U.S. risky assets generally respond substantially more to monetary shocks than growth shocks.

4.3 Distinguishing between reaction-function and inflation shocks

Thus far, we have not distinguished between monetary shocks that are due to a change in the Fed's reaction function and those due to a change in inflationary pressure. We can do this by adding information from changes in inflation expectations around FOMC announcements. (We focus on spillovers around FOMC announcements only, since employment-report releases should not contain any information about the Fed's reaction function.) Using inflation compensation derived from 5-year U.S. TIPS yields as a proxy for inflation expectations, we interpret monetary shocks in which expected inflation moves in the opposite direction of 2-year yields following FOMC announcements as a "reaction-function shock" and a monetary shock in

which expected inflation moves in the same direction as an “inflation shock.”¹³ Of the 54 FOMC meetings in our sample in which monetary news dominates, this approach identifies 44 reaction-function shocks and 10 inflation shocks.

Table 3 presents regressions in which monetary shocks are further disaggregated in this way. As seen in the table, spillovers are larger for inflation shocks than reaction-function shocks, perhaps because inflation shocks may be expected to require longer periods of future adjustment to interest rates and financial conditions than shifts in the Fed’s reaction function. However, the confidence bands surrounding these estimates are large, reflecting the relatively small number of days associated with inflation news.

4.4 The role of country characteristics

Lastly, we examine whether characteristics of EMEs themselves affect the degree of spillovers from changes in U.S. financial conditions driven by growth and monetary news. To do this, we estimate modified versions of the regressions presented in Table 2, in which we include the interaction between changes in U.S. Treasury yields around FOMC and employment-report releases and the summary EME vulnerability ranking described in Section 3 and in further detail in the appendix. As in Table 2, we include separate interactions for changes in yields around meetings dominated by growth news and those dominated by monetary news. To minimize concerns about potential endogeneity between financial spillovers and vulnerabilities, we use the vulnerability ranking for the year prior to the FOMC announcement or employment report.

¹³ A caveat is that TIPS are generally less liquid than nominal Treasury securities, so part of the change in the break-even inflation may reflect the liquidity difference as nominal yields adjust more quickly or liquidity demand fluctuates.

Our results, shown in Table 4, suggest that there is significant differentiation between EMEs based on their vulnerabilities, especially in the case of monetary shocks. For example, for every unit increase in the vulnerability ranking, both CDS spreads and bond yields rise on average by an additional 10-13 basis points and equity prices decline by 1-1.5 percent in response to monetary news. Differentiation between EMEs around growth shocks is much smaller, as indicated by the small and statistically insignificant coefficients on the interaction terms; note that the standard errors on these estimates are for the most part similar to those estimated around monetary shocks, suggesting that they are not any less precisely estimated.

To get a better sense for the amount of differentiation across EMEs implied by these estimates, Figures 3 through 6 show, for each EME asset, the predicted effect on each EME in our sample of a 100 basis-point rise in U.S. 2-year yields identified from both FOMC announcements (the top panel) and U.S. employment reports (the bottom panel). The EMEs are sorted by their average vulnerability rank (rounded to the nearest whole number) over the sample period. The blue bars in each figure show the effect of monetary shocks and the red bars show the effect of growth shocks.

Taking the case of EME exchange rates in Figure 3, for example, we see that spillovers from monetary shocks are larger than spillovers from growth shocks, but for both types of shocks (and for both FOMC announcements and employment releases), the size of the spillover rises with the extent of the country's vulnerability. Similar results obtain for CDS spreads, bond yields, and equity prices. Indeed, in several cases, the degree of differentiation is sufficiently large that the sign of the spillover flips between more and less vulnerable economies. For example, spillovers to CDS spreads (Figure 4) are estimated to be favorable for the less vulnerable countries (that is, spreads decline) in response to growth shocks, even though they are

adverse and large for more vulnerable countries. One anomalous result is that growth shocks identified from FOMC announcements appear to benefit equities more in highly vulnerable economies (Figure 6, panel A); however, that result is based on an imprecisely estimated and statistically insignificant coefficient and is probably spurious.

5. Interpreting the 2018 tightening in EME financial conditions

The research described in this paper, so far, focuses on effects during narrow windows around FOMC and payrolls announcements. In this section, we show how our estimates of the different spillovers associated with growth and monetary shocks can be used to predict and interpret movements in EME asset prices over longer periods of time. As shown in figure 7, there was a notable rise in the 2-year U.S. Treasury yield between September 2017 and November 2018. This tightening of U.S. monetary policy appears to have reflected a response to relatively strong U.S. growth, since inflation and inflation expectations remained subdued. Therefore, if our analysis described in the preceding pages is correct, our models of financial spillover based on U.S. growth shocks should be able to better predict the evolution of EME financial conditions over this period than our models based on U.S. monetary shocks. Is this the case?

To shed light on this question, we focus on the evolution of EME asset prices for the four major categories analyzed above and evaluate their paths relative to those predicted by the evolution of U.S. monetary policy. For simplicity, we exclude from our analysis any potential common factors that affect EME assets other than the path of U.S. monetary policy. Departing from our event study approach, which focuses exclusively on FOMC and payroll announcements, we use weekly data on U.S. and EME asset prices. We then consider which

forecast of EME assets prices based on U.S. yields tracks historical data the best, based on three different assumptions:

1. The shocks moving U.S. yields from week to week are exclusively monetary shocks. To incorporate this assumption into our forecast, we multiply changes in U.S. yields by the coefficient on monetary shocks from Table 3 to predict the change in EME asset prices.¹⁴
2. The shocks moving U.S. yields from week to week are exclusively growth shocks. Therefore, analogously to #1 above, we use the coefficient on growth shocks to predict EME asset prices.
3. The shocks moving U.S. yields may shift each week between growth and monetary shocks. Accordingly, as in our original identification scheme, weeks in which the S&P 500 index and the 2-year Treasury yield move in the same direction are classified as growth shocks, and weeks in which they move in opposite directions are classified as monetary shocks.¹⁵ Then, depending on whether a change in U.S. yields in a particular week is classified as a growth or a monetary shock, we multiply it by the corresponding coefficient to predict EME asset prices. This identification scheme categorizes 46 weeks out of 62 as periods when changes in the 2-year yield were growth-driven.

As shown by the black line in panel a of Figure 8, amid firming expectations for Fed tightening, the average EME currency depreciated about 10 percent between September 2017 and November 2018.¹⁶ The red dashed line shows the prediction of EME currencies, based on the assumption that changes in U.S. yields were perceived as resulting from monetary shocks (#1

¹⁴ We average the coefficients from the FOMC and payrolls regressions to do this calculation.

¹⁵ As we are analyzing changes outside narrow event windows, fluctuations in investor risk appetite (or effective risk aversion) driven by other factors can be especially important. Our analysis here can be considered as treating risk shocks the same as growth shocks because the former also moves stock prices and bond yields in the same direction (see Cieslak and Schrimpf (2019) for a detailed discussion).

¹⁶ The index is an unweighted average of the exchange rate against the dollar of the 22 countries in our sample.

above); this prediction calls for considerably more EME currency depreciation than actually occurred, reinforcing the view that rising U.S. interest rates during this period did not reflect inflation fears or a hawkish shift by the Fed. The blue dashed line shows the prediction based on the assumption that changes in U.S. yields are reflect growth shocks (#2 above); this prediction comes closer to tracking actual exchange rates, though ultimately underpredicts the extent of depreciation to some extent. The black dashed line is based on the assumption that changes in U.S. yields may reflect either monetary or growth shocks (#3 above). This prediction does not track period-to-period swings in currencies, which are affected by any number of other shocks hitting emerging markets. However, by the time U.S. yields peaked in early November, the cumulative depreciation in the average EME currency, 10.6 percent, was remarkably close to the 8.5 percent predicted.

Panels b, c, and d repeat the same exercise for the other EME asset prices. They tell a very similar story: the model assuming growth shocks comes much closer to predicting the actual path than that assuming monetary shocks, while the model assuming both types of shocks performs best of all.

All told, these examples provide further support for our view that changes in U.S. interest rates may have very different effects on EME asset prices, depending on the shocks driving those changes. They also show how simple models of monetary policy spillover can be used to interpret movements in EME asset prices. Thus, the evidence from our models support the view that the spillovers from U.S. monetary policy tightening in 2018 were driven more by stronger U.S. growth than by a more hawkish Fed or concerns about inflationary pressures, and this accounts for the relatively muted declines in asset prices for most EMEs during this period.

6. Conclusion

In this paper, we showed that spillovers from U.S. monetary policy to EMEs critically depend on the reason for the change in policy—in particular, whether changes in interest rates are interpreted by financial markets as monetary shocks or growth shocks. This represents a novel and important contribution to the literature on spillovers from monetary policy, which for the most part has treated monetary policy actions as exogenous events.

We first showed that spillovers to EME asset prices (exchange rates, credit spreads, bond yields, and equities) from changes in U.S. interest rates following FOMC meetings are much larger than equivalent changes in interest rates following U.S. employment reports. These results are consistent with the idea that increases in interest rates driven by hawkish shifts in monetary policy or concerns about inflation have more adverse spillovers than rising rates driven by stronger U.S. growth.

We then allowed for the possibility that FOMC announcements may convey news not only about monetary policy but also about growth, and that U.S. employment situation reports may convey news not only about growth but also about prospects for inflation and monetary policy. Accordingly, we categorized FOMC announcements and employment releases as monetary shocks (shocks to the Fed's reaction function or changes in interest rates prompted by concerns about higher inflation) or growth shocks (changes in interest rates made predominantly in response to changes in the growth outlook). We found strong evidence that spillovers to EMEs are much larger for monetary shocks than growth shocks, whether these were identified from FOMC meetings or employment reports. For FOMC meetings alone, we also distinguished between monetary news reflecting a change in the FOMC's reaction function and news reflecting

changing concerns about inflation, and found that the latter exert somewhat larger spillovers than the former.

Third, we found not only that spillovers are greater in the case of more vulnerable EMEs, consistent with previous findings, but also that the sensitivity of spillovers to vulnerability tends to be greater for monetary shocks than for growth shocks. Indeed, we found that positive U.S. growth shocks have positive spillovers to some asset prices in the least vulnerable EMEs.

Finally, we showed how our analysis could be used to interpret past movements in EME asset prices. Our models suggest that the relatively muted response of EME asset prices to U.S. monetary policy tightening in 2018 owed to that tightening being driven more by stronger U.S. growth than by a more hawkish Fed or concerns about inflationary pressures.

In future research, we intend to extend our analysis in several ways. First, we plan to examine how policy actions and other announcements may affect the risk premium investors demand for holding financial assets, and how that, in turn, spills over to EME assets. Second, we seek to analysis how spillovers to EMEs propagate over time, going beyond the two-day window used in this paper.

Appendix: Vulnerability Rankings

This appendix explains the construction of the vulnerability ranking that we use to measure EME vulnerabilities, following Ahmed, Coulibaly, and Zlate (2017).

First, for each of the 22 EMEs in our sample, we obtained annual data for six macroeconomic indicators from Haver Analytics for each year from 2009 to 2018.¹⁷ The variables we use are: (1) current account balance as a percent of GDP, (2) external debt as a percent of exports, (3) international reserves as a percent of GDP, (4) gross general government debt as a percent of GDP, (5) average of annual inflation over the past three years, and (6) 5-year change in bank credit to the private sector as a percent of GDP. Second, for each of the six variables in each year, we rank countries from 1 to 22, such that a higher rank indicates a greater vulnerability. For example, in a given year, the country with the highest government debt as a percent of GDP would receive a 22, while the country with the highest international reserves as a percent of GDP would receive a 1. Third, in each year, we obtain an overall country ranking by averaging the rank for each of the six indicators for each country. Thus, theoretically, the ranking for a country in any given year can range from 1 to 22. In practice, the country rankings range from a low of 4.5 to a high of 19.5 in our sample.

¹⁷ The countries in our sample are: Argentina, Brazil, China, Chile, Colombia, the Czech Republic, Hong Kong, Hungary, India, Indonesia, Israel, Malaysia, Mexico, the Philippines, Poland, Romania, Russia, Singapore, South Africa, South Korea, Thailand, and Turkey.

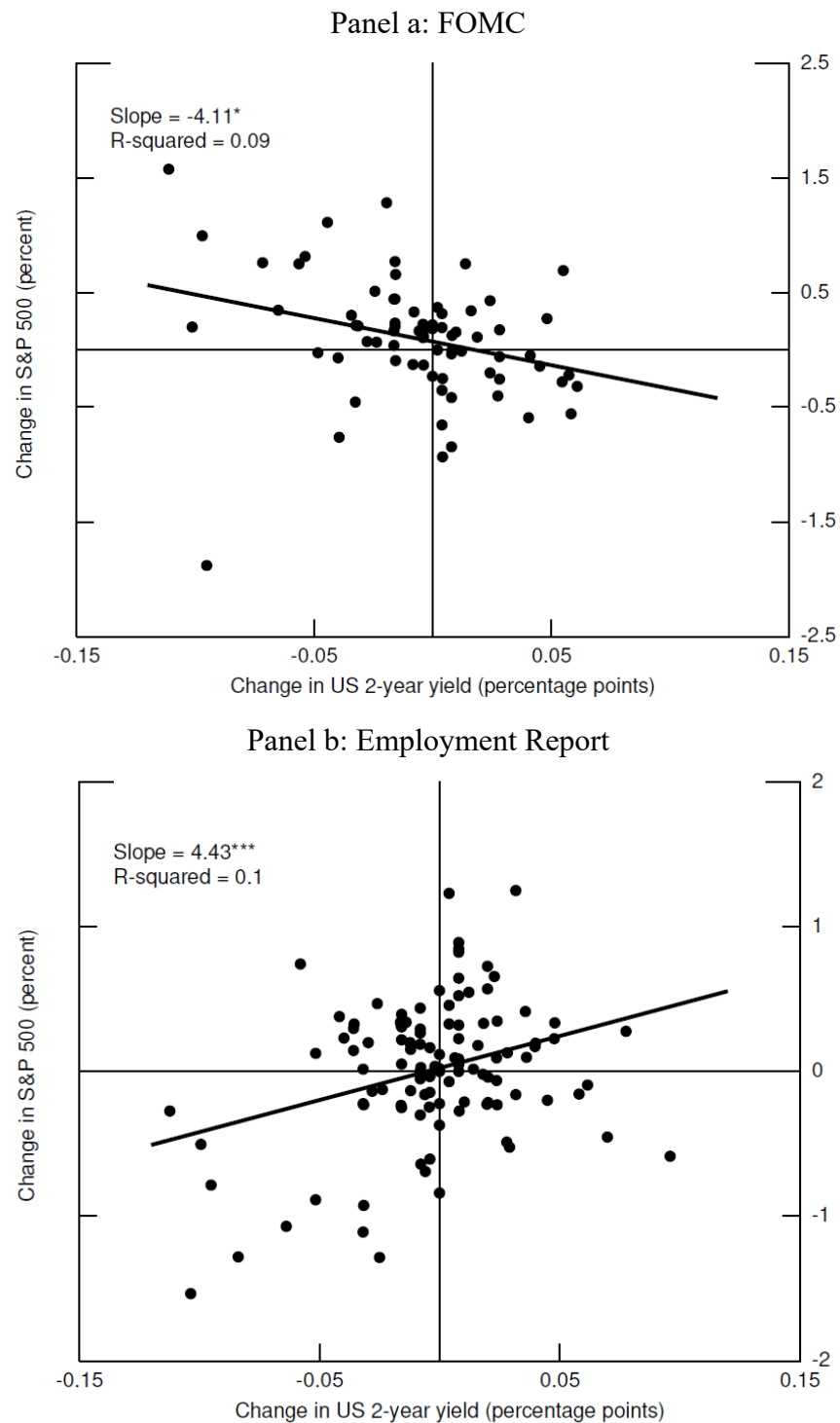
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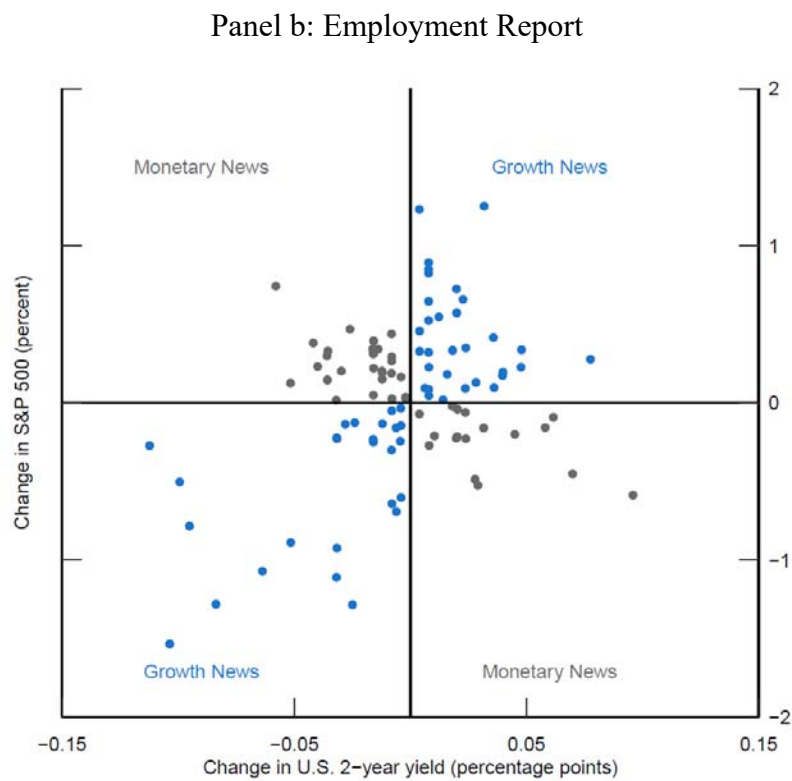
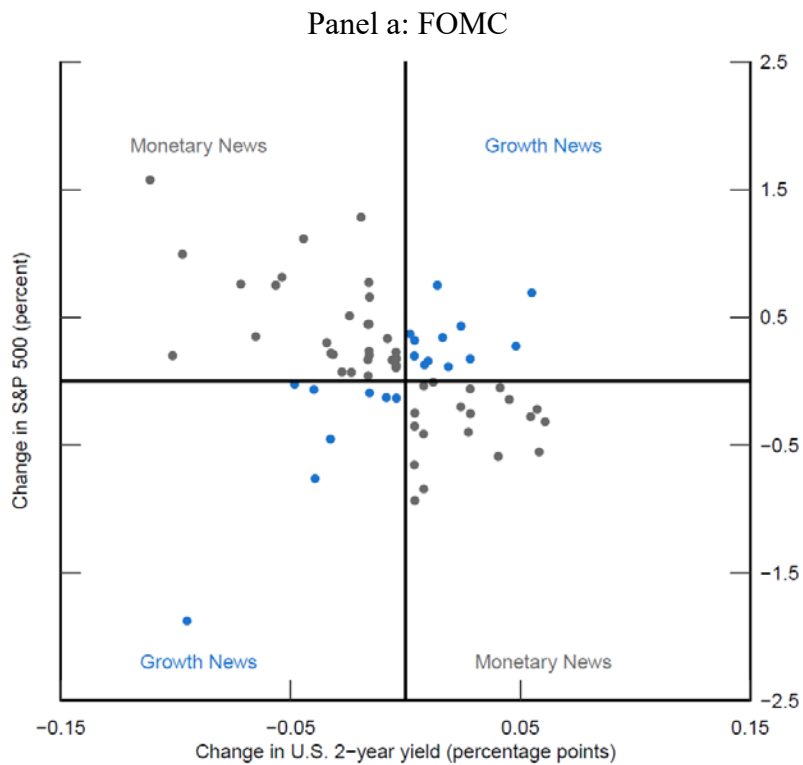
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Figure 1: Treasury Yields and Stock Prices around FOMC Days and Employment Reports



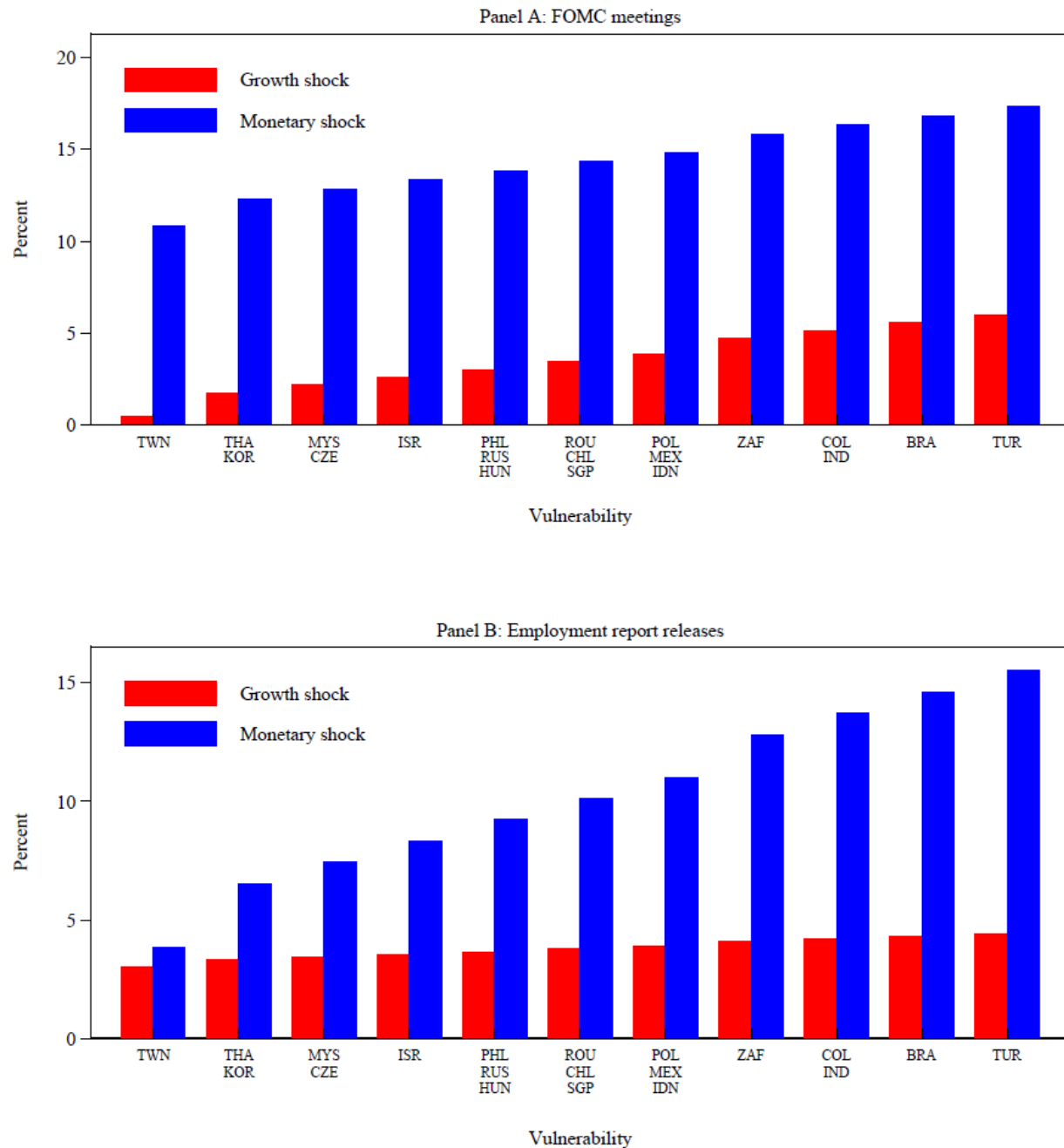
Note: Changes in the 2-year Treasury yield and S&P 500 index within the 1-hour window surrounding FOMC statements and employment reports. Source: Bloomberg. ***, **, and * denote significance at the 1, 5, and 10 percent levels, respectively.

Figure 2: Growth vs Monetary News around FOMC Days and Employment Reports



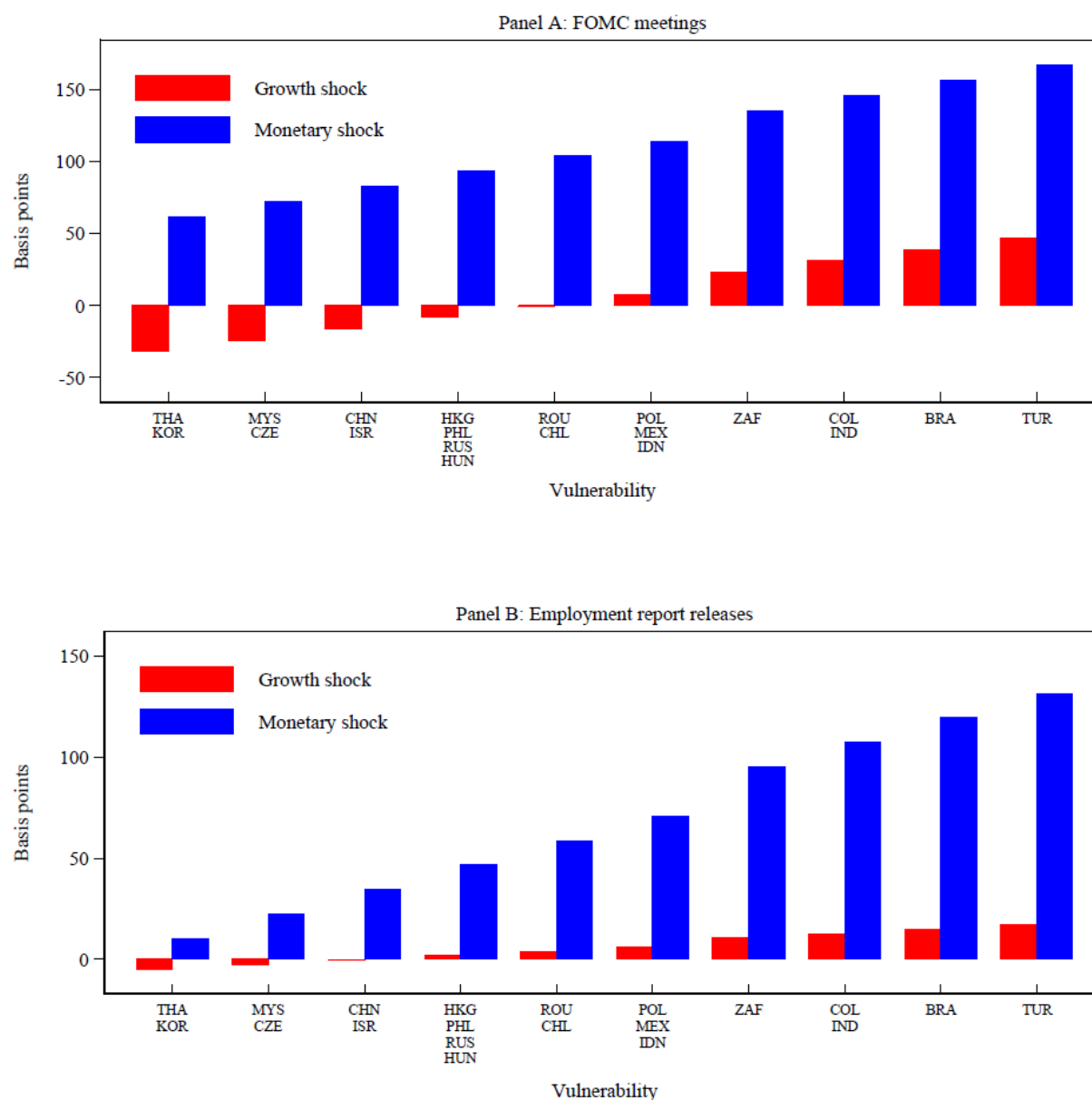
Note: Changes in the 2-year Treasury yield and S&P 500 index within the 1-hour window surrounding FOMC statements and employment reports. Source: Bloomberg.

Figure 3: Effect of 100 basis-point surprise in 2-year U.S. treasury yields on EME exchange rates, by measured vulnerability



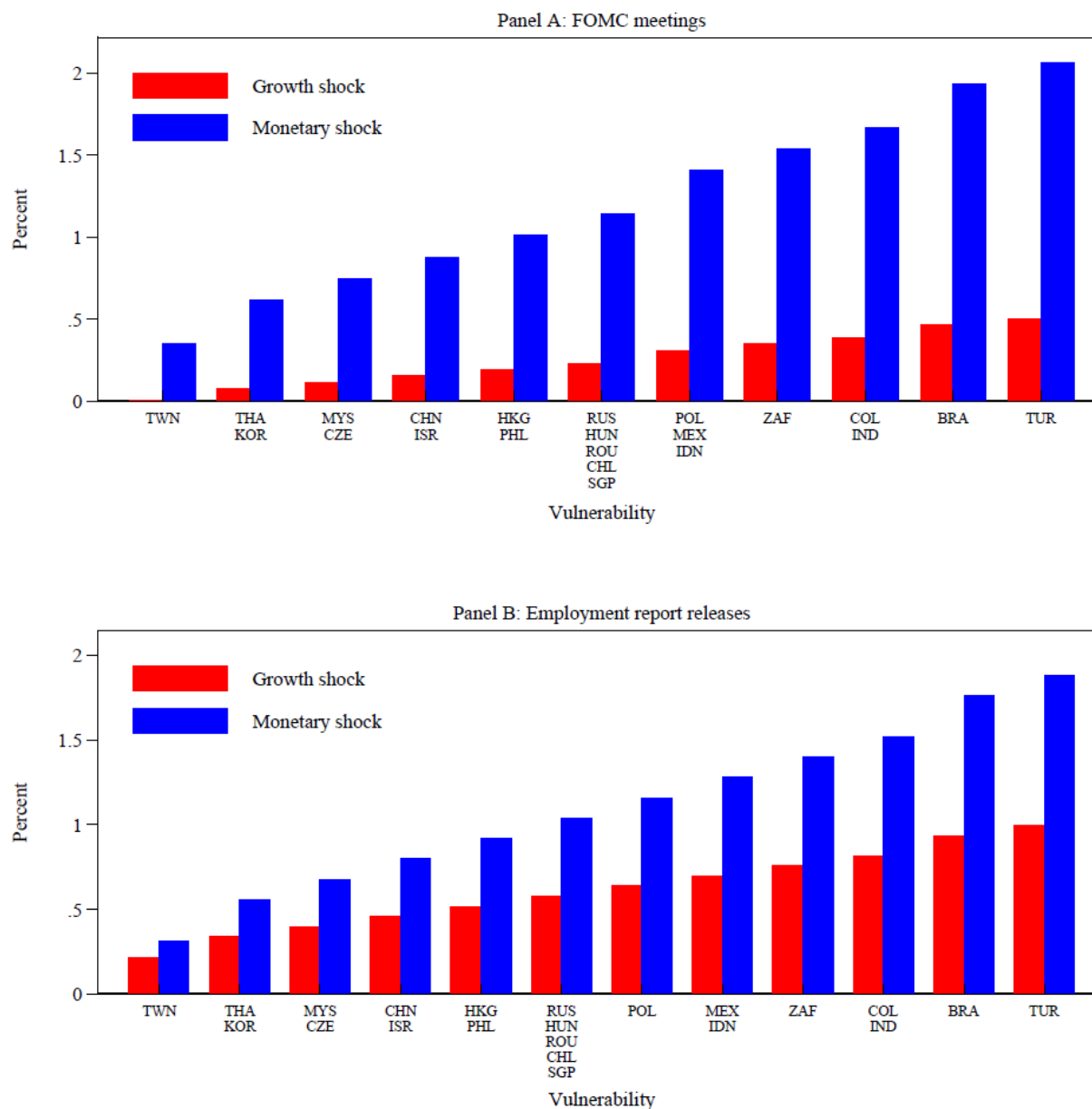
Note: Figure plots predicted effects of a 100 basis-point increase in the U.S. Treasury yield from regressions of the percent change in EME exchange rates in 2-day windows around FOMC meetings on the change in the 2-year U.S. Treasury yield in a narrow 30-minute window around these events, interacted with dummies for the type of news conveyed by each event (“growth” or “monetary” shocks) and lagged EME vulnerability rankings. “Growth shock” is a dummy variable indicating that moves in the 2-year U.S. treasury yields and the S&P 500 are of the same sign in the narrow window. “Monetary shock” is a dummy variable indicating that moves in the 2-year yield and S&P 500 are of the opposite sign. The EME vulnerability rank assigns each country in each year a rank based on six separate vulnerability measures (current account deficit/GDP, external debt/exports, reserves/GDP, government debt/GDP, 3-year average inflation, and 5-year credit growth). Countries are grouped by their average vulnerability ranking since 2009 rounded to the nearest whole number.

Figure 4: Effect of 100 basis-point surprise in 2-year U.S. treasury yields on EME CDS spreads, by measured vulnerability



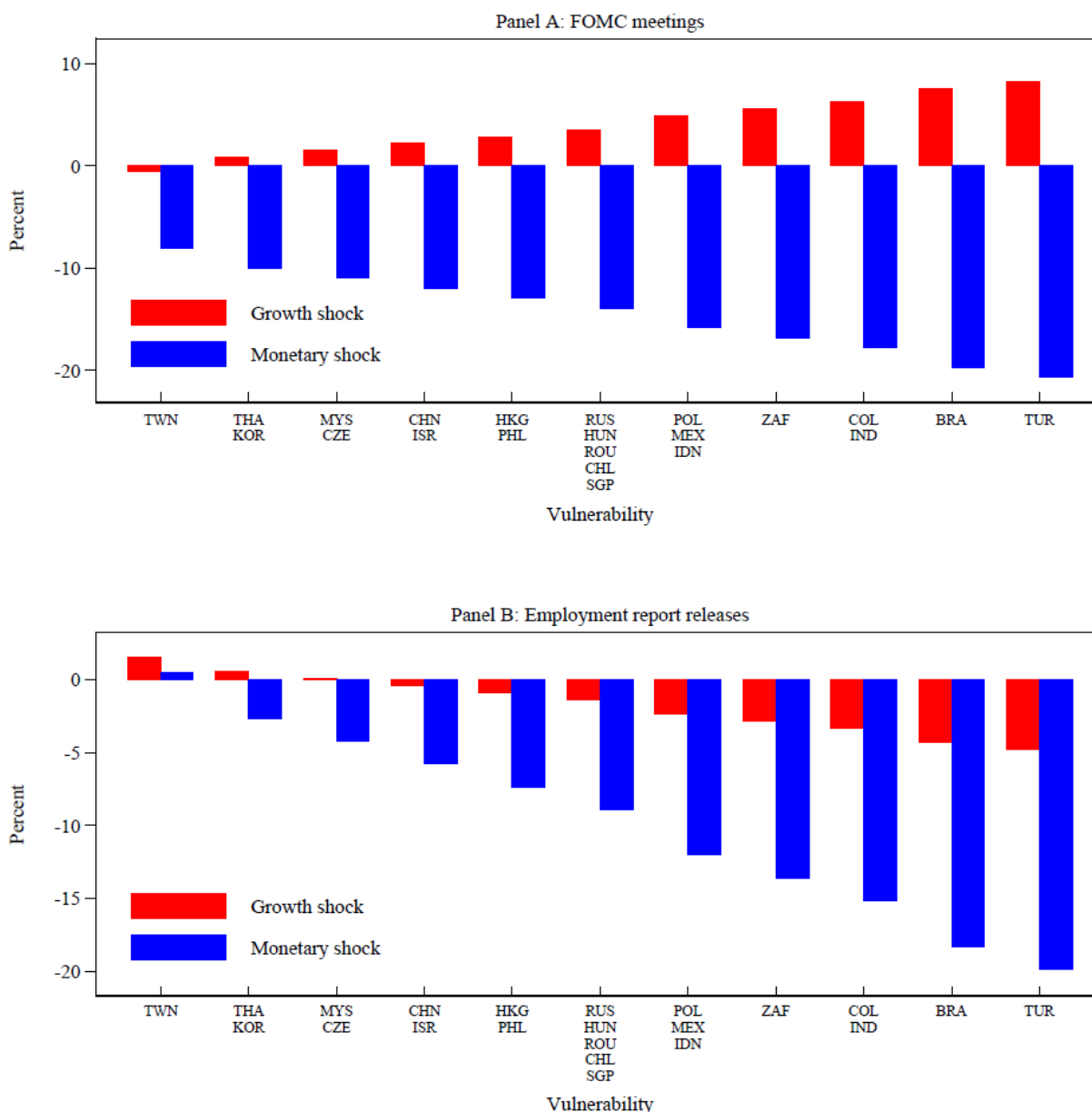
Note: Figure plots predicted effects of a 100 basis-point increase in the U.S. Treasury yield from regressions of the change in EME CDS spreads in 2-day windows around FOMC meetings on the change in the 2-year U.S. Treasury yield in a narrow 30-minute window around these events, interacted with dummies for the type of news conveyed by each event (“growth” or “monetary” shocks) and lagged EME vulnerability rankings. “Growth shock” is a dummy variable indicating that moves in the 2-year U.S. treasury yields and the S&P 500 are of the same sign in the narrow window. “Monetary shock” is a dummy variable indicating that moves in the 2-year yield and S&P 500 are of the opposite sign. The EME vulnerability rank assigns each country in each year a rank based on six separate vulnerability measures (current account deficit/GDP, external debt/exports, reserves/GDP, government debt/GDP, 3-year average inflation, and 5-year credit growth). Countries are grouped by their average vulnerability ranking since 2009 rounded to the nearest whole number.

Figure 5: Effect of 100 basis-point surprise in 2-year U.S. treasury yields on EME local-currency bond yields, by measured vulnerability



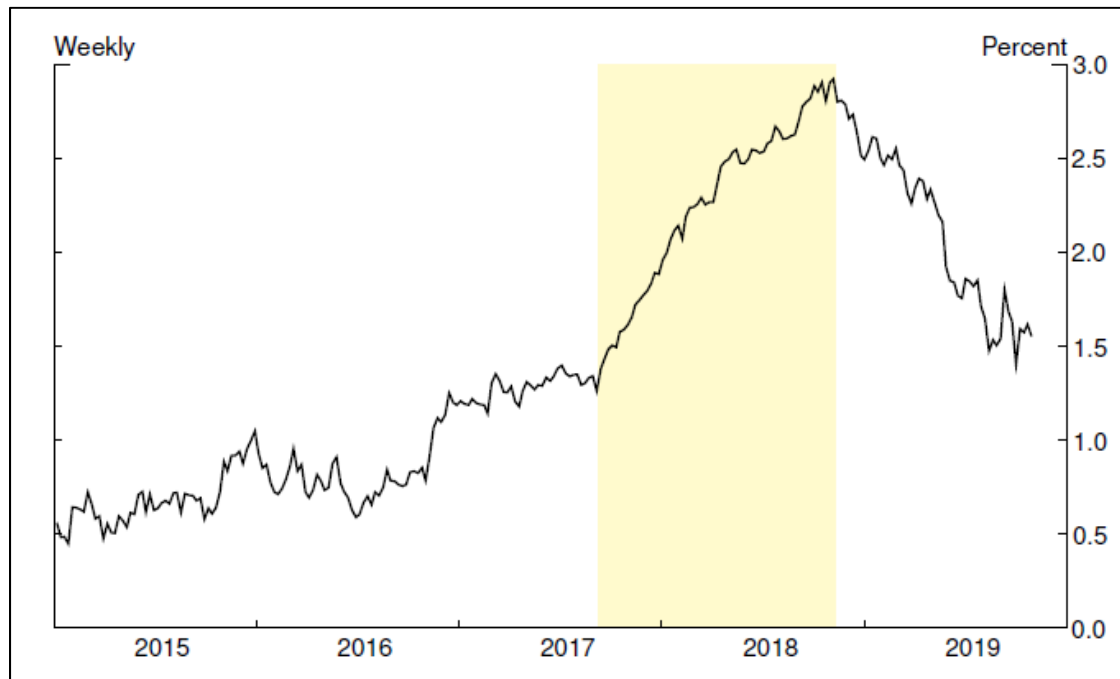
Note: Figure plots predicted effects of a 100 basis-point increase in the U.S. Treasury yield from regressions of the change in EME local-currency bond yields in 2-day windows around FOMC meetings on the change in the 2-year U.S. Treasury yield in a narrow 30-minute window around these events, interacted with dummies for the type of news conveyed by each event (“growth” or “monetary” shocks) and lagged EME vulnerability rankings. “Growth shock” is a dummy variable indicating that moves in the 2-year U.S. treasury yields and the S&P 500 are of the same sign in the narrow window. “Monetary shock” is a dummy variable indicating that moves in the 2-year yield and S&P 500 are of the opposite sign. The EME vulnerability rank assigns each country in each year a rank based on six separate vulnerability measures (current account deficit/GDP, external debt/exports, reserves/GDP, government debt/GDP, 3-year average inflation, and 5-year credit growth). Countries are grouped by their average vulnerability ranking since 2009 rounded to the nearest whole number.

Figure 6: Effect of 100 basis-point surprise in 2-year U.S. treasury yields on EME equity prices, by measured vulnerability



Note: Figure plots predicted effects of a 100 basis-point increase in the U.S. Treasury yield from regressions of the percent change in EME equity prices in 2-day windows around FOMC meetings on the change in the 2-year U.S. Treasury yield in a narrow 30-minute window around these events, interacted with dummies for the type of news conveyed by each event (“growth” or “monetary” shocks) and lagged EME vulnerability rankings. “Growth shock” is a dummy variable indicating that moves in the 2-year U.S. treasury yields and the S&P 500 are of the same sign in the narrow window. “Monetary shock” is a dummy variable indicating that moves in the 2-year yield and S&P 500 are of the opposite sign. The EME vulnerability rank assigns each country in each year a rank based on six separate vulnerability measures (current account deficit/GDP, external debt/exports, reserves/GDP, government debt/GDP, 3-year average inflation, and 5-year credit growth). Countries are grouped by their average vulnerability ranking since 2009 rounded to the nearest whole number.

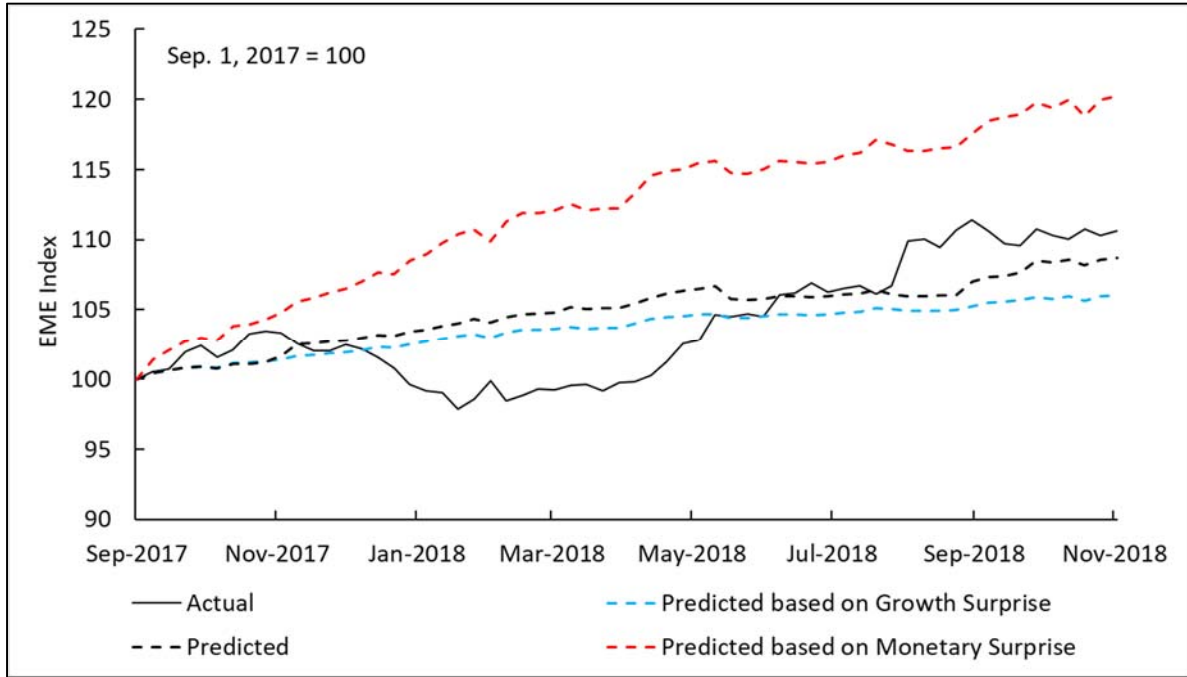
Figure 7: 2-year Treasury Yield



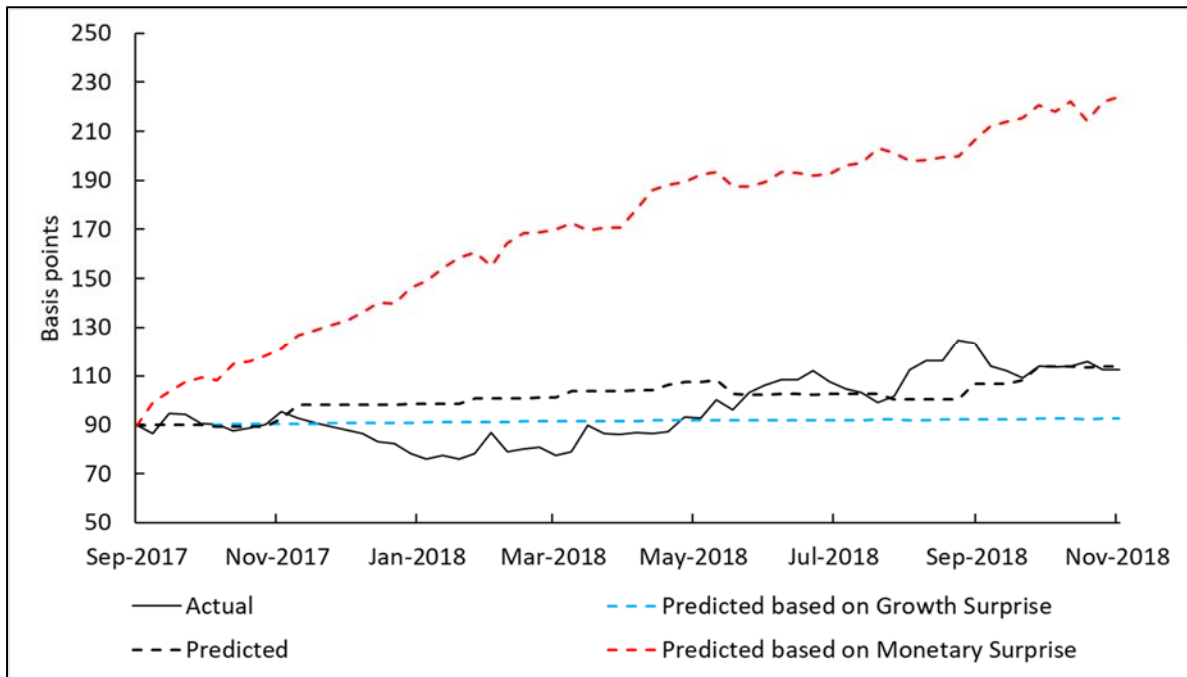
Note: Generic 2-year Treasury yield from Bloomberg (weekly as of Friday). Shading from September 1, 2017 to November 9, 2018.

Figure 8: EME Asset Prices (Sept. 2017 – Nov. 2018)

Panel a: Exchange Rate



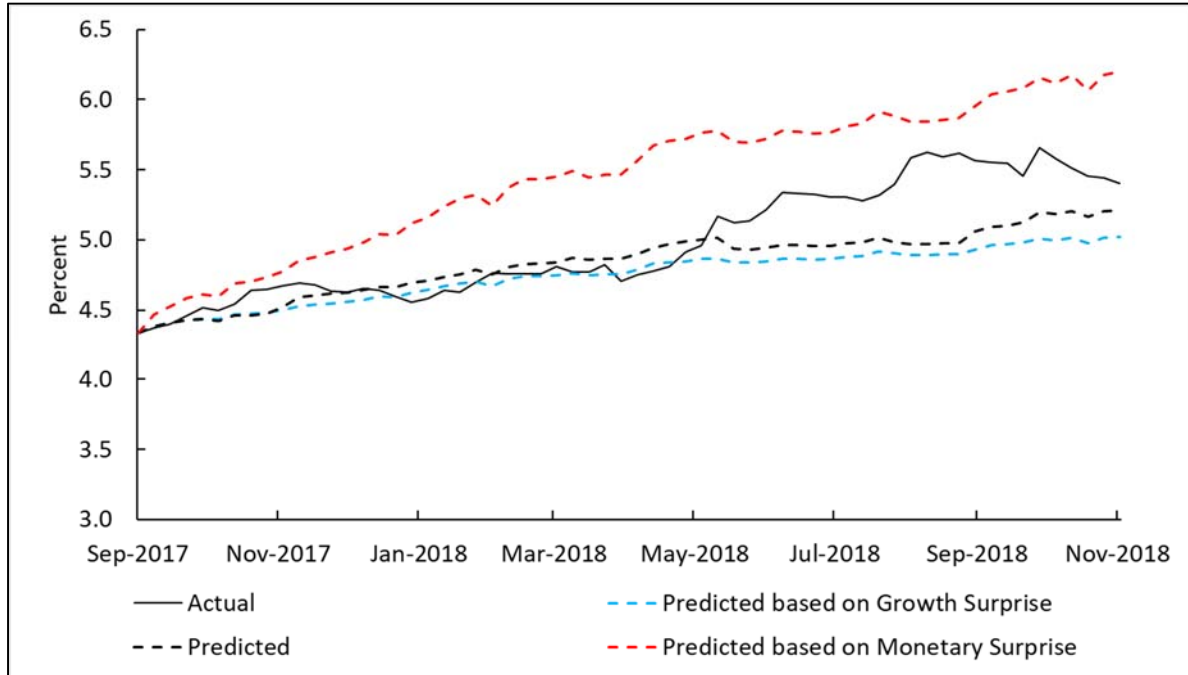
Panel b: 5-year Sovereign CDS Spread



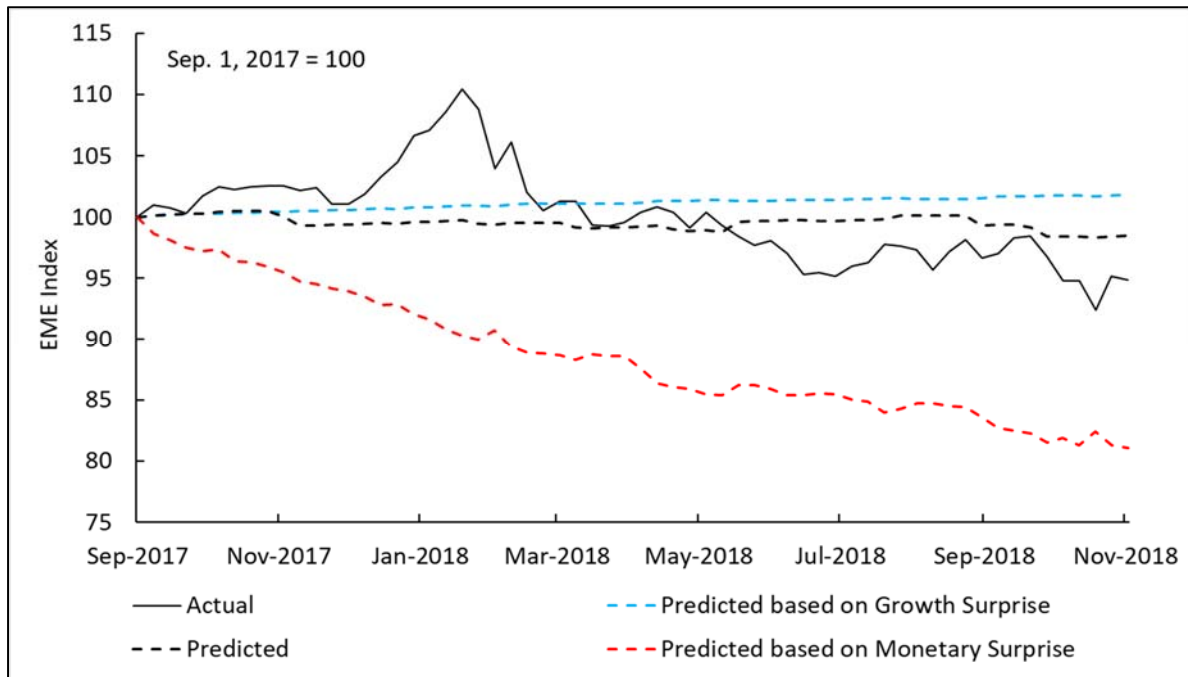
Note: Data are weekly as of Friday. EME aggregates are based on equally weighted averages. Source: Bloomberg, Markit, and the authors' calculations.

Figure 8: EME Asset Prices (Cont'd) (Sept. 2017 – Nov. 2018)

Panel c: 10-year Bond Yield



Panel d: Equity Price Index



Note: Data are weekly as of Friday. EME aggregates are based on equally weighted averages. Source: Bloomberg, and the authors' calculations.

Table 1. Effect of FOMC v. employment-report surprises on EME asset prices

	Dependent variable:							
	Exchange rate		CDS spread		Local-currency bond yield		Equity prices	
	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ 2-year U.S. Treasury yield	11.71 *** (2.797)	5.903 ** (2.262)	76.38 *** (28.70)	23.52 (18.93)	0.96 *** (0.159)	0.766 *** (0.152)	-9.683 *** (3.486)	-3.924 (3.081)
Observations	1410	2053	1411	2149	1316	1823	1485	2108
R-squared	0.138	0.049	0.080	0.012	0.091	0.079	0.055	0.012

Table shows regressions of the change in EME asset prices in 2-day windows around FOMC announcements and employment-report releases on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events. All regressions include country fixed effects.

Robust standard errors, adjusted for clustering within time periods, in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 1a. Effect of FOMC v. employment-report surprises on U.S. asset prices

	Dependent variable:					
	HY CDS spread		10-year Treasury yield		S&P 500 Index	
	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report
	(3)	(4)	(5)	(6)	(7)	(8)
Δ 2-year U.S. Treasury yield	168.7 *** (60.59)	43.77 (60.19)	0.911 *** (0.281)	1.068 *** (0.186)	-11.89 ** (5.077)	-0.490 (4.574)
Observations	73	98	74	109	74	102
R-squared	0.098	0.005	0.127	0.236	0.071	0.000

Table shows regressions of the change in U.S. asset prices in 2-day windows around FOMC announcements and employment-report releases on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events.

*** p<0.01, ** p<0.05, * p<0.1

Table 2. Effect of growth v. monetary news from FOMC announcements and employment-report releases on EME asset prices

	Dependent variable:							
	Exchange rate		CDS spread		Local-currency bond yield		Equity prices	
	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta 2$ -year U.S. Treasury yield x Growth shock	3.508 (3.979)	3.794 (3.083)	-0.480 (33.70)	4.010 (26.51)	0.24 * (0.130)	0.59 *** (0.185)	3.552 (5.179)	-1.379 (4.402)
$\Delta 2$ -year U.S. Treasury yield x Monetary shock	14.28 *** (3.250)	10.07 *** (2.817)	103.4 *** (34.31)	58.21 ** (23.62)	1.17 *** (0.190)	1.071 *** (0.227)	-13.91 *** (3.769)	-8.897 *** (3.230)
Observations	1410	2053	1411	2149	1316	1823	1485	2108
R-squared	0.159	0.060	0.108	0.024	0.104	0.084	0.085	0.017

Table shows regressions of the change in EME asset prices in 2-day windows around FOMC announcements on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events. "Growth shock" is a dummy variable indicating that moves in 2-year U.S. treasury yields and the S&P 500 that are of the same sign in the narrow window around FOMC releases. "Monetary shock" is a dummy variable indicating that moves in the 2-year yield and S&P 500 are the opposite sign. All regressions include country fixed effects.

Robust standard errors, adjusted for clustering within time periods, in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 2a. Effect of growth v. monetary news from FOMC announcements and employment-report releases on U.S. asset prices

	Dependent variable:					
	HY CDS spread		10-year Treasury yield		S&P 500 Index	
	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report
	(3)	(4)	(5)	(6)	(7)	(8)
Δ 2-year U.S. Treasury yield x Growth shock	72.09 (128.6)	-11.61 (72.92)	0.798 (0.583)	1.204 *** (0.230)	-6.191 (10.49)	3.481 (5.665)
Δ 2-year U.S. Treasury yield x Monetary shock	195.4 *** (68.95)	162.7 (105.3)	0.950 *** (0.323)	0.811 ** (0.315)	-13.68 ** (5.819)	-7.955 (7.733)
Observations	73	98	74	109	74	102
R-squared	0.106	0.025	0.128	0.243	0.076	0.014

Table shows regressions of the change in U.S. asset prices in 2-day windows around FOMC announcements on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events. "Growth shock" is a dummy variable indicating that moves in 2-year U.S. treasury yields and the S&P 500 that are of the same sign in the narrow window around FOMC releases. "Monetary shock" is a dummy variable indicating that moves in the 2-year yield and S&P 500 are the opposite sign.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Effect of FOMC surprises on EME asset prices: growth, reaction-function, and inflation shocks

	Exchange rate	CDS spread	Local-currency bond yield	Equity price
	(2)	(4)	(6)	(8)
Δ 2-year U.S. Treasury yield x Growth shock	3.496 (3.999)	-0.548 (33.78)	0.23 * (0.128)	3.595 (5.203)
Δ 2-year U.S. Treasury yield x Inflation shock	21.15 *** (7.729)	137.9 (134.2)	2.382 (1.548)	-34.03 ** (15.29)
Δ 2-year U.S. Treasury yield x Reaction-function shock	13.76 *** (3.385)	100.20 *** (34.79)	1.091 *** (0.155)	-12.33 *** (3.701)
Observations	1410	1411	1316	1485
R-squared	0.161	0.109	0.109	0.097

Table shows regressions of the change in four EME asset prices in 2-day windows around FOMC meetings on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events, interacted with the type of news conveyed in the events. "Growth shock" is a dummy variable indicating that moves in 2-year U.S. treasury yields and the S&P 500 that are of the same sign in the narrow window around FOMC and employment-report releases. "Monetary shocks" from the regressions in Table 2 (indicating that moves in the 2-year yield and S&P 500 are the opposite sign) are disaggregated into "reaction-function shocks," in which inflation compensation falls on the day of the FOMC meeting, and "inflation shocks," in which inflation compensation rises. All regressions include country fixed effects.

Robust standard errors, adjusted for clustering within time periods, in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Effect of growth v. monetary news from FOMC announcements and employment-report releases on EME asset prices, by vulnerability

	Dependent variable:							
	Exchange rate		CDS spread		Local-currency bond yield		Equity prices	
	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report	FOMC	Employment report
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ 2-year U.S. Treasury yield x Growth shock	3.453 (3.933)	3.777 (3.045)	-0.640 (33.68)	3.916 (26.39)	0.24 * (0.131)	0.59 *** (0.179)	3.669 (5.252)	-1.459 (4.435)
Δ 2-year U.S. Treasury yield x Monetary shock	14.32 *** (3.276)	10.13 *** (2.833)	103.3 *** (34.29)	58.43 ** (23.66)	1.164 *** (0.189)	1.058 *** (0.223)	-14.07 *** (3.817)	-9.192 *** (3.267)
EME vulnerability	0.00575 (0.0255)	-0.00457 (0.0196)	-0.140 (0.156)	-0.0437 (0.176)	0.00103 (0.00175)	-0.0000523 (0.00152)	-0.0202 (0.0325)	-0.00242 (0.0242)
Δ 2-year U.S. Treasury yield x Growth shock x EME vulnerability	0.425 (0.558)	0.107 (0.345)	7.841 (4.856)	2.176 (4.094)	0.0387 (0.0314)	0.06 * (0.0304)	0.674 (0.694)	-0.485 (0.429)
Δ 2-year U.S. Treasury yield x Monetary shock x EME vulnerability	0.502 (0.386)	0.898 ** (0.425)	10.56 *** (3.542)	12.13 *** (3.699)	0.132 ** (0.0540)	0.12 ** (0.0468)	-0.973 ** (0.443)	-1.563 *** (0.414)
Observations	1410	2053	1411	2149	1316	1823	1485	2108
R-squared	0.162	0.065	0.125	0.035	0.118	0.094	0.090	0.022

Table shows regressions of the change in EME asset prices in 2-day windows around FOMC announcements and employment-report releases on the change in the 2-year U.S. Treasury yield in a narrow one-hour window around these events, interacted with the type of information conveyed and EME vulnerability ranking. "Growth shock" is a dummy variable indicating that moves in 2-year U.S. treasury yields and the S&P 500 are of the same sign in the narrow window around FOMC releases. "Monetary shock" is a dummy variable indicating that moves in the 2-year yield and S&P 500 are the opposite sign. All regressions include country fixed effects. EME vulnerability is the average rank of six vulnerability indicators for a country in the year prior to the news event (current account/GDP, international reserves/GDP (expressed as a negative number), external debt/exports, government debt/GDP, 3-year average of inflation, and 5-year growth of credit to the private sector). All regressions include country fixed effects.

Robust standard errors, adjusted for clustering within time periods, in parentheses.

*** p<0.01, ** p<0.05, * p<0.1