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Spillovers to Emerging Markets from US Economic News and Monetary Policy

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ABSTRACT: Abstract: When the U.S. economy sneezes, do emerging markets catch a cold? We show that economic news, and not just monetary policy, in the United States affects financial conditions in emerging markets. News about U.S. employment has the strongest effects, followed by news about economic activity and about vaccines during the COVID-19 pandemic. News about inflation has instead limited effects on average. A key channel of international transmission of U.S. economic news appears to be the risk perceptions or risk aversion of international investors. We also show that some of the transmission of U.S. economic news occurs independently of the U.S. monetary policy reaction. Finally, we expand on evidence that financial conditions in the U.S. and emerging markets respond differently to U.S. monetary policy surprises, depending on the reaction of US stock prices.

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WORKING PAPERS

Spillovers to Emerging Markets from US Economic News and Monetary Policy

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1. INTRODUCTION

When the U.S. economy sneezes, do emerging markets catch a cold? The answer depends on why the U.S. economy is sneezing. In other words, it depends on what kind of economic news is coming out of the U.S. Monetary policy announcements in the U.S., for example, have been shown to affect financial conditions in emerging markets almost immediately.[1,2] However, little is known about the international effects of other types of news, whether about employment, economic activity or inflation, and no papers that we know of study the effects of such news on emerging markets.[3] Given their strong and immediate effects on financial conditions in the U.S., we would expect them to have meaningful effects on financial conditions in emerging markets as well.

Indeed, we show in this paper that US economic news does meaningfully affect financial conditions in emerging markets. Better-than-expected news about US *employment* or *economic activity* immediately lowers credit spreads on US dollar-denominated bonds issued by emerging market governments. It also immediately increases interest rates on local currency government bonds in emerging markets. Better-than-expected *employment news* leads emerging market currencies to depreciate against the US dollar. Positive news about the development of *vaccines* against the virus that causes COVID-19 lowered financial markets volatility in the US and credit spreads in emerging markets. By contrast, news about US *inflation* has smaller effects on financial conditions in the U.S. itself, and therefore does not immediately spill over to financial conditions in emerging markets. Inflation surprises may have weaker effects on average in our sample because they reflect a mixture of cost-push and demand-pull shocks, each of which pull financial conditions in different directions. In addition, US inflation expectations may have been sufficiently anchored to render any shocks too transitory to move financial markets.

We find that risk, rather than trade or portfolio balancing, is a more plausible interpretation of the mechanism by which US economic news immediately transmits to emerging markets. Riskier emerging markets experience a deeper decline in credit spreads following better-than-expected news about US employment or durable goods orders. This behaviour suggests that certain types of good economic news reduce perceptions of risk or aversion to risk. The types of risk that matter most are external, like external debt and currency volatility, as well as inflation, rather than measures of fiscal risk. However, not all news clearly transmits through a risk channel. For example, news about US retail sales seems to affect high- and low-risk emerging markets similarly.

The evidence for a trade channel is limited, in two ways. First, emerging market exchange rates are only affected by news about U.S. employment, and not by other news about U.S. economic activity or inflation. Second, while better-than-expected US employment news does depreciate currencies by less in emerging markets with deeper trade ties to the US, this effect is imprecisely estimated. We do not find evidence for a portfolio balance channel. If a portfolio balance channel were operating, we would expect credit spreads to react more forcefully in emerging markets with deeper financial ties to the US or in those whose government bonds tend to move more closely with US Treasuries. However, neither pattern emerges.

[1] We follow the International Monetary Fund's definition of emerging market economies, which consists of all member countries that are not classified as either advanced or low-income developing countries. This classification differs slightly from those produced by private sector firms, which have been used in the literature. The Appendix provides more detail.

[2] Selected papers in the literature include Albagli et al. (2019), Bauer and Neely (2014), Curcuru et al. (2018), Hausman and Wongswan (2011), Hoek et al. (2022), Iacoviello and Navarro (2019), Kalemli-Ozcan (2019), Gilchrist, Yue and Zakrajsek (2019). These papers have shown that US monetary policy affects credit spreads on US dollar-denominated bonds, yields on local currency bonds, premia of yields on long-term bonds over expected future short-term interest rates, stock prices, exchange rates and capital flows, of emerging markets.

[3] US economic news has been shown to spill over to stock and foreign exchange markets in advanced economies (Andersen et al. 2003; Becker et al., 1995; Ehrmann and Fratzscher, 2003; Wongswan, 2006; Albuquerque and Vega, 2009).

We refine our analysis to account for the potential effects of US economic news on the expected future evolution of monetary policy. The literature has long recognized that the effects of US interest rates on emerging market financial conditions depend on whether any change in US interest rates is being driven by US economic news or monetary policy.[4] Therefore, we check whether holding US interest rates constant reduces our estimated spillovers from US economic news.

We find that news about US retail sales seems to affect emerging markets' short-term bond yields independently of its effects on future US monetary policy, thereby ruling out a monetary policy channel for retail sales news. However, for US employment news, it is not possible to distinguish statistically how much of its effect on long-term emerging market bond yields works through expectations of monetary policy. This finding clarifies that the result in Hoek et al. (2020), in which US interest rates spill over to emerging market interest rates on days of US employment releases, may simply reflect employment news and therefore may have nothing to do with US monetary policy.

Our paper also contains several results on the spillovers from US monetary policy to emerging markets. Many of these confirm existing findings,[5] but we contribute three new results to this literature.

First, we expand on the finding that emerging market bond yields have become more sensitive to US monetary policy over time (Albagli et al., 2019). We show that this increase is primarily driven by the period of the global financial crisis and the euro area crisis. Thus, the increasing sensitivity over time seems simply to indicate that spillovers are higher in financial crises and may not be driven by secular trends like deepening global integration or rising debt.

Second, we find that the domestic and international effects of US monetary policy depend on whether US stock prices move in the opposite direction to monetary policy, as they usually do, or in the same direction. We show that these differential reactions occur not just in emerging markets' interest rates and exchange rates, as found in Hoek et al. (2022), but also in emerging markets' credit spreads, term premia and portfolio flows. While many of these findings can be explained by "information effects", under which US monetary policy announcements reveal new information about the state of the economy (Jarocinski and Karadi, 2020), the reaction of emerging market interest rates is more difficult to reconcile with this interpretation. For this, we offer an alternative interpretation in terms of measurement error that is correlated with conditions of economic stress.

Third, we do not find evidence that flexible exchange rate regimes help insulate emerging markets from US monetary policy surprises. This evidence, based on high-frequency event studies, complements the evidence from low-frequency recursive identification in Iacoviello and Navarro (2019), and the evidence for the euro area from Corsetti et al. (2021). This interesting and somewhat puzzling evidence deserves further exploration.

The remainder of this paper is structured as follows. Section 2 summarizes the data and methods used in the paper, deferring the details to the Appendix. Section 3 presents the estimates of spillovers from the US to emerging markets, and analyses transmission channels. Section 4 concludes.

[4] See, for example, IMF (2014), Matheson and Stavrev (2014), Hoek et al. (2019).

[5] Specifically, our results confirm that US monetary policy surprises affect yields on local currency bonds, credit spreads on US dollar-denominated bonds, stock prices, exchange rates and capital flows in emerging markets. They also confirm that the effects of US monetary policy on emerging market local currency government bond yields work primarily through term premia, rather than through expected future short-term interest rates.

2. ANALYTICAL APPROACH

2.1. Identifying news events

We use data on eight types of US economic news: non-farm payroll employment, initial jobless insurance claims, retail sales, the advance estimate for GDP, durable goods orders, core CPI inflation and core PPI inflation. On each day when new data for each indicator is released, a surprise is constructed as the difference between the announced value and the median prevailing expectation from a market survey, run by Action Economics or Bloomberg the previous Friday. Our data also include high-frequency changes in US financial variables, from 5 minutes before each Federal Open Market Committee (FOMC) announcement to 15 minutes afterward. The US economic news surprises are from Gürkaynak et al. (2020), and the US monetary policy surprises are from the updated dataset behind Gürkaynak et al. (2005).[6] We define US monetary policy surprises as the changes in yields on US Treasuries with a 2-year maturity in these narrow windows around FOMC announcements. The choice of the 2-year maturity follows Gertler and Karadi (2015) and Hanson and Stein (2015) and allows us to capture the effects of forward guidance and asset purchases. The same approach has since been used in the literature on spillovers to emerge markets by Gilchrist et al. (2019), Albagli et al. (2019) and Hoek et al. (2022).

We also construct a measure of news about the development of COVID-19 vaccines between April 1, 2020 and the day of the final announcement of the Phase III trial results (November 18 for Pfizer-BioNTech and November 30 for Moderna).[7] The measure is an index derived from stock prices, obtained from a regression of daily stock returns of two leading vaccine manufacturers, Moderna and BioNTech, against returns on the MSCI US Healthcare Index. For each company, we code the daily residual as -1 (negative news) or 1 (positive news) if the residual falls, respectively, in the bottom or top 10^{th} percentiles of its historical distribution, and zero otherwise (no news).[8] We then define an overall daily vaccine news index which equals -1 or 1 if the sum of the news index for two companies is respectively negative or positive, otherwise the index is set to zero.

Our regressions are estimated only on days when news took place. The event days for monetary policy actions are FOMC announcement days, while the event days for economic news are the release days for each economic indicator, excluding any such days that fall on monetary FOMC announcement days. Similarly, for the index-based measure of COVID-19 vaccines, we consider only 57 days where a news event (+1 or -1) was observed.

Our sample includes 60 emerging markets, following IMF definitions, between January 2000 and May 2020. To the best of our knowledge, it is the largest sample of economies that has been used to study the spillovers from US news to emerging markets. The Appendix discusses the sample in more detail, defines the construction of each variable and provides summary statistics.

[6] We thank Refet Gürkaynak for kindly providing us with his dataset on economics news.

[7] We obtain very similar results when we end the sample on the day of the preliminary announcement of the Phase III trial results (November 9 for Pfizer-BioNTech and November 16 for Moderna).

[8] We also considered an entirely different dating approach, based on the list of press releases posted on the two companies' websites. This approach did not yield any statistically significant result on the effect of vaccine news on either the US or on emerging markets' financial variables. This lack of response may be because press releases contained information that, in most cases, markets had already anticipated and incorporated into stock prices.

2.2. Estimation equations

We estimate the following models of the effects of real news, vaccine news and monetary policy surprises s_t on financial conditions in emerging markets:

$$y_{c,t+1} - y_{c,t-1} = \alpha_c + \zeta s_t + u_{c,t+1} \qquad (1)$$

where the dependent variable $y_{c,t}$ represents various financial indicators on day t (local time) in emerging market c, including government bond yields at various maturities, exchange rates, total stock returns, portfolio flows, term premiums and expectations of future short-term monetary policy rates.[9] The model uses two-day event windows, to allow for differences in time zones and trading hours across markets. News days are indicated by t. US economic news and monetary policy surprises (s_t) are scaled by their standard deviations before estimation, so that the interpretation of the parameter ζ is the response of the dependent variable to a one-standard deviation increase in the news variable.

We consider three separate extensions to this model. In the first, we examine variation in spillovers across emerging markets, by allowing the sensitivity to US news to depend linearly on the emerging market's predetermined underlying characteristics $x_{c,t}$, as follows:

$$y_{c,t+1} - y_{c,t-1} = \alpha_c + \zeta s_t + \gamma x_{c,t} + \eta s_t x_{c,t} + u_{c,t+1} \qquad (2)$$

Note that controlling for $x_{c,t}$ is key to avoid omitted variable bias in the estimates of η. This is an important improvement of our paper over Hausman and Wongswan (2011), Bowman et al. (2015) and Kearns et al. (2019).

In the second extension, we maintain the assumption that the sensitivities are the same across emerging markets, but we allow the sensitivity to vary across time. We consider a linear time trend in the sensitivity, using the specification

$$y_{c,t+1} - y_{c,t-1} = \alpha_c + \zeta s_t + \theta \tau_t + \mu s_t \tau_t + u_{c,t+1} \qquad (3)$$

where τ_t denotes years elapsed since 2000. We also consider step shifts in the sensitivity, using the alternative specification

$$y_{c,t+1} - y_{c,t-1} = \alpha_c + \zeta s_t + \mu_1 I(t \geq \text{Nov. } 2008) + \mu_2 I(t \geq 2014) + \mu_3 s_t I(t \geq \text{Nov. } 2008) + \mu_4 s_t I(t \geq 2014) + u_{c,t+1} \qquad (4)$$

where $I()$ denotes the indicator function.

In our third extension, we examine whether some of the effect of US economic news transmits through expectations about future US monetary policy actions. To do this, we control for daily changes in US interest rates (2-year Treasury yields) r_t in the extended specification

$$y_{c,t+1} - y_{c,t-1} = \alpha_c + \zeta s_t + \beta r_t + v_{c,t+1}. \qquad (5)$$

The models are estimated by least squares. The identifying assumption is that the surprise s_t is uncorrelated with the error term. In other words, our identifying assumption is that other relevant factors, like contemporaneous data releases or policy announcements in the US or emerging markets, are not correlated with s_t. This assumption is supported by two facts. First, the models are estimated only on days of the announcement of economic news, vaccine news or monetary policy actions. On these days, the news release is more likely to be the only source of systematic variation in the dependent variable. Second, the surprise s_t is news, because it represents only the *unexpected* component of announcement on day t. Given the long time-

[9] Dynamic factor models (like Adrian, Crump, and Moench (2013)) can be used to split the changes in yields on five-year sovereign bonds in emerging markets into one component that represents changes in the expected monetary policy rate in emerging markets and another component that is the residual term premium. The term premium represents the extra return required by investors to shoulder the greater (inflation, liquidity and credit) risk associated with a fixed long-term rate of return.

dimension, standard errors that allow for spatial and temporal dependence are used following Driscoll and Kraay (1998).

To gauge the effects of real news, vaccine news and monetary policy surprises on global and US financial indicators, we use the following simplified time series version of (1):

$$y_t - y_{t-1} = \delta + \chi s_t + e_{t+1} \qquad (6)$$

where y_t represents US Treasury yields, US expected future policy rates and term premiums, the US dollar nominal effective (trade-weighted) exchange rate and the US stock market volatility index (VIX).[10] This model uses one-day event windows for the dependent variables[11] and is estimated by least squares with standard errors that follow Newey and West (1987).

We also test for a different reaction of US financial conditions according to the direction of co-movement between US monetary policy and US stocks, which is sometimes interpreted as the "information effect" of monetary policy. To do so, we consider versions of (1) and (6) where ζ or χ is decomposed into

$$\phi(1 - J_t) + \lambda J_t \qquad (7)$$

where J_t is equal to unity if the sign of the monetary policy surprise agrees with the sign of the change in the S&P500 index, in narrow windows around the monetary policy announcement, and zero otherwise. Then ϕ measures the effect of "pure" monetary policy surprises, while λ either measures the effect of monetary policy announcements that reveal a lot of information about future economic conditions, or the effect of announcements when measurement error is high, like during crises.

3. DOMESTIC EFFECTS OF US NEWS

We set the stage for the analysis of spillovers by showing the effects of news about the US economy, COVID-19 vaccines and monetary policy on US financial conditions. The relatively mature literature on the domestic effects of US news provides a strong benchmark for the data and methods that we subsequently use to study spillovers to emerge markets. We cover news about the US economy and COVID-19 vaccines in Section 3.1, and news about US monetary policy in Section 3.2.

At the same time, this section makes three contributions to the event study literature on the domestic effects of US news. The first is the novel analysis of COVID-19 vaccines. Section 3.1 shows that news about COVID-19 vaccines tended to lift long-term interest rates and stock prices in the US during the pandemic, but not shorter-term interest rates. The second contribution is to show that the domestic effects of US monetary policy depend on the reaction of US stock prices to the monetary policy announcement (Section 3.3). When US stock prices move in the same direction as US monetary policy, the US dollar and VIX do not seem to react to the monetary policy decision. We offer interpretations in terms of "information effects" and measurement error correlated with periods of economic stress. Our third contribution is to emphasize that positive employment and monetary policy surprises both lift US interest rates, but they have opposite effects on the VIX (Section 3.4). Positive

[10] The VIX is a measure of the market expectation of the volatility of stock returns over the next month, derived from options prices.

[11] Recent papers, like Rigobon and Sack (2008) have measured the dependent variables in narrow intraday windows around the announcements. This helps to avoid noise induced by other announcements occurring on the same day, but some announcements (like non-farm payrolls and civilian unemployment) remain simultaneous. We prefer one-day windows because our objective is to benchmark our results on spillovers, which use two-day windows for the dependent variables in emerging markets. Using one-day windows also allows us to decompose the effects on interest rates into effects on term premia and expected future short-term interest rate components and allows us to measure the effects of news on the trade-weighted US dollar, both of which are measured daily. One-day windows also allow us to measure the effects of announcements that are made when some markets are closed. Finally, we suspect that the outcomes are more likely to be relevant for the macroeconomy if the effects last for a day, than if they dissipate after a few minutes.

employment news reduces the VIX, while surprise monetary policy tightenings raise it. This distinction has important implications for spillovers to emerging markets.

3.1. Domestic effects of news about the US economy and vaccines

Table 1 shows the estimates of coefficient χ from equation (6). Good news about labour market conditions, retail sales, economic activity and COVID-19 vaccines, and higher-than-expected inflation, all lift US nominal interest rates.[12] Like Faust et al. (2007), we find the peak effect of employment news and core CPI inflation at the 2-year maturity, but our estimates suggest that core PPI inflation has stronger effects at longer maturities, perhaps because producer prices take time to pass through to consumer prices. Long-term interest rates also respond to various types of US economic news (including employment, jobless claims, retail sales, GDP and inflation). The importance of these types of news was established in Gürkaynak, Sack and Swanson (2005), but we show that positive news about COVID-19 vaccines also lifts long-term US interest rates. The directions of these effects on interest rates are consistent with those of Fleming and Remolona (1999) and Faust et al. (2007), but they are smaller in magnitude.[13] The difference could either be because the importance of such news has decreased over time (as Faust et al. (2007) find), or because the effects that those authors identify do not persist as strongly over a full day.

While all types of economic news lift US interest rates, they act on different components of the yield curve. Positive news about US employment, and higher-than-expected CPI inflation lift interest rates by driving up expectations of future monetary policy tightening, consistent with a Taylor rule. By contrast, positive news about US economic activity and higher-than-expected PPI inflation lifts interest rates by increasing the term premium embedded in longer-term yields, suggesting that they affect investors' risk perceptions or risk tolerance. News about jobless claims and retail sales drives both components of the yield curve, with slightly more weight on expected future monetary policy. Altavilla et al. (2017) also find that US economic news tends to exert stronger effects on expected future monetary policy rates than on term premia.

The US dollar tends to appreciate after positive news about US employment or lower-than-expected producer price inflation, but it does not clearly respond to news about economic activity or vaccines. A one standard deviation surprise increase in US employment tends to appreciate the US dollar by 9.9 basis points against the currencies of its trading partners over one day, which is similar to other estimates in the literature. Andersen et al. (2003) find that such a surprise leads the dollar to appreciate by 8 basis points against the euro over 5 minutes, and Faust et al. (2007) find that such a surprise leads the dollar to appreciate by 15 basis points against the euro over 20 minutes.

US stock prices do not respond clearly to news about labour market conditions, economic activity or inflation, although they tentatively increase after positive news about retail sales.[14] This lack of response is well documented in the literature. Stock prices may not respond to news about labour market conditions or economic activity because the implications for future corporate earnings could be offset by the effects on investor discount rates. Alternatively, stock prices may show no correlation with employment because the relationship can be positive or negative at different times, depending on the state of the economy (Boyd et al.,

[12] We refer to rising employment or falling jobless claims as "good" news about US labour market conditions. We use "economic activity" to refer to GDP.

[13] Faust et al. (2007) find that a one-standard deviation surprise increase in employment increases the 2-year Treasury yield by about 6 basis points over 20 minutes, and we find the effect to be 3.8 basis points over a day.

[14] Not shown in the table, the S&P500 also responds to retail sales, and to durable goods orders. A one-standard deviation surprise to retail sales and durable goods orders leads to increases of 19 and 13 basis points in the S&P500, respectively, which are both statistically significant at the 10 percent level.

2005). Our point estimate for the effect of inflation on stock prices is negative, which agrees with the event study estimates in Rigobon and Sack (2008), but the lack of statistical significance suggests that the effects that they find over 30-minute windows do not clearly persist over the whole day. Stock prices may not correlate with news about inflation because the reaction of stock prices depends on whether the inflation news is supply- or demand-driven (Hess and Lee, 1999).[15]

During the pandemic of 2020, the Federal Reserve committed to maintaining interest rates low for a long time, until full employment and 2 percent inflation had been reached. Therefore, we would not expect investors' short-term discount rates to increase significantly in this period with good economic news. Consistent with this view, news about COVID-19 vaccines tended to lift US stock prices, without lifting medium-term interest rates (up to the 5-year maturity) or expected future short-term interest rates.

The literature finds that even though event study regressions are well-identified, they tend to explain little of the variation in the dependent variable, possibly because of measurement error in the economic surprise variables used (Rigobon and Sack, 2008). We find similar results. News about US labour market conditions, economic activity and inflation explains more of the movements in Treasury yields than of stock returns, which mirrors the pattern in statistical significance of their slope coefficients in Table 1. Among Treasury yields, economic news is better able to explain movements in 2-year and 10-year yields, because they are more sensitive than 3-month yields to news. For 10-year Treasury yields, and among the news types that are significant at the 5 percent level in Table 1, employment news explains the highest share of variation (18 percent) and core PPI inflation explains the lowest share (3.4 percent). Conversely, news about vaccines explains more of the variation in stock returns (30 percent), than in Treasury yields (8 percent for the 10-year yield).[16]

3.2. Domestic effects of news about US monetary policy

The last row of Table 1 looks at the effect of monetary policy announcements. Positive US monetary policy surprises tend to lift US interest rates at all maturities. Since we have chosen the 2-year Treasury yield as our monetary policy instrument, the coefficient of 5.3 on this yield matches the standard deviation of monetary policy surprises.[17] Monetary tightenings lead US interest rates to rise even at long horizons, as emphasized by Gürkaynak, Sack and Swanson (2005). The effects of economic news and monetary policy surprises on interest rates are in line with those reported in Gürkaynak, Kısacıkoğlu and Wright (2020), although the estimates are less precise here due to our longer (daily) event windows, shorter (post-2000 only) sample period and HAC standard errors.

We find that this rise in long-term rates appears to work through expectations of future monetary policy tightenings, rather than increases in term premia, which is consistent with Gürkaynak, Kısacıkoğlu and Wright (2020). This suggests that US monetary policy actions using interest rates do not act through the supply of duration risk available to investors. This contrasts with the Federal Reserve's asset purchases since 2008, which have reduced the supply of long-term securities available to investors, thereby reducing their yields and the term premium (Gagnon et al., 2011).

Every one-standard deviation monetary policy tightening leads the US dollar to appreciate over one day against trading partner currencies by 18.4 basis points. Equivalently, every 100-basis point monetary policy tightening

[15] The theory offers several competing hypotheses for the relationship between inflation and stock prices, as explained in Campbell and Vuolteenaho (2004).

[16] Vaccine news explains more of the variation in US financial conditions than other types of news, which could be due to the importance of vaccine news or could simply be due to the shorter sample period for vaccine news.

[17] Technically, the standard deviation of (intraday) monetary policy surprises is 5.4 basis points, which is slightly different from the coefficient of 5.3 because equation (3) uses daily changes in 2-year Treasury yields on the left-hand side.

appreciates the US dollar by 3.4 percent. It is difficult to benchmark this number against previous work, because previous papers like Faust et al. (2007) use the target Federal Funds rate as the monetary policy instrument, whereas we use the 2-year Treasury yield. Nevertheless, the results in Faust et al. (2007) are of the same order of magnitude. They find that a 100-basis point increase in the Federal Funds target rate appreciates the US dollar by 1.2 percent against the euro.

Every one-standard deviation monetary policy tightening (about 5.4 basis points) leads US stock prices to fall by about 33 basis points over a day,[18] or equivalently, every 1 percentage point tightening leads stock prices to fall by 6.1 percent. This result is close to the 4.7 percent found in Bernanke and Kuttner (2005), even though those authors use Federal Funds Futures as the monetary policy instrument.

3.3. Domestic "information effects" of US monetary policy

Table 2 shows results of estimating equations (3) and (4), which allow US monetary policy to have different effects on US financial conditions depending on whether US stock prices move in the same or different direction to monetary policy. The bottom rows of the table test formally whether these two effects differ from each other by more than could be expected from simple sampling variation.

Conditional on monetary policy and stocks moving in different directions, the effects of US monetary policy are close to the unconditional effects estimated previously. When stocks move in the same direction as monetary policy, US monetary policy has slightly stronger effects on US interest rates, which seem to be driven by slightly stronger effects on expected future short-term interest rates rather than term premia (although the increases in sensitivities of interest rates are not statistically significant). A one standard deviation (5.4-basis point) surprise increase in the 2-year US Treasury yield on FOMC announcement days leads to a 2.9-basis point increase in 10-year US Treasury yields over a day if stock prices fall at the announcement, and a 3.9-basis point increase if stock prices rise. These magnitudes are equivalent to increases of 57 and 78 basis points, respectively, per percentage point US monetary tightening, after correcting for rounding.

Furthermore, when stocks move in the same direction as monetary policy rates, US monetary policy shows no statistically significant effect on the US dollar or the VIX. Therefore, instead of the US dollar appreciating and the VIX increasing with a surprise US monetary tightening, an accompanying increase in stock prices means that the US dollar and VIX do not change with the tightening. The difference in sensitivities is statistically significant for the US dollar, and only marginally significant for the VIX. Finally, the reaction of stock prices at an intradaily frequency is by construction, but the reaction of stock prices at the daily frequency shows that the identification strategy here extends to the broader Wilshire 5000 index and persists over a full day, albeit with a loss of precision.

The results therefore strongly support the hypothesis that monetary policy has domestic effects that depend on the stock price reaction to monetary policy. Jarocinski and Karadi (2020) interpret similar results as evidence that the Federal Reserve reveals information about the economic outlook—the so-called "information effects" of US monetary policy. However, from our perspective, an equally plausible explanation seems to be that monetary policy surprises, or stock price surprises, are poorly measured on some days, and this mismeasurement is more likely to occur during times of economic stress. The Appendix presents evidence for this alternative interpretation in the data and in news media reports.

Both interpretations can be consistent with the results from Table 2. An "information effects" interpretation would say that US interest rates rise slightly more, in response to US monetary policy tightenings that reveal positive information about the outlook, than they do in response to other such tightenings. Similarly, positive

[18] The result for the S&P500 is similar, at 31.9 basis points.

information about the US economic outlook would lower the VIX, which offsets the tendency for US monetary policy tightenings otherwise to lift the VIX, and therefore results in no clear change in the VIX. However, the "information effects" interpretation has more difficulty explaining the response of the US dollar, which in principle should appreciate even more if a US monetary policy tightening reveals positive information about the outlook.

Under the alternative interpretation of measurement error that is correlated with economic stress, US monetary policy is slightly more effective at influencing interest rates in times of economic stress. For this interpretation, monetary policy easings would have to be less effective at lowering the VIX or depreciating the US dollar in times of economic stress. This could be consistent with the increases in VIX and US dollar appreciations that occur at such times.

These event-study results for the 10-year Treasury yield and stock prices are within one-and-a-half standard deviations of the results in Hoek et al. (2022), although the longer sample periods here increase the precision of the estimates. Our results for the other variables (3-month and 2-year yields, term premia, expected future short-term interest rates, the US dollar index and the VIX) seem to be new in the literature.

3.4. US news, risk premia, and volatility

Sabor and Wilson (2013) find a risk premium on US stocks associated with days of US economic news announcements, which is independent of the contents of the announcements, but they do not identify which type of news is most important in driving this premium. We capture the expected returns on announcement days through the intercept term δ in equation (6), because the means of the economic news and monetary policy surprises are close to zero. The estimated intercept (δ) is highest for monetary policy surprises and implies a 28.6 basis point daily return on US stocks on these days (standard error of 11.8, statistically significant at the 5 percent level). This finding suggests that investors perceive the greatest risk from monetary policy announcements. There is little evidence for other types of macroeconomic news in driving the equity risk premium. The intercept for jobless claims is 6.9 basis points, but it is only statistically significant at the 10 percent level (standard error 4.1), and the intercepts are not statistically significant for other types of news.

The results also suggest that US news has important effects on investors' risk perception or risk tolerance. While good news about US employment, retail sales and vaccines tend to reduce the VIX, surprise monetary policy tightenings tend to raise the VIX (Table 1). We find that every one-standard deviation US monetary policy tightening (a 5.4 basis point increase in 2-year Treasury yields) increases the VIX by 1.7 percent over a day. This result is similar to that in Bekaert et al. (2013), who find, using high-frequency 3-month Federal Funds Futures as the monetary policy instrument, that a 29-basis point monetary policy tightening leads to a 1.3 and 4.7 percent increase in two components of the VIX over a day. The estimates of the intercepts (δ) from equation (6) suggest that risk perceptions or risk aversion tend to fall in days of employment or monetary policy announcements, independently of the contents of those announcements. These intercepts are -1.8 percent for employment announcement days, and -2.4 percent for monetary policy announcement days (both estimates have standard errors of 0.47 and are significant at the 1 percent level).

4. EFFECTS OF US NEWS ON EMERGING MARKETS

This section examines the effects of US news on emerging markets. It is split into two parts, with Section 4.1 analysing the effects of US economic news and Section 4.2 analysing the effects of US monetary policy. In

keeping with its strong domestic effects in Section 3, US employment news also has strong spillover effects to emerging markets. News about US retail sales and COVID-19 vaccines spill over to emerging market credit spreads and short-term local currency interest rates, but do not clearly affect long-term interest or exchange rates. In keeping with its limited domestic effects in Section 3, US inflation news has limited effects on emerging markets.

Sections 4.1 and 4.2 also build on the result, from Section 3, that US news has effects on investor risk perceptions or aversion, through the VIX. They show evidence of differentiation across emerging markets that is consistent with a risk channel of transmission of news, about the US economy and monetary policy, to emerging markets. Section 4.2 clarifies that rising spillovers over time identified in previous work are related to the global financial and euro area crisis period. It also shows a lack of evidence that flexible exchange rate regimes insulate emerging economies from US monetary policy surprises. Finally, Section 4.2 shows that US monetary policy spillovers to emerging markets depend significantly on the direction of comovement of US monetary policy with the US stock market.

4.1. Effects of US economic news on emerging markets

4.1.1. Effects on the average emerging market.

Table 3 shows the effects of news about the US economy, COVID-19 vaccines and monetary policy on emerging markets. Table 4 digs further into these effects on emerging market interest rates by decomposing them into term premia and expected future short-term interest rates components for a subset of 13 economies from 2016 onwards for which data are available.

Table 3 shows that positive news about US employment (more jobs or fewer jobless claims) lowers credit spreads on dollar-denominated emerging market government bonds (and negative news lifts these credit spreads). The magnitude of the employment effect is a 2-basis point fall in credit spreads over two days for each standard deviation (77,000-job) surprise increase in employment. Since we show above that good employment news lifts US interest rates, falling emerging market credit spreads imply that yields on dollar-denominated emerging market bonds rise less than one-for-one with US interest rates. Positive news on US employment also lifts yields on long-term local currency government bonds in emerging markets (1.3 basis points per standard deviation) and depreciates emerging market currencies against the US dollar (4.9 basis points per standard deviation). While jobless claims do not seem to affect local currency interest rates in emerging markets in the full sample, they do have an effect in the post-2016 period (Table 4). This effect operates through the term premium component of interest rates, suggesting that emerging market monetary policy is not expected to respond to offset the US news. The effects of US labour market conditions on emerging market interest rates are consistent with a trade channel, where investors expect good US economic news to increase US demand for emerging market exports—we explore this possibility further below. Emerging market stock prices, like US stock prices, do not clearly respond to news about US labour market conditions, perhaps because its effects on investor discount rates offset its effects on firms' earnings.

The spillovers to emerging markets from US employment news are consistent with uncovered interest parity. In response to a one-standard deviation surprise increase in US employment, local currency 10-year emerging market government bond yields increase by 1.3 basis points and 10-year US Treasury yields increase by 3.3 basis points, meaning that the emerging market premium falls by 2 basis points (the difference). On the same news, emerging market currencies depreciate too, which reduces their expected future depreciation, in line with the uncovered interest parity relation.

Emerging markets also experience spillovers from news about US economic activity, meaning retail sales, GDP and durable goods orders. Positive news about US retail sales and durable goods orders lowers credit spreads

in emerging markets. The magnitudes are a 2.3 and 1.2 basis point fall in credit spreads over two days for every standard deviation surprise increase in retail sales (61 basis points higher month-on-month growth) and durable goods orders (2.9 percentage points higher month-on-month growth), respectively. News about US economic activity has limited effects on local currency government bond yields in emerging markets, apart from a slight effect of retail sales on short-term yields (significant only at the 10 percent level). However, the reaction of 5-year yields to such news in the post-2016 period is stronger, with good US news lifting emerging market interest rates. Again, the effect on emerging market interest rates in the post-2016 period operates through the term premium component of interest rates, suggesting that emerging market monetary policy does not adjust to US news in this period in these 13 countries.

Good news about US retail sales lifts emerging market stock prices by even more than it lifts US stock prices, possibly because long-term interest rates do not clearly increase in emerging markets after positive news about US retail sales. The size of the stock price reaction in emerging markets is a 25.7-basis point increase over two days for every standard deviation surprise increase in US retail sales. News about US GDP only clearly affects portfolio flows to emerging markets. In line with a standard push-pull model, increases in US GDP, and the associated increase in US interest rates (Section 3.1), attract capital flows from other countries into the US. Portfolio capital flows out of emerging markets by 1.4 basis points of annual GDP over the two days following a one standard deviation (65 basis points of higher quarter-on-quarter annualized growth) surprise increase in US GDP news.

Positive news about US retail sales and GDP seems to reduce external financing premia in emerging markets, because it increases US domestic 10-year Treasury yields without affecting local currency 10-year government bond yields or exchange rates in emerging markets. The drop in credit spreads on dollar-denominated government bonds, in response to positive news about US retail sales, suggests that the lower external financing premium could be due to lower risk perceptions.

Positive vaccine news lowers credit spreads in emerging markets, increases capital inflows and reduces yields on local currency bonds (maturities 1 and 5 years), but does not clearly affect the value of their currencies against the US dollar or their stock prices. Therefore, financial conditions in emerging markets ease overall. A possible explanation of the capital inflows is the fall in risk perceptions or risk aversion, indicated by the falling VIX in Section 3.4, together with the lack of reaction of short-term US interest rates.

4.1.2. Transmission channels: risk, trade, portfolio balance, and monetary policy.

We examine whether US news transmits to emerging markets through a risk channel. To do this, we dig further into emerging market credit spreads, and the three types of US news that Table 3 shows to affect them: employment, retail sales, durable goods orders and (intraday) monetary policy. Table 5 shows estimates of the coefficient on a term that interacts US retail sales, durable goods orders or monetary policy surprises with measures of an emerging market's risk (η from Section 2.2 above). We do not show the results for US retail sales news to save space, because we found these not to be statistically significant.

The results in Table 5 offer some support to the idea that some types of US economic news vary across emerging markets, with stronger effects on riskier countries. In particular, riskier emerging markets tend to experience stronger declines in credit spreads than safer emerging markets after positive news about US employment or durable goods orders. This finding echoes the results shown above of effects of US economic news on the VIX, emerging market credit spreads, and term premia in the US and emerging markets. Together these findings suggest that US economic news transmits internationally through its effects on investors' risk perceptions or risk aversion. The risk channel we find here for spillovers from US economic news therefore parallels the risk channel of transmission that the literature has found for spillovers from US monetary policy. That literature has emphasized the wealth or income effects of monetary policy on the risk aversion of financial intermediaries, for example through banks' funding costs (Bruno and Shin, 2015). Since US economic news

affects interest rates, stock prices and exchange rates, employment surprises affect US interest rates, they could also affect such funding costs.

However, the evidence in Table 5 for a risk channel based on a stronger response in riskier countries is specific. It relies on specific measures of the riskiness of emerging markets, specific measures of emerging market financial conditions (here, credit spreads), and specific types of US news. For US employment news, the relevant measures of risk are inflation, exchange rate volatility, external debt, short-term debt relative to reserves, a composite risk rating reflecting an assessment of political, economic and financial risks, and an index of vulnerability that combines current account deficits, government debt, inflation, credit growth, short-term external debt and international reserves.[19] For news about durable goods orders, credit growth becomes another important measure of risk, while the measures of external debt and risk rating lose statistical significance. Inflation, exchange rate volatility and the vulnerability index are the only measures of risk that are common to news about both US employment and durable goods orders. Furthermore, we considered other measures of risk that turned out not to be statistically significant, which are not reported in Table 5 to save space. These include the current account, government debt, international reserves (all relative to GDP), and an investment grade credit rating. Government debt and international reserves especially may be poor measures of risk, because the vulnerability of a country may necessitate it to maintain low debt and high reserves. Finally, since credit spreads are often used as indicators of risk themselves, they might naturally show a strong relationship with other risk measures. By contrast, the responses of 10-year local currency bond yields in emerging markets do not show a clear relationship to risk as credit spreads do in Table 5.

Bauer and Neely (2014) find that the Federal Reserve's asset purchases since 2008 affected term premia on foreign bonds, which they attribute to the substitutability between US and foreign bonds and call a portfolio balance channel of international monetary transmission. We test whether such a channel could also explain spillovers from US economic news, or in the next section, from the Federal Reserve's interest rate decisions, to emerging markets. The idea is that the changes in US Treasury yields caused by US economic news or the Federal Reserve's interest rate decisions could lead investors to substitute between US Treasuries and emerging market bonds, the way US monetary policy leads them to do with US corporate bonds (Cenesizoglu et al., 2012; Rogers et al. 2014). Specifically, we test whether spillovers from US economic news are stronger to emerging markets whose bonds are more substitutable with US Treasuries, or whether they are stronger to those emerging markets with deeper financial links to the US. As described in the Appendix, we measure substitutability by the correlation between the total US dollar returns on each emerging market bond with those of US Treasuries, as proposed by Neely (2013), and we measure financial links to the US with bilateral asset and liability positions that include direct investment, portfolio investment and banking relationships. We do not find evidence of a portfolio balance channel in the international transmission of US economic news. Table 5 shows the response of emerging market credit spreads to US economic news is *no stronger* if the EM has deeper financial ties to the US or if the emerging market's government bonds are closer substitutes for US Treasuries.

Recall from above that positive US employment news depreciates emerging markets' currencies against the US dollar and lowers their credit spreads. Table 5 shows that such depreciations are weaker in emerging markets that have stronger trade ties to the US, suggesting that these countries experience a greater increase in external demand on positive US employment news. This pattern is therefore consistent with a trade channel, although the effect is statistically significant only at the 10 percent level. Furthermore, the reduction of emerging market credit spreads is stronger in countries with deeper trade ties to the US, which is consistent with a trade channel and statistically significant at the 5 percent level (not shown). However, an increase in external

[19] The vulnerability index is the average, across the six listed measures of vulnerability of the rank of each emerging market in the preceding year, following Hoek et al. (2020).

demand should increase interest rates, and emerging markets with more trade with the US do not experience an increase in interest rates, relative other emerging markets, in response to good US employment news (not shown). We therefore find only tentative evidence that US economic news transmits to emerging markets through a trade channel.

Finally, we investigate the possibility that US economic news could transmit to emerging markets by influencing investor expectations of future monetary policy actions. For example, positive US employment news could affect emerging market interest rates simply by raising short-term US interest rates, which then spill over to emerging market interest rates, without any other effect of the US'S news on emerging markets. This possibility is investigated in Albagli et al (2019), who find limited evidence that US interest rates spill over to emerging market interest rates on days of US economic news announcements. Perhaps because they use intraday changes in interest rates, Hoek et al (2022) do find evidence for such effects, showing that increases in 2-year US Treasury yields transmit to 10-year government bond yields in emerging markets on days of US employment reports. Since neither of these papers studies the international effects of US news, they do not allow for US news to have any independent effect on emerging market interest rates. In other words, they attribute all the comovement between US and emerging market interest rates, on days of US news, to how US monetary policy might react to the news. Here, we allow for US news to have its own direct effects on emerging markets other than indirectly through US monetary policy.

We investigate this by estimating equation (5), which controls for changes in 2-year Treasury yields when measuring the effect of news about US retail sales or employment on emerging market interest rates.[20] Table 6 shows the estimates of ζ and β. News about retail sales has the same effect on short-term emerging market yields, regardless of whether 2-year Treasury yields are held constant, which suggests that the spillover from US retail sales to emerging market interest rates does not transmit through expectations of US monetary policy. However, the effect of employment news on long-term emerging market yields reduces by about one-third, and loses its statistical significance, when controlling for changes in 2-year Treasury yields, which suggests that at least some of the international spillover of US employment news transmits through its effects on US monetary policy. In other words, not all the effect of US employment seems to transmit through interest rates. However, the amounts attributable to direct effects of US employment, and indirect effects through US monetary policy, are ambiguous because neither employment news nor monetary policy changes are statistically significant in the last column of Table 6. Further evidence, possibly using intraday data, is needed to resolve the lack of statistical significance here.

4.2. Effects of US monetary policy surprises on emerging markets

4.2.1. Effects on the average emerging market.

The effects on emerging markets of US monetary policy have been studied extensively. Therefore, we include estimates of such effects mainly for completeness, although our use of intraday US monetary policy surprises and daily data for emerging markets, our large and refined[21] sample of emerging markets, and our comprehensive coverage of emerging market financial conditions (credit spreads, interest rates, exchange rates, stock prices and portfolio flows) improve on earlier studies and thus allow us to cross-check their

[20] From the perspective of Albagli et al (2019) and Hoek et al (2022), the coefficient β on the change in 2-year Treasury yields would be the object of interest, and the US economic news would be a control variable that is omitted in those papers.

[21] As explained in the Appendix, we follow the official and more restrictive IMF definitions in the classification of emerging markets, whereas some other studies mix in economies that are classified only by the private sector, but not by the IMF, as emerging markets.

findings. Moreover, we are able to make two modest contributions to the literature on the effects of US monetary policy on emerging markets. First, we show that the increasing sensitivity over time identified by Albagli et al. (2019), among others, is related to the period covering the global financial crisis and euro area debt crisis but ends around 2014. Second, we show a lack of evidence for flexible exchange rates in insulating emerging markets from US monetary policy surprises, which is an extension of the exchange rate insulation puzzle that Corsetti et al. (2021) identify from euro area monetary policy surprises.

We begin with estimates of the spillover from US monetary policy to emerging market bond yields, shown in Table 3. Every standard deviation US monetary policy surprise (a 5.4-basis point increase in 2-year Treasury yields in narrow windows around announcement times) raises credit spreads on dollar-denominated emerging market bonds by 2.4 basis points over two days. The response of local currency emerging market government bond yields ranges from 2.3 basis points at the 1-year maturity to 3.3 basis points at the 10-year maturity. The latter sensitivity is equivalent to a 61-basis point increase in 10-year emerging market interest rates for every percentage point tightening in US monetary policy, after correcting for rounding. We show below that this sensitivity increased after the global financial crisis, which is why Hoek et al. (2022) find a higher sensitivity, of 89 basis points, on the later 2010-2019 sample.[22] Daily US monetary policy surprises produce smaller spillovers, with an insignificant effect on credit spreads, and a 1-percentage point tightening that leads to a 36-basis point rise in emerging market interest rates.[23] The latter sensitivity is within one standard error of the 29 basis points reported in Albagli et al. (2019).

Table 4 digs deeper into the effect on emerging market interest rates, showing that most of the effect of US monetary policy transmits though emerging market term premiums, although it does increase expected future short-term interest rates in emerging markets too. Specifically, a one standard deviation (5.4-basis point) surprise US monetary tightening leads to a 2.6-basis point increase in 5-year interest rates in emerging markets in the full sample, but a 5.9-basis point increase in the post-2016, 13-country sample for which we have the term premium decomposition.[24] About two-thirds (4.2 out of 5.9) of the effect on 5-year emerging market interest rates transmits through term premiums, which is similar to the proportion that Albagli et al. (2019) find for 10-year interest rates in the post-2008 period. By contrast, the remaining one-third of the effect on emerging market interest rates transmits through expected future monetary policy rates in emerging markets, which suggests that markets anticipate some fear-of-floating behaviour (Calvo and Reinhart, 2002) in the average emerging market, even since 2016.

Above, we showed that a surprise US monetary tightening leads the US dollar to appreciate on a trade-weighted basis. Table 3 shows the mirror image, where emerging market currencies depreciate against the US dollar after a surprise US monetary tightening. The average emerging market currency depreciates 9.2 basis points for every one-standard deviation tightening, which is equivalent to a 1.7 percent depreciation per 100 basis point tightening. This magnitude is plausible compared to the 3.4 percent appreciation of the trade-weighted US dollar (above). It is also close to the 2 percent depreciation found both by Bowman et al. (2015), for emerging market currencies, and by Hausman and Wongswan (2011), for a mix of advanced economy and

[22] On the narrower date range sample of Hoek et al. (2022), we find a similar sensitivity of 85 basis points, with a standard error of 27.8, which is statistically significant at the 1 percent level.

[23] These 36 basis points are equivalent to the coefficient of 2.6 on daily US monetary policy surprises shown in Table 3, corrected for rounding.

[24] It would be tempting to conclude, by comparing the coefficients of 3.1 and 5.9 in the third and fourth columns of Table 4, that the increase in the coefficient stems from the reduction in sample size from 21 to 13 emerging markets, instead of stemming from the reduction in sample period from the post-2000 to post-2016 periods. However, this conclusion would be incorrect, because the coefficient in the post-2000, 13-country sample is 3.3. Therefore, the increase in coefficient stems from *both* a reduction in the number of countries and the time period, not one or the other.

emerging market currencies.[25] It is also close to the depreciation of 7.5 basis points per standard deviation US monetary tightening that we estimate in Table 3 using daily monetary policy surprises. Nevertheless, the effect of US monetary policy on emerging market exchange rates is imprecisely estimated, as it is only statistically significant at the 10 percent level. Illustrating this sampling uncertainty, Hoek et al. (2022) find a much larger 11.6 percent depreciation of emerging market currencies per percentage point surprise US monetary tightening.[26]

A surprise US monetary policy tightening seems to raise external financing premia in emerging markets, because premia on 10-year local currency bond yields do not change while the exchange rate depreciates. Specifically, both emerging market and US local currency 10-year government bond yields increase by 3.3 basis points in response to a one-standard deviation US monetary policy surprise. Since emerging market currencies depreciate on the same news, this reduces expectations of future depreciation. The higher credit spreads on dollar-denominated bonds, in response to the same news, suggests that the external premia rise due to perceptions of higher risk.

We find that emerging market stock prices fall 40.9 basis points over two days for every one-standard deviation (5.4 basis point) surprise US monetary policy tightening, which is equivalent to a 7.5 percent stock price fall per percentage point tightening. This is within one standard deviation of the 9.6 percent fall reported in Hoek et al. (2022).

4.2.2. Transmission channels: risk and portfolio balance.

Like much of the literature, we find mixed results on whether US monetary policy exerts stronger effects on riskier emerging markets. Table 5 shows that surprise US monetary policy tightenings raise credit spreads by more in emerging markets with higher composite risk ratings, which reflect an assessment of political economic and financial risk.[27] Thus, we have some evidence of stronger US monetary policy effects on credit spreads in riskier emerging markets, but only the composite risk rating is a relevant measure of risk in this case. Gilchrist et al. (2019) also find stronger responses of credit spreads in riskier countries, but their results are specific to the pre-2009 sample period, rely on a mixed sample of advanced and emerging economies (in which case they may explain differentiation between advanced and emerging economies, rather than differentiation within emerging economies themselves), and use credit ratings as the risk measure.[28] The results are more mixed for US monetary policy effects on emerging market interest rates and stock prices (not shown to save space). Hoek et al (2022) find stronger spillovers from US monetary policy surprises to equity prices in more vulnerable EMs (statistically significant at 5 percent), and to a lesser extent to 10-year government bond yields (statistically significant at 10 percent). However, they note that their result is specific to the sample period they study (January 2010 to March 2019) and weakens significantly on an earlier sample. They use a vulnerability index constructed from six underlying indicators: current account balances, international reserves, government debt, the change in credit to the private sector (all relative to GDP) and external debt as a percent of exports and inflation. We replicate this index, and in our full sample period, we do not find evidence for stronger US

[25] Technically, both papers find that a 25-basis point surprise US monetary easing appreciates foreign currencies against the US dollar by 0.5 percent. This result in Hausman and Wongswan (2011) depends on using the one-year Eurodollar futures rate as the monetary policy instrument, and the ten-year US Treasury yield in Bowman et al. (2015).

[26] On the Hoek et al. (2022) 2010-2019 sample period, we find a depreciation of 3.8 percent, which is larger than the 1.7 percent that we find over the full sample, but nevertheless far smaller than the 11.6 percent that they report.

[27] The composite risk rating is published by the International Country Risk Guide. We multiply the rating by -1, so that higher values mean more risk. Unreported results using sub-indices reveal that the heterogeneous effect of US employment news across emerging markets is driven by “economic risk”, while the heterogenous effect of US monetary policy is driven by “political risk”.

[28] By contrast, we do not find a statistically significant role for credit ratings in explaining the cross-section of spillovers to emerging market credit spreads, in our full sample.

monetary policy spillovers to credit spreads in emerging markets that are more vulnerable according to this index (Table 5). The same lack of evidence applies to US monetary policy spillovers to emerging market interest rates and stock prices (not shown to save space).[29]

Like the previous section, we test whether the Federal Reserve's interest rate decisions transmit to emerging markets through a portfolio balance channel. However, we do not find evidence for stronger effects of US monetary policy on the credit spreads of emerging markets whose bonds are more substitutable for US Treasuries, or which have stronger financial links to the US.

4.2.3. Time-varying spillovers.

Table 7 shows variation over time in the effect of US monetary policy surprises on local currency emerging market government bond yields with a 10-year maturity. The first column shows, using a linear time trend, that the sensitivity has increased over time. However, the second column allows this linear trend in the sensitivity to vary across different episodes. The sensitivity clearly increases between the 2000-2008 period and the 2008-2013 period, and then the point estimate drops in the 2014-2020 period. The increase in sensitivity coincides with the global financial crisis and eurozone debt crisis. A Wald test reveals that the sensitivity in the 2014-2020 period is not significantly different from the sensitivity in the 2000-2008 period, which clarifies that the upward linear trend in the sensitivity in the first column is driven by the 2008-2013 period. This finding suggests that the increasing spillovers over time identified in papers like Albagli et al. (2019) might reflect higher spillovers in crisis related periods, rather than secular trends like financial or economic integration.

4.2.4. The role of emerging market currency regime.

There have been few event-study analyses of whether flexible exchange rates insulate emerging economies against US monetary policy surprises, as predicted by Mundell—Fleming.[30] Hausman and Wongswan (2011) find that fixed-rate regimes experience stronger increases in interest rates and stronger declines in equity prices after surprise US monetary policy tightenings in an event study. However, their sample contains both advanced and emerging economies, so it is unclear whether the results are driven by differences between these two groups.[31] Here, we provide the event study evidence to fill this gap. Table 7 shows estimates of the spillovers when the sensitivity is a function of an indicator variable for whether the emerging market has a flexible exchange rate regime. Results are shown for both *de facto* and *de jure* classifications. They show that the spillover of US monetary policy to emerging markets is no stronger in less flexible exchange rate regimes than in more flexible exchange rate regimes, regardless of the regime classification system used. The first column shows this result for spillovers to emerging market local currency bond yields with 10-year maturities. This holds even though the exchange rate classification systems seem somewhat informative. The second column validates these systems by showing that two of them are able to reflect a larger currency depreciation in emerging markets with less flexible exchange rate regimes.

[29] Hoek et al. (2022) estimate on a sample of 22 countries, of which only 17 are emerging markets by IMF definitions (see appendix). Restricting our sample period to match theirs, restricting our country sample to their 17 emerging markets, and adding additional interaction terms in the model specification as they do (along the lines of Table 2), we find very limited evidence for stronger spillovers to emerging markets that are more vulnerable according to their index. This applies to interest rates, stock prices and exchange rates.

[30] Recent studies using lower-frequency vector autoregressions, including Bluwstein and Canova (2016) (weekly) and Miranda-Agrippino and Rey (2020) (monthly), do not find evidence for insulation from flexible exchange rate regimes.

[31] For example, Iacoviello and Navarro (2019) find important differences between advanced and emerging economies. Using vector autoregressions, they find that flexible exchange rates seem to insulate economic activity in advanced economies, but not in emerging markets, from US monetary policy surprises.

The finding of lack of insulation from flexible exchange rates therefore extends evidence presented in Corsetti et al. (2021) from euro area to US monetary policy. A simple explanation could be the prevalence of trade invoicing in foreign currencies, which limits the expenditure-switching effects associated with flexible exchange rates. Relatedly, Corsetti et al. (2021) show that, even if flexible exchange rates in principle insulate an economy from foreign monetary policy surprises, an inflation-targeting central bank may rationally choose to adjust policy rates to limit exchange rate volatility, even at the cost of higher output volatility.

4.2.5. "Information effects" in the spillover to emerging markets.

Table 9 presents estimates of equations (1) and (7). These test whether financial conditions in emerging markets respond differently to US monetary policy, depending on whether US stock prices move in the opposite direction to the monetary policy rate, as we would expect, or in the same direction. The first row of coefficients shows that the effects of US monetary policy on emerging market financial conditions, conditional on US stock prices moving in the opposite direction to monetary policy, are in the same directions as the unconditional coefficients of Table 3. The conditional coefficients are larger (in absolute value) and more precisely estimated, especially for credit spreads, exchange rates and stock prices.

The second row of coefficients show the effects of US monetary policy on emerging market financial conditions, conditional on US stock prices moving in the same direction as monetary policy. Unlike US interest rates, there is limited evidence that in this case emerging market interest rates respond to US monetary policy surprises. The only exception are 10-year emerging market interest rates, which may increase slightly with US monetary policy tightenings that coincide with a rising stock market, but this effect is only statistically significant at the 10 percent level. A one standard deviation (5.4-basis point) US monetary policy surprise increases 10-year interest rates in emerging markets by 4.2 basis points if US stock prices fall on the monetary policy announcement, and by 1.1 basis points if US stock prices rise. These magnitudes are equivalent to 77 and 21 basis points per 100-basis point monetary policy tightening, respectively. When we restrict the sample to the 17 emerging markets (according to IMF definitions) that are analysed in Hoek et al. (2022), and to their 2010-2019 sample period, we find larger estimates of 136 and 39 respectively (with standard errors of 31.0 and 18.4; statistically significant at the 1 and 5 percent levels). These are within one standard deviation of the 108.5 and 23.6 that they report on a sample of 22 countries.

We find no evidence of any reaction of emerging market credit spreads, term premia, expected future policy rates, exchange rates against the US dollar, stock prices or portfolio flows in response to US monetary policy actions, as long as US stock prices move in the same direction as US monetary policy. While Hoek et al. (2022) report results on exchange rates,[32] our results seem to be the first on emerging market credit spreads, term premia and portfolio flows. The lack of spillover from US monetary policy to emerging markets, when US stock prices move in the same direction as US monetary policy, echoes the lack of reaction of the US dollar and VIX under such circumstances.

The bottom rows of Table 9 show tests of whether the sensitivities to the two types of monetary policy surprise differ by more than could be expected from normal sampling uncertainty. From the low p-values, they show that emerging market credit spreads, interest rates, term premia, exchange rates and stock prices respond significantly differently to US monetary policy, depending on whether US stock prices move in the opposite direction to US monetary policy, or the same direction.

[32] Hoek et al. (2022) report emerging market currency depreciations of 13.9 and 4.1 percent in response to a 1 percentage point US monetary tightening that is accompanied by a US stock market fall, or rise, respectively. On a comparable sample to theirs, we find an emerging market currency depreciation of 8.9 percent and an appreciation of 2.4 percent, respectively. In their paper and in ours, the second number in each pair (i.e. 4.1 and 2.4) is not statistically significant.

As in Section 3.3, these results on conditional spillovers from US monetary policy can be interpreted in terms of measurement error related to economic stress, or "information effects". The lack of reaction of emerging market financial conditions to US monetary policy, when US stock prices move in the same direction as monetary policy, is easy to interpret in terms of the attenuation bias associated with measurement error. This simple explanation could apply to all elements of emerging market financial conditions: credit spreads, interest rates, term premia, exchange rates, stock prices and portfolio flows.

Alternatively, an "information effects" interpretation would say that emerging market credit spreads do not rise with a US monetary tightening, if US stock prices rise too, because this reveals positive information about the economic outlook that lowers risk perceptions or risk aversion. This positive information offsets the tendency for credit spreads to rise with a US monetary tightening, resulting in no clear response of credit spreads. Similarly, emerging market stock prices might not fall with a US monetary tightening, if the tightening reveals good economic news that offsets the traditional effects the US monetary tightening itself. However, the "information effects" interpretation is more difficult to reconcile with the pattern of spillovers to emerging market interest rates. If a US monetary policy tightening reveals good economic news, it should lift emerging market interest rates even more than such a tightening without the news. Indeed, Section 4.1 shows that good US economic news lifts interest rates in emerging markets. In contrast to this hypothesis, we do not see clear evidence that emerging market interest rates rise more in response to a US monetary tightening that is accompanied by an increase in US stock prices.

5. CONCLUDING REMARKS

We have established that economic news, and not just monetary policy, in the United States affects financial conditions in emerging markets. News about employment has the strongest effects, followed by news about economic activity and COVID-19 vaccines, but news about inflation has limited effects on average. The effects are felt immediately, within two days of the news release. We also show that financial conditions in the US and emerging markets respond differently to US monetary policy surprises, depending on the reaction of US stock prices. In addition to the usual "information effects" interpretation of this pattern, we offer a new interpretation in terms of measurement error that is correlated with times of economic stress.

A key channel of transmission appears to be the risk perceptions or risk aversion of international investors. We see this in three ways. First, news about US employment, economic activity and monetary policy influences the VIX. Second, their effects on emerging market interest rates mainly operate through term premia, rather than expectations of future monetary policy, which amount to compensation for the risk of holding longer-term bonds. Thirdly, news about US employment, economic activity and monetary policy seem to exert stronger effects on the credit spreads of riskier emerging economies. One notable distinction from this work is that US monetary policy acts on domestic interest rates through expected future monetary policy, but on emerging market interest rates through term premia.

Taken together, these findings suggest that news about the US economy and monetary policy is an important fundamental risk factor in the pricing of emerging market assets, and news may have predictable relationships with risk premia on such assets. The findings also have policy implications. They support the view in the literature that rising US interest rates can have benign implications for emerging markets, if the rises are driven by good US economic news.

News about US employment seems to preserve uncovered interest parity. However, positive news about US retail sales and GDP seems to lower external financing premia in emerging markets, and surprise US monetary policy tightenings seem to raise external financing premia. Both moves in external premia seem related to risk. Relatedly, we do not find significant evidence for insulation coming from flexible exchange rates. This points to

the importance of frictions, like for example foreign currency trade invoicing, the effects of which on insulation should be explored in future work.

We have shown effects that persist over a day, for US financial conditions, and over two days, for those in emerging markets. Nevertheless, because economic agents may make decisions over longer horizons than a few days, further research will need to examine to what extent these effects persist over several months or quarters. We hope that our estimates will serve as useful benchmarks for such work.

Table 1. Effects of US economic news on US financial conditions.

U.S. News	Yield[a]			Term prem.[b]	Exp. rate[c]	Exch. rate[d]	Stocks[e]	VIX[f]
	3-month	2-year	10-year					
Employment	0.9***	3.8***	3.3***	0.8	2.5***	9.9***	6.6	-0.7*
	(0.34)	(0.68)	(0.81)	(0.52)	(0.49)	(2.54)	(9.85)	(0.42)
Jobless claims	-0.5**	-0.8***	-1.1***	-0.4**	-0.7***	0.8	-6.0	0.1
	(0.22)	(0.22)	(0.24)	(0.18)	(0.17)	(1.06)	(4.72)	(0.22)
Retail sales	0.6***	1.6***	1.9***	0.8**	1.0***	1.1	20.3*	-0.8**
	(0.19)	(0.41)	(0.48)	(0.34)	(0.22)	(1.78)	(10.62)	(0.41)
GDP	0.1	1.3	1.9**	1.0*	0.9	7.7	-17.3	0.3
	(0.28)	(0.89)	(0.80)	(0.49)	(0.55)	(4.86)	(16.53)	(0.73)
Dur. goods orders	0.2	0.5	0.6	0.2	0.4	1.1	11.6	-0.8
	(0.38)	(0.41)	(0.47)	(0.25)	(0.38)	(1.88)	(7.23)	(0.65)
Inflation								
• core CPI	-0.1	1.2***	0.8*	0.1	0.7**	2.1	-6.9	0.4
	(0.27)	(0.43)	(0.42)	(0.32)	(0.30)	(2.56)	(13.73)	(0.47)
• core PPI	< |0.5|	< |0.5|	1.0***	1.0***	< |0.5|	-3.7**	-1.8	-0.4
	(0.13)	(0.33)	(0.30)	(0.24)	(0.21)	(1.86)	(6.80)	(0.37)
Vaccine news	< |0.5|	< |0.5|	1.3**	1.3**	< |0.5|	-4.1	80.1***	-3.4***
	(0.17)	(0.20)	(0.62)	(0.64)	(0.13)	(5.33)	(17.2)	(0.99)
Monetary policy	2.0***	5.3***	3.2***	-0.6	3.7***	18.4***	-33.0*	1.7**
	(0.52)	(0.72)	(0.64)	(0.52)	(0.41)	(4.49)	(19.41)	(0.85)

Notes:

[a] Yield on US Treasury securities with a 3-month or 10-year maturity, as indicated, in basis points per year.

[b] Term premium at the 10-year maturity, in basis points, according to Adrian, Crump and Moench (2013).

[c] Expected future short-term interest rate over the next 10 years, in basis points, according to Adrian, Crump and Moench (2013).

[d] Percentage change in the trade-weighted US dollar index, in basis points, where increases denote appreciation.

[e] Percentage change in the Wilshire 5000 total return stock index, in basis points.

[f] Percentage change in the Chicago Board Options Exchange Volatility Index, in percentage points.

The coefficient entries represent the effect of a one-standard deviation surprise in each type of US economic news on US financial conditions. Newey and West (1987) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.

Sources: Authors calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P. Haver Analytics, International Monetary Fund and Federal Reserve Bank of New York.

Table 2. Effects of US monetary policy on US financial conditions, conditional on the response of the US stock market.

	Yield[a]			Term prem.[b]	Exp. Rate[b]	Exch. rate[c]	Stocks[d]		VIX[e]
	3-month	2-year	10-year				Daily	Intradaily	
Given that stocks move in the opposite direction to monetary policy:									
	1.8***	5.0***	2.9***	-0.7	3.6***	23.7***	-58.4***	-43.6***	2.5***

	(0.67)	(0.59)	(0.85)	(0.66)	(0.45)	(5.74)	(12.43)	(4.43)	(0.62)
Given that stocks move in the same direction as monetary policy:									
	2.7***	6.1***	3.9***	-0.4	4.3***	4.4	36.7	35.3***	-0.3
	(0.75)	(1.16)	(0.79)	(0.86)	(0.71)	(6.33)	(34.07)	(11.12)	(1.75)
Test of equal coefficients:									
• t-statistic	-1.0	-1.0	-0.8	-0.3	-0.8	2.3	-2.7	-6.6	1.6
• p-value	0.33	0.32	0.43	0.79	0.42	0.02	< 0.01	< 0.01	0.12
No. observations	152	151	152	152	152	153	152	153	152

Notes:

[a] Constant maturity spot yield on US Treasury securities with a 3-month or 10-year maturity, as indicated, in basis points per year.

[b] The 10-year yield on Treasury securities is decomposed into a term premium and expected future short-term interest rate component, following Adrian, Crump and Moench (2013).

[c] Percentage change in the trade-weighted US dollar index, in basis points, where increases denote depreciation.

[d] Percentage change in a total return stock index, in basis points. For daily returns, the index is the Wilshire 5000 (which produces very similar results to the S&P500), and for intradaily returns it is the S&P500.

[e] Percentage change in the Chicago Board Options Exchange Volatility Index, in percentage points.

The coefficient entries represent the effect of a one-standard deviation surprise in each type of US economic news on US financial conditions. All models include an intercept. Newey and West (1987) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.

Sources: Authors calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P. Haver Analytics, International Monetary Fund, Federal Reserve Bank of New York, JP Morgan, BNP Paribas, Morgan Stanley Capital International, and Institute of International Finance.

Table 3. Effects of U.S. economic news on emerging markets.

U.S. news	EMBI[a]	Yield[b]			Exch. rate[c]	Stocks[d]	Inflows[e]
		1-year	2-year	10-year			
Employment	-2.0***	0.6	0.1	1.3**	4.9**	3.9	-0.1
	(0.76)	(0.46)	(0.59)	(0.55)	(2.34)	(7.55)	(0.34)
Jobless claims	0.9**	< |0.05|	-0.1	-0.2	0.6	-0.7	-0.3
	(0.45)	(0.34)	(0.25)	(0.19)	(0.98)	(4.42)	(0.22)
Retail sales	-2.3***	0.9*	1.0	0.5	0.9	25.7***	0.6
	(0.76)	(0.53)	(0.61)	(0.44)	(1.6)	(8.48)	(0.42)
GDP	-0.5	0.1	0.1	0.8	7.3	4.0	-1.4**
	(1.5)	(1.09)	(1.1)	(0.52)	(5.65)	(13.6)	(0.65)
Dur. goods orders	-1.2*	0.5	< |0.05|	-0.1	< |0.05|	7.9	0.1
	(0.7)	(0.42)	(0.34)	(0.23)	(1.5)	(7.79)	(0.34)
Inflation							
• core CPI	-1.3	0.4	-0.1	0.4	-1.1	5.4	0.2
	(1.37)	(0.51)	(0.36)	(0.34)	(2.52)	(14.61)	(0.34)
• core PPI	-1.0	0.2	< |0.05|	0.2	-3.0*	-2.0	0.5
	(0.99)	(0.35)	(0.4)	(0.4)	(1.65)	(9.22)	(0.4)
Vaccine news	-3.2***	-1.8***	-0.9	-0.6	0.4	9.1	0.7*
	(1.02)	(0.69)	(0.65)	(0.69)	(1.82)	(8.69)	(0.36)
Monetary policy							
• Intradaily	2.4*	2.3**	3.4***	3.3***	9.2*	-40.9***	-0.4
	(1.26)	(1.03)	(1.11)	(1.28)	(4.87)	(15.48)	(0.6)
• Daily	-0.5	2.9**	2.9**	2.6**	7.5*	-31.9	-0.3
	(1.93)	(1.21)	(1.26)	(1.08)	(4.33)	(22.65)	(0.75)

Notes:

[a] Emerging Market Government Bond Index spread on dollar-denominated debt, in basis points.

[b] Yield on local currency government bonds with the indicated maturity, in basis points per year.

[c] Percent change in the local currency price of US dollars, in basis points.

[d] Total return on MSCI local currency stock index, in basis points.

[e] Debt and equity portfolio inflows, in basis points of yearly GDP.

Table shows estimates of the effect, over two days, of a one-standard deviation surprise in each measure of US news, on financial conditions in emerging markets. Driscoll and Kraay (1998) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.
Sources: Authors' calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P. Haver Analytics, JP Morgan, BNP Paribas, Morgan Stanley Capital International, and Institute of International Finance.

Table 4. Effect of US news on 5-year emerging market interest rates and term premiums.

U.S. News	5-year yield[a]			Term prem.[b]	Expected rate[b]
	From 2000, 21 EMs	From 2016, 21 EMs	From 2016, 13 EMs		
Employment	1.0	-1.1	-0.7	-1.6	0.9
	(0.63)	(1.00)	(1.29)	(1.23)	(0.62)
Jobless claims	-0.1	-1.0**	-1.3**	-1.0**	-0.4
	(0.20)	(0.47)	(0.56)	(0.50)	(0.35)
Retail sales	0.8	3.3**	4.7**	3.0**	1.7
	(0.49)	(1.51)	(2.04)	(1.31)	(1.26)
GDP	0.5	0.9*	1.4***	2.0**	-0.6
	(1.00)	(0.53)	(0.44)	(1.00)	(0.83)
Dur. goods orders	0.1	1.4	1.7	2.6**	-0.8
	(0.46)	(0.95)	(1.66)	(1.27)	(0.51)
Inflation					
• core CPI	0.1	0.6	0.7	0.7	< |0.05|
	(0.34)	(0.80)	(0.93)	(0.59)	(0.53)
• core PPI	0.2	0.5	0.7	0.2	0.5
	(0.40)	(0.64)	(0.85)	(0.52)	(0.66)
Vaccine news	n.a.	-1.4*	-2.4**	-1.0	-1.4
		0.77	(1.12)	(0.77)	(0.98)
Monetary policy					
• Intradaily	2.6***	3.1**	5.9***	4.2***	1.7***
	(0.84)	(1.20)	(1.04)	(0.93)	(0.40)
• Daily	2.3**	4.5***	6.5***	5.8***	0.7*
	(0.95)	(1.30)	(0.96)	(1.01)	(0.37)

Notes:

[a] Yield on local currency government bonds with a 5-year maturity, in basis points per year. The sub-columns show the results for one sample from 2000 onwards and another for 2016 onwards.

[b] Term premium on local currency government bonds with a 5-year maturity, in basis points per year, following Adrian, Crump and Moench (2013). The expected future short-term interest rate is the difference between the 5-year yield and the term premium. Covers 13 emerging markets from Jan. 2016 to Dec. 2020.
Table shows estimates of the effect, over two days, of a one-standard deviation surprise in each measure of US news, on financial conditions in emerging markets. Driscoll and Kraay (1998) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent. The vaccine news sample period applies to the period between April and November 30, 2020.
Sources: Authors' calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P. Haver Analytics and BNP Paribas.

Table 5. Destination-country factors that amplify spillovers from economic news.

	Employment	Dur. goods orders	Monetary policy
Risk channel tests			
Effects on credit spreads in basis points:			
Credit growth[a]	-0.02	-0.05*	0.02
Inflation[b]	-9.82**	-11.18*	1.45
Exch. rate volatility[c]	-0.20***	-0.31**	0.06
External debt to GDP[d]	-3.69**	0.51	-4.74
Short-term ext. debt to reserves[e]	-1.70*	-1.31	1.14

Composite risk rating[f]	-11.10**	0.18	23.70*
Vulnerability index[g]	-5.62**	-9.61**	4.11
Portfolio balance channel tests			
Effects on credit spreads in basis points:			
Bond substitutability[h]	2.24	-2.94	-1.02
Financial ties to the U.S.[i]	11.35*	5.86	3.67
Trade channel test			
Effects on exchange rates in basis points:			
Trade ties to the U.S.[j]	-33.16*	n.a.	n.a.

Notes:
[a]Change in the ratio of private sector credit to GDP over the last five years.
[b]Consumer price inflation in the past year.
[c]Average, across months in the previous year, of the within-month annualized standard deviation of daily percentage (log) changes in the nominal effective (trade-weighted) exchange rate.
[d]The ratio of external debt to GDP.
[e]Ratio of short-term external debt to international reserves.
[f]Rating that reflects political, financial and economic risk, on a scale from -100 (low risk) to 0 (high risk). Equals the negative of the rating calculated by the International Country Risk Guide.
[g]The vulnerability index is the average, across six measures of vulnerability of the rank of each emerging market in each year, following Hoek, Kamin and Yoldas (2022). The measures of vulnerability include current account deficits, government debt, inflation, credit growth, short-term external debt and international reserves, appropriately scaled.
[h]Correlation between the total returns, in U.S. dollars, of government bonds with those of U.S. Treasuries.
[i]Claims on, and obligations to, the U.S. in percent of GDP. Claims and obligations include direct and portfolio investment, and cross-border banking relationships.
[j]Imports and exports from the U.S. in percent of GDP.
Inference based on Driscoll and Kraay (1998) standard errors. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.
Sources: Authors' calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), World Bank, International Monetary Fund, International Country Risk Guide, and Haver Analytics.

Table 6. Effects of US news on emerging market yields, controlling for changes in U.S. Treasury yields.

	1-year[a]	1-year[a]	10-year[b]	10-year[b]
Retail sales	0.9*	1.0*		
	(0.53)	(0.60)		
Employment			1.3**	0.9
			(0.55)	(0.60)
Interest rate[c]		-1.1		11.3
		(10.68)		(7.89)
No. observations	2,154	2,141	2,843	2,802

Notes:
[a]The dependent variable is the change in yield on local currency government bonds with a 1-year maturity, in basis points per year.
[b]The dependent variable is the change in yield on local currency government bonds with a 10-year maturity, in basis points per year.
[c]Change in the yield on U.S. Treasury securities with a 2-year maturity, in basis points per year.
Driscoll and Kraay (1998) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=1 percent.
Sources: Authors' calculations using data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P., Haver Analytics.

Table 7. Time variation in monetary policy spillovers to emerging markets.

	Yield[a]	Yield[a]
Monetary policy[b]	< |0.5|	1.3
	(1.55)	(0.94)
Interactions with monetary policy:[c]		
Time trend	0.4**	
	(0.17)	
Nov. 2008 onwards		6.5**
		(2.90)
2014 onwards		-3.2
		(3.43)
Time variables individually:		
Time trend	0.1	
	(0.12)	
Nov. 2008 onwards		0.8
		(1.26)
2014 onwards		-0.4
		(1.44)
No. observations	1,951	1,951
Chi-squared statistic[d]		2.2
Chi-squared *p*-value[d]		0.14

Notes:
[a]The dependent variable is the change in yield on local currency government bonds with a 10-year maturity, in basis points per year.
[b]Intraday change in the yield on U.S. Treasury securities with a 2-year maturity in a narrow window around FOMC announcements.
[c]These variables are interacted with the monetary policy variable. The first variable is a linear time trend, defined as the number of (fractional) years since 2000. The second and third variables are indicator variables, equal to one after the specified date and zero before.
[d]Test of whether the coefficient from 2014 onwards is different from the coefficient before November 2008.
Driscoll and Kraay (1998) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.
Sources: Authors' calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020) and Haver Analytics.

Table 8. The exchange rate insulation puzzle of monetary policy spillovers.

	Yield[a]	Exch. rate[b]
De jure classifications:[c]		
Floating	2.75	13.58**
Free vs. managed float	0.77	7.59
De facto classifications:[d]		
Flexiblity (IRR)	0.44	0.77
Flexibility (LYS)	-1.08	3.62**

Notes:
[a]Yield on local currency government bonds with a 10-year maturity, in percent per year.
[b]Percent change in the local currency price of US dollars.
[c]The first indicator equals one if a country self-declares as having a free or managed floating regime, otherwise zero. Countries without separate legal tender are dropped. The second indicator equals one for free-floaters, zero for managed floaters, and drops other countries.
[d]The first and second indicators follow the classifications of Ilzetski, Reinhart and Rogoff (2018), and Levy-Yeyati and Sturzenegger (2016), respectively.
Inference based on Driscoll and Kraay (1998) standard errors. Stars denote statistical significance: ***=0.1 percent, **=1 percent, *=5 percent,.=10 percent.
Sources: Authors' calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Ilzetski, Reinhart and Rogoff (2018), and Levy-Yeyati and Sturzenegger (2016), Haver Analytics, International Monetary Fund.

Table 9. Effects of US monetary policy on emerging market financial conditions, conditional on the response of the US stock market.

	EMBI[a]	Yield[b]			Term prem.[c]	Expected rate[c]	Exch. rate[d]	Stocks[e]	Inflows[f]
		1-year	2-year	10-year					
Given that stocks move in the opposite direction to monetary policy:									
	3.7***	3.4***	4.4***	4.2***	4.6***	1.8*	13.9***	-57.1***	-0.7
	(0.63)	(0.97)	(1.00)	(0.85)	(0.88)	(0.97)	(2.04)	(6.06)	(0.69)
Given that stocks move in the same direction as monetary policy:									
	-1.0	-0.3	1.2	1.1*	1.0	1.4	-3.0	8.1	0.4
	(0.74)	(0.72)	(0.75)	(0.64)	(1.34)	(2.32)	(2.07)	(10.07)	(0.73)
Test of equal coefficients:									
• t-statistic	5.0	3.1	2.7	2.9	2.3	0.1	5.8	-5.7	-1.1
• p-value	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.89	< 0.01	< 0.01	0.29
No. observations	4,575	1,506	1,442	1,945	198	198	7,503	3,244	336

Notes:

[a] Emerging Market Government Bond Index spread on dollar-denominated debt, in basis points.

[b] Yield on local currency government bonds with the indicated maturity, in basis points per year.

[c] Term premium on local currency government bonds with a 5-year maturity, in basis points per year, following Adrian, Crump and Moench (2013). The expected future short-term interest rate is the difference between the 5-year yield and the term premium. Covers 13 emerging markets from Jan. 2016 to Dec. 2020.

[d] Percent change in the local currency price of US dollars, in basis points.

[e] Total return on MSCI local currency stock index, in basis points.

[f] Debt and equity portfolio inflows, in basis points of yearly GDP.

Coefficient entries are estimates of the effect, over two days, of a one-standard deviation surprise in each measure of US news, on financial conditions in emerging markets. All models include country fixed effects. Driscoll and Kraay (1998) standard errors in parentheses. Stars denote statistical significance: ***=1 percent, **=5 percent, *=10 percent.

Sources: Authors calculations based on data from Gürkaynak, Kısacıkoğlu and Wright (2020), Bloomberg, L.P. Haver Analytics, International Monetary Fund, Federal Reserve Bank of New York, JP Morgan, BNP Paribas, Morgan Stanley Capital International, and Institute of International Finance.

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APPENDIX

Data sources and construction

We obtain data on eight types of US economic news as used in Gürkaynak, Kısacıkoğlu and Wright (2020). The data include surprises to non-farm payroll employment (monthly), initial jobless insurance claims (weekly), retail sales (monthly), the advance estimate for GDP (quarterly), durable goods orders (monthly), core CPI inflation (monthly) and core PPI inflation (monthly).

The sample contains 60 emerging markets. It starts from the 97 emerging market countries by the IMF's definitions, which are those that are neither advanced economies nor low-income developing countries. We then drop offshore financial centres, countries without their own currency, countries undergoing hyperinflation or crises, countries on the IMF's list of fragile states, countries with population of less than 1 million persons and countries with GDP less than US$ 10 billion in 2019. The resulting economies are Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahrain, Belarus, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Dominican Republic, Egypt, Equatorial Guinea, Gabon, Georgia, Guatemala, Hungary, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kuwait, Macedonia, Malaysia, Mauritius, Mexico, Mongolia, Morocco, Namibia, Oman, Pakistan, Paraguay, Peru, Philippines, Poland, Qatar, Romania, Russia, Saudi Arabia, Serbia, South Africa, Sri Lanka, Thailand, Trinidad & Tobago, Tunisia, Turkey, Turkmenistan, Ukraine, United Arab Emirates and Uruguay.

To the best of our knowledge, this is the largest sample of emerging markets used to study spillovers from US monetary policy news to emerging markets (and the only sample used so far to study spillovers from other types of US economic news to emerging markets). Hausman and Wongswan (2011) mix 19 emerging markets with 30 advanced economies, and their results for interest rates apply to advanced economies only. Bowman et al. (2015) uses 17 countries, 5 of which are in fact advanced economies by IMF definitions (Czech Republic, Hong Kong, Korea, Singapore and Taiwan PRC). Albagli et al. (2019) use 12, 3 of which are advanced (Israel, Korea and Taiwan PRC). Hoek et al. (2022) use 22, 5 of which are advanced (Czech Republic, Hong Kong, Israel, Korea and Singapore). Gilchrist et al. (2019) use 90 countries, which include 26 advanced economies and 55 emerging markets.

Table 10 below summarizes the coverage and variation of the emerging market financial conditions variables in this paper. Exchange rates have the widest coverage and are available for all 60 emerging markets. Credit spreads on dollar-denominated bonds are available for 47 emerging markets, interest rates with a 10-year maturity are available for 23, stock prices for 22, term premia for 13, and portfolio flows for 6.

For emerging markets, data for nominal, local-currency, emerging market government bond yields are obtained from Haver Analytics. These come first from official sources if available, otherwise from Tullett Prebon, and otherwise from Reuters. This combination of sources ensures that more emerging market interest rates are included than in previous studies. As in previous studies, the interest rates can be a mixture of yields to maturity and zero-coupon yields. Government bond total return indices and EMBI spreads are from JP Morgan Markets. MSCI total stock return indices and BNP Paribas 5-year EM term premiums are from Bloomberg, and the latter follow the method of Adrian et al. (2013). Emerging market exchange rates against the US dollar are from the IMF's Global Data Source database if available, otherwise from official sources through Haver. Daily portfolio flows aggregate equity and debt flows, as available, from the Institute of International Finance.

We adopt standard definitions in the literature for data on US financial conditions. US Treasury yields are constant maturity spot yields. The decomposition of US interest rates into term premia and expected future policy rates are from the Federal Reserve Bank of New York, also following the methodology of Adrian et al.

(2013). US stock prices are the Wilshire 5000 total return index and S&P500 stock price index, as specified, via Haver. The US dollar index is the trade-weighted nominal effective exchange rate from the IMF's Global Data Source. The VIX is based on the S&P500 and is calculated by the Chicago Board Options Exchange, provided by Haver.

The definitions of the various measures of heterogeneity across emerging markets are given in the footnotes to, for example, Table 5. Data on private sector credit come from the World Bank's Global Financial Development Database. Inflation and the current account balance are from the IMF's World Economic Outlook database. The ratios of external debt to GDP and short-term debt to reserves are from the World Bank's World Development Indicators. The composite risk rating is from the International Country Risk Guide. The total returns on emerging market bonds are from JP Morgan GBI-EM indices, and on US Treasuries they are the JP Morgan broad index. Financial ties to the US are averages of bilateral asset claims against the US and liability obligations to the US, in percent of the emerging market's GDP. These are simple averages of direct investment, portfolio investment and cross-border banking claims and obligations. The data sources are the IMF's Coordinated Direct and Portfolio Investment Surveys and the BIS' Locational Banking Statistics (LBS). In the LBS, claims and obligations are taken as reported by the US, not as reported by emerging markets, because the coverage of the US-reported data is broader. Data on trade ties to the US are taken from the IMF's Direction of Trade Statistics. *De jure* exchange rate regimes are taken from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. De facto exchange rate regimes are from Ilzetski, Reinhart and Rogoff (2018), and Levy-Yeyati and Sturzenegger (2016), as specified.

Table 10. Coverage and variation of emerging market financial condition variables.

Variable	Units	Obs.	Countries	Years	Mean	Std. dev.	Min.	Max.
EMBI spread	Percent per year	147,983	47	18.8	3.72	4.86	-0.25	72.22
Yield, 3-month	Percent per year	52,067	18	19.6	5.54	3.84	-0.14	64.86
Yield, 6-month	Percent per year	44,389	16	19.6	5.39	3.82	-0.05	41.99
Yield, 1-year	Percent per year	53,769	20	19.6	5.87	3.58	-0.04	46.00
Yield, 2-year	Percent per year	51,795	22	19.6	6.43	4.09	-0.01	28.25
Yield, 5-year	Percent per year	57,742	21	19.6	7.01	3.39	0.98	25.49
Yield, 10-year	Percent per year	68,098	23	19.6	6.95	3.01	1.13	22.42
Term premium	Percent per year	10,165	13	3.1	1.02	1.82	-4.65	9.38
Expected future policy rate	Percent per year	9,818	13	3.1	4.96	3.67	0.28	20.84
Exchange rate	Log of local currency price of USD	249,937	60	19.7	3.11	2.57	-3.44	10.69
Portfolio inflows, total	Percent of annual GDP	11,581	6	14.3	0.0104	0.0643	-0.5899	0.6636
Stock price	Log of total return index	105,454	22	19.7	7.37	2.39	2.56	14.32

Table 11. Summary statistics of US news indicators.

Variable	Units	Obs.	From	To	Mean	Std dev.	Min.	Max.
Employment	Hundreds of thousands of jobs	223	1/7/2000	12/7/2018	-0.16	0.77	-3.28	2.08
Jobless claims	Thousands of jobs	792	1/6/2000	12/27/2018	0.50	17.77	-94.00	70.00
Retail sales	Percentage change mom	214	1/13/2000	12/14/2018	-0.01	0.61	-1.76	5.13
GDP	Percentage change qoqar	62	1/28/2000	10/26/2018	-0.09	0.65	-1.68	1.80

Dur. goods orders	Percentage change mom	211	1/27/2000	12/21/2018	0.02	2.93	-8.85	17.10
Inflation								
• core CPI	Percentage change mom	213	1/14/2000	12/12/2018	-0.008	0.091	-0.300	0.246
• core PPI	Percentage change mom	216	1/13/2000	12/11/2018	-0.002	0.257	-0.980	1.068
Monetary policy								
• Intradaily	Percent per year	154	2/2/2000	12/13/2017	-0.007	0.054	-0.233	0.216
• Daily	Percent per year	176	2/2/2000	11/5/2020	-0.007	0.071	-0.260	0.270
Vaccine news								
• index	Index -1 or 1	57	1/4/2020	12/15/2020	0.02	1.009	-1	1

Notes: The US economic news announcements exclude all monetary policy announcement days. The following acronyms are used: mom denotes month-on-month and qoqar denotes quarter-on-quarter annualized.
Sources: Gürkaynak, Kısacıkoğlu and Wright (2020); Bloomberg, L.P.; Moderna, Inc.; and BioNTech S.E.

Information effects or measurement error correlated with economic conditions

Jarocinski and Karadi (2020) find that in about one-third of announcements, yields and stock prices puzzlingly move in the same direction. We find the same ratio, whether we use 3-month Federal Funds futures as the monetary policy instrument, as they do, or the 2-year Treasury yield, as we do. The ratio also prevails in the post-2000 sample period, which we use in our spillover analysis.

Jarocinski and Karadi (2020) interpret the instances when stock prices and interest rates move in the same direction as evidence of an information effect, where the Federal Reserve's announcement reveals information about the economic outlook that causes investors to revise their expectations for the future, and hence to reassess the value of stocks. The idea that Federal Reserve actions reveal information to the public goes back at least to Romer and Romer (2000). Strikingly however, four of the six most puzzling dates (when monetary policy and stock prices move substantially in the same direction) are associated with the dotcom and financial crises of 2001 and 2008.[33] Bauer and Swanson (2020) noted a similar pattern in the data of Nakamura and Steinsson (2018). This suggests that the instances of puzzling comovement between stocks and bonds around FOMC announcements might be related to economic conditions, and especially crisis or stress conditions.

Moreover, market commentary from *The New York Times* following each of these events never alludes to information effects at the primary explanation. For example, on March 21, 2001, the paper reported that investors were 'disappointed' with the previous day's policy rate cut, even though 3-month Federal Funds futures rates fell slightly at the announcement.[34] This suggests that stock market investors' expectations are not correctly measured in the monetary policy surprise from that day. Consistent with a measurement error interpretation, 1-month Federal Funds futures rose at the announcement, so whether this announcement was a tightening or easing is sensitive the choice of interest rate used.

Commentary on other dates also points to measurement error as the cause of the comovement of stocks and bonds. For example, surprises in stock prices can depend on the length of the window chosen around the announcement (two cases in point are November 6, 2002, and October 29, 2008, according to next-day commentary from *The New York Times*). Measurement error can also arise from a failure to account for heterogeneous expectations: investors in stock and bond markets may differ, so that it's possible for one to be positively surprised while the other is disappointed (this seems to be the case on March 11, 2008). Another

[33] The six most puzzling dates are February 1, 1991, March 20, 2001, November 6, 2002, January 22, 2008, and October 29, 2008.
[34] Bernanke and Kuttner (2005) provide a similar interpretation of market commentary on this date.

possibility is an earlier-than-expected policy rate cut combined with revised expectations of no further rate cuts, which therefore looks like a surprise monetary policy easing, even though it is a tightening from the perspective of stock market investors (this occurred on January 22, 2008). Rigobon and Sack (2008) also emphasized the importance of measurement error in measuring monetary policy surprises.

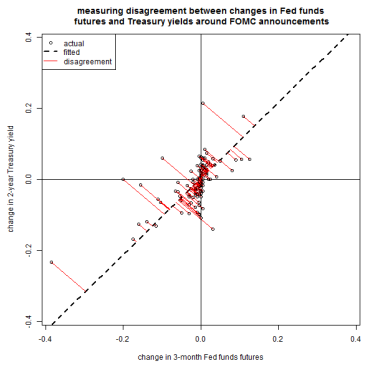
These kinds of measurement errors can be higher in times of economic crisis. For example, intraday volatility can be higher at such times, making the measured monetary policy or stock market surprises more sensitive to the length of the window chosen. Liquidity can also be impaired, making the choice of interest rate important for determining the sign of the monetary policy surprise. The Federal Reserve may also be more likely to intervene with an unscheduled policy action during a crisis.

We can show the correlation between one type of measurement error and crisis conditions more formally. There are two steps to this. First, we construct a proxy for measurement error by measuring the disagreement between surprises in 3-month Federal Funds futures and 2-year Treasury yields in narrow windows around FOMC announcements. To do this, we fit a line through a scatterplot of these two measures of surprises, and then measure the perpendicular distance between each point and the fitted line,[35] as illustrated in Figure 1. The perpendicular distances are larger when the two types of interest rate surprises disagree more—for example, when one shows a positive surprise and the other shows a negative surprise. In the second step, we compare this measure of disagreement to the US volatility index (VIX), which is a commonly used measure of financial distress or crisis conditions. We then regress the measure of disagreement on the average of the VIX over the next 18 months, which produces the following results, with standard errors in parentheses:

$$\underset{}{\text{disagreement}_t} = \underset{(0.00925)}{0.0014} + \underset{(0.00048)}{0.00102}\ \text{VIX}_t$$

the coefficient on the VIX is statistically significant at the conventional 5 percent level, with a *p*-value of 3.5 percent, suggesting a strong relationship between measurement error and economic conditions, especially stress conditions.

Figure 1. The lengths of the red lines in this figure measure the disagreement between surprises in 3-month Fed funds futures and 2-year Treasury yields in narrow windows around FOMC announcements.



[35] We fit the line using orthogonal ("Deming") regression, which minimizes both the vertical and the horizontal distances between the points and the line, to make these measures of disagreement as small as possible. We do not use a 45-degree line, which would produce larger errors, because we would not expect exactly the same response of 3-month and 2-year yields.

PUBLICATIONS