Online Appendix
for
The US, Economic News, and the Global Financial Cycle*

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*The views expressed are those of the authors and do not necessarily reflect those of the Federal Reserve Board or the Federal Reserve System.
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A A Structural Framework to Interpret the Results

The following exposition extends the framework in Faust et al. (2007) to the international setting.

A.1 Setup

We adopt the high-frequency setup from Section 4, and denote by t the release time. The time window around the release is $[t-\Delta^-, t+\Delta^+]$, where Δ^- and Δ^+ are short time periods. We are interested in the effect of news about a US macroeconomic variable $y_{US,\tau}$ on an asset price q_i in country i. τ is a generic time index.

Letting $\mathcal{I}_{t-\Delta^-}$ denote agents' (common) information set prior to the news release, the *surprise* about the US macroeconomic variable is $s^y_{US,t} = y_{US,t} - E\left[y_{US,t}|\mathcal{I}_{t-\Delta^-}\right]$, where $E\left[\cdot|\mathcal{I}_{t-\Delta^-}\right]$ denotes the expectation conditional on information set $\mathcal{I}_{t-\Delta^-}$. Consistent with recent evidence (Gürkaynak, Kısacıkoğlu, and Wright, 2020), we assume that $s^y_{US,t}$ is measured without error. We denote the set of new information that becomes available in the time window we study by $\mathcal{N}_{[t-\Delta^-,t+\Delta^+]}$. It includes, in particular, news on the macroeconomic variable $y_{US,t}$, but also other news. Asset prices at time $t+\Delta^+$ are then based on the information set $\mathcal{I}_{t+\Delta^+} = \mathcal{I}_{t-\Delta^-} \cup \mathcal{N}_{[t-\Delta^-,t+\Delta^+]}$.

We assume a log-linear multi-country world with a unique equilibrium. Countries are indexed by i, j, and k, and $\mathcal{C}$ denotes the set of countries. The state variables of the economy are elements of the *vectors* $x_{j,\tau}$ and $x_{glob,\tau}$. State variables specific to country $j \in \mathcal{C}$ are included in the vector $x_{j,\tau}$ and global state variables are included in the vector $x_{glob,\tau}$. For instance, a component of total factor productivity (TFP) specific to the US is an element in vector $x_{US,\tau}$, while the global TFP component is included in $x_{glob,\tau}$. We are agnostic as to which state variables drive the business cycle and explicitly allow for news shocks in the spirit of Beaudry and Portier (2006). All structural shocks are uncorrelated.

The price of an asset of interest in country i can then be written as

$$q_{i,\tau} = E\left[\sum_{k\in\mathcal{C}} a^q_{i,k} x_{k,\tau} + a^q_{i,glob}\, x_{glob,\tau}|\mathcal{I}_\tau\right], \tag{A1}$$

where $a^q_{i,k}$, $k \in \mathcal{C}$, and $a_{glob,i}$ are coefficient vectors that depend on the specification of the model. They capture, respectively, how the asset price $q_{i,\tau}$ is affected by the country-specific state variables in $x_{k,\tau}$ and the global state variables in $x_{glob,\tau}$. Similarly, we can express country j's macroeconomic variable y of interest as

$$y_{j,\tau} = \sum_{k\in\mathcal{C}} a^y_{j,k} x_{k,\tau} + a^y_{j,glob}\, x_{glob,\tau}. \tag{A2}$$

For most of the paper, we are interested in US macroeconomic variables so that $j = US$.

Under the assumption that $x_{k,t+\Delta^+} = x_{k,t-\Delta^-}$ for all k and $x_{glob,t+\Delta^+} = x_{glob,t-\Delta^-}$ for small Δ^-, Δ^+, we can write the change in asset price $q_{i,\tau}$ over the window we study as

$$\begin{aligned}\Delta q_{i,t} &= q_{i,t+\Delta^+} - q_{i,t-\Delta^-}\\ &= \sum_{k\in\mathcal{C}} a^q_{i,k}\left(E\left[x_{k,t+\Delta^+}|\mathcal{I}_{t+\Delta^+}\right] - E\left[x_{k,t+\Delta^+}|\mathcal{I}_{t-\Delta^-}\right]\right)\\ &\qquad + a^q_{i,glob}\left(E\left[x_{glob,t+\Delta^+}|\mathcal{I}_{t+\Delta^+}\right] - E\left[x_{glob,t+\Delta^+}|\mathcal{I}_{t-\Delta^-}\right]\right).\end{aligned} \tag{A3}$$

In words, when new information becomes available, market participants change their expectations about the state of the economy, which in turn, changes asset price $q_{i,t}$.

We next use the fact that $\mathcal{I}_{t+\Delta^+} = \mathcal{I}_{t-\Delta^-} \cup \mathcal{N}_{[t-\Delta^-,t+\Delta^+]}$, and parameterize the conditional expectations in equation (A3),

$$E\left[x_{k,t+\Delta^+}|\mathcal{I}_{t+\Delta^+}\right] - E\left[x_{k,t+\Delta^+}|\mathcal{I}_{t-\Delta^-}\right] = b_k^y s_{US,t}^y + u_{k,t}, \qquad \text{for } k \in \mathcal{C}, \tag{A4}$$

$$E\left[x_{glob,t+\Delta^+}|\mathcal{I}_{t+\Delta^+}\right] - E\left[x_{glob,t+\Delta^+}|\mathcal{I}_{t-\Delta^-}\right] = b_{glob}^y s_{US,t}^y + u_{glob,t}. \tag{A5}$$

These expressions make explicit that market participants use the surprise about US macroeconomic news, as well as other information that becomes available within the time window (as captured by $u_{k,t}$ and $u_{glob,t}$), to update their expectations about the state of the world economy. To the extent that the US macroeconomic news release is informative about the state, the *vectors* b_k^y and b_{glob}^y contain nonzero elements. For instance, higher-than-expected US Nonfarm Payrolls may lead market participants to update their expectation of the US-specific component of TFP. In this case, the relevant element in b_{US}^y is nonzero. If the surprise is not useful for estimating particular state variables, then the relevant entries in b_k^y and b_{glob}^y are zero.

We make no specific assumptions on how agents update their estimate of the state. They could, for instance, use the Kalman filter, but we do not impose this assumption. We only require that the estimation of the unobserved state requires a nonzero correlation between the observed macroeconomic variable and the state of interest. Formally, we require

Assumption 1. *For all $k \in \mathcal{C} \cup \{glob\}$: $b_k^y \neq 0 \Rightarrow a_{US,k}^y \neq 0$.*

Plugging equations (A4) and (A5) into equation (A3) gives

$$\Delta q_{i,t} = \left(\sum_{k\in\mathcal{C}} a_{i,k}^q b_k^y + a_{i,glob}^q b_{glob}^y\right) s_{US,t}^y + \varepsilon_{i,t}, \tag{A6}$$

where $\varepsilon_{i,t} = \sum_{k\in\mathcal{C}} a_{i,k}^q u_{k,t}^y + a_{i,glob}^q u_{glob,t}$. Letting $\gamma_i := \sum_{k\in\mathcal{C}} a_{i,k}^q b_k^y + a_{i,glob}^q b_{glob}^y$, delivers our estimating equation (4).

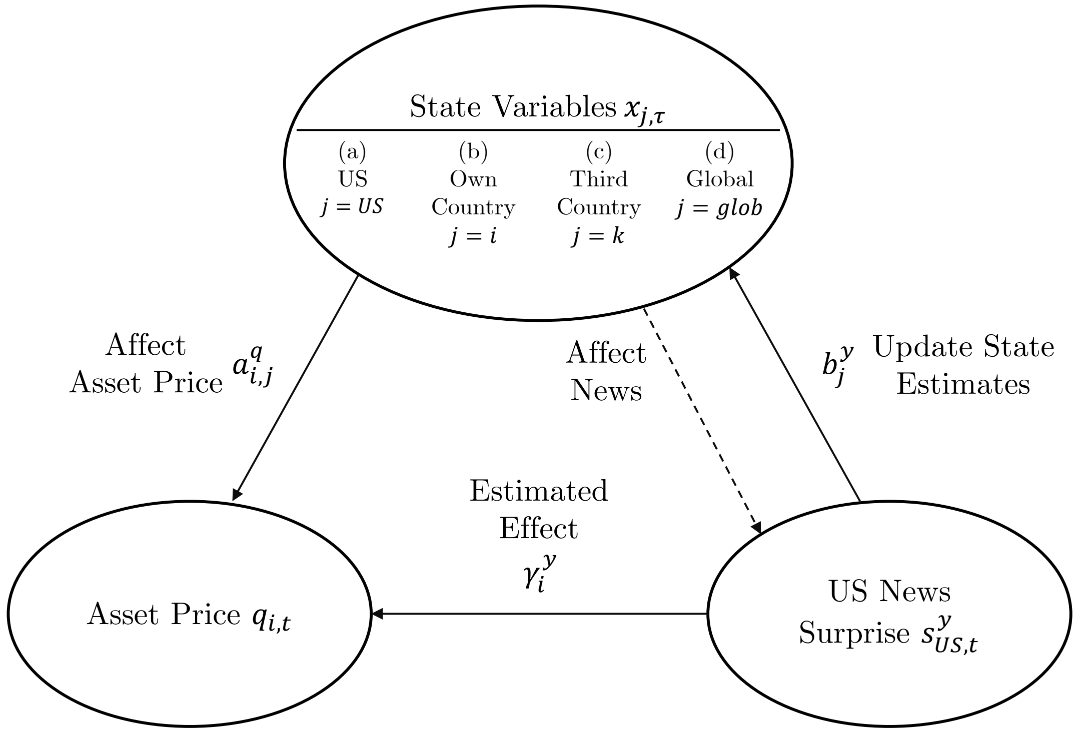
A.2 Discussion

For a given asset price $q_{i,t}$ and surprise $s_{US,t}^y$, equation (A6) highlights that a country's response reflects two components. First, the response reflects the asset price's dependence on the true unobserved state, as captured by $a_{i,k}^q$ and $a_{i,glob}^q$. Second, the response reflects market participants' updates about the state of the world, as measured by vectors b_k^y and b_{glob}^y. If market participants use the newly available information to update only some state variables, and country i's asset price does not depend on the state variables being updated, then the asset price should not systematically respond to the surprise. The nonzero responses that we identified in Section 4 thus imply that market participants update their belief about states, which country i's asset price depends on.

We next split the asset price response in equation (A6) by country into four different components,

$$\Delta q_{i,t} = \left(\underbrace{a_{i,US}^q b_{US}^y}_{\text{(a)}} + \underbrace{a_{i,i}^q b_i^y}_{\text{(b)}} + \underbrace{\sum_{j\neq US,i} a_{i,j}^q b_j^y}_{\text{(c)}} + \underbrace{a_{i,glob}^q b_{glob}^y}_{\text{(d)}}\right) s_{US,t}^y + \varepsilon_{i,t}. \tag{A7}$$

Figure A1: Interpretation of Country's i Asset Price Response to US News (with details)



Notes: The figure illustrates the discussion in the text. Solid arrows display relevant relationships at the time of the news release, as captured by equation (A7). The dashed arrow indicates that the relationship is predetermined at the time of the release.

This breakdown reflects the origins of disturbances. Term (a) captures economic disturbances originating in the US. If, for instance, the change in US TFP affects US macroeconomic variable $y_{US,\tau}$, market participants who observe the surprise $s^y_{US,t}$ may update their estimate of US TFP. This would be captured by a nonzero element in vector b^y_{US}. At the same time the change in US TFP may affect foreign asset price $q_{i,t}$—as captured by a nonzero entry in vector $a^q_{i,US}$. The asset price in country i only responds to a change in US TFP if both market participants update their expectation of US TFP *and* US TFP indeed affects the asset price in country i. More generally, term (a) captures this logic for all US state variables and thus reflects country i's asset price responses to disturbances originating in the US.

Term (b) in the above expression reflects changes in state variables, which originate in country i. In order for an innovation to the state in country i to affect i's own asset price *through the US macroeconomic surprise*, it would have to the case that market participants learn about i's state by studying US macroeconomic news. Similarly, term (c) captures disturbances, which originate in a third country j, and affect both US macro news as well as the asset price in country i. Lastly, term (d) reflects changes in the global state vector. Such disturbances may affect US macroeconomic surprises, and as a result market participants may use these surprises to estimate these global state variables. Figure A1 illustrates this intuition.

A reasonable assumption in the context of our analysis is that surprises in US macroeconomic variables are not used to update state variables that are specific to countries other than the US.

That is, $b^y_k = 0$ for $k \notin \{US, glob\}$. This assumption implies that it is not the case that market participants use US payroll employment to forecast the country-specific component of Belgian TFP. Under Assumption 1, a sufficient condition for this to hold is that countries other than the US are *small* relative to the US. Continuing with the earlier example, a change in Belgian TFP has no impact on US macroeconomic variables, and hence, the forecaster would find no useful correlation to predict Belgian TFP when new information about the US macroeconomy becomes available. Formally, Assumption 1 immediately implies that $a^y_{US,BEL} = 0 \Rightarrow b^y_{BEL} = 0$. The premise is satisfied because Belgium is small relative to the US.

Under this assumption, equation (A6) becomes

$$\Delta q_{i,t} = \left(\underbrace{a^q_{i,US} b^y_{US}}_{\text{transmission from US}} + \underbrace{a^q_{i,glob} b^y_{glob}}_{\text{common shock}} \right) s^y_{US,t} + \varepsilon_{i,t}. \tag{A8}$$

This estimating equation makes clear that a significant coefficient on the US macroeconomic surprise reflects two different components. First, if the surprise leads to an update of market participants' expectations on US state variables (as captured by nonzero elements in the vector b^y_{US}), and if changes in US state variables impact the foreign asset price (the vector $a^q_{i,US}$ contains nonzero elements), then the inner product $a^q_{i,US} b^y_{US}$ can be different from zero. This component thus reflects *transmission* of macroeconomic shocks from the US to country i. Second, the surprise $s^y_{US,t}$ may be useful to forecast global state variables (b^y_{glob} contains nonzero elements). In this case, a significant coefficient on the surprise reflects that country i is impacted by a *common shock*.

This discussion helps interpret our estimates in Section 4. While foreign stock prices strongly respond to the release of US macroeconomic news, this does not necessarily imply the transmission of US shocks to foreign countries. It is also possible that the US and other countries are subject to common shocks. These common shocks affect US macroeconomic outcomes and are therefore reflected in the measured surprises. Foreign stock markets respond to these surprises, because they reveal information about the common state vector.

A.3 Foreign Macroeconomic News

To test for the presence of common shocks, we study the effect of foreign news releases on the US stock market. In particular, we regress the log-change in the S&P 500 on foreign macroeconomic surprises,

$$\Delta q_{US,t} = \zeta^y_i s^y_{i,t} + \varepsilon_{i,t}, \tag{A9}$$

where we omit the constant and controls for clarity. Analogous to Section A.1, it is possible to obtain a structural interpretation of the estimated coefficient ζ^y_i. In particular, we can write

$$\zeta^y_i = a^q_{US,US} b^y_{US,i} + a^q_{US,i} b^y_{i,i} + \sum_{k \neq US,i} a^q_{US,k} b^y_{k,i} + a^q_{US,glob} b^y_{glob,i}, \tag{A10}$$

where the vectors $b^y_{j,i}$ ($b^y_{glob,i}$) are now specific to country i, and capture how market participants update their estimate of country j's state $x_{j,t}$ (the global state $x_{glob,t}$) upon observing news in country i. Further, vectors $a^q_{US,k}$ ($a^q_{US,glob}$) capture how country k's (the global) state affects the US stock market.

Studying the effects of foreign news on the US stock market—rather than on a third country—has a key advantage. Since most countries are small relative to the US, the interpretation of coefficient (A10) simplifies considerably. In particular, under the assumptions that (i) country i is small relative to the US so that $a^q_{US,i} = 0$, and (ii) country i's news does not affect the US stock market through third countries ($a^q_{US,k} b^y_{k,i} = 0$ for all k),[1] the estimated coefficient simplifies to

$$\zeta^y_i = \underbrace{a^q_{US,US} b^y_{US,i}}_{\text{(a)}} + \underbrace{a^q_{US,glob} b^y_{glob,i}}_{\text{(b)}}. \tag{A11}$$

These remaining two terms reflect the following intuition. First, term (a) reflects the possibility that market participants learn about the US state vector by observing foreign macroeconomic news. Since the US is large relative to country i, shocks in the US are likely to have an effect on country i's macroeconomic outcomes. As a result, country i's surprises could be informative about US-specific shocks. While this possibility cannot be ruled out *a priori*, we don't view it as particularly plausible either. Since US shocks presumably affect foreign macroeconomic outcomes with a lag and many indicators of US macroeconomic performance become available in a timely fashion, it is rather unlikely that this indirect channel of learning about the US state is active in practice.

Second, term (b) reflects the presence of common shocks. As noted earlier, if countries' macroeconomic and financial variables were driven by common global state variables, other countries' macroeconomic releases should generally be informative about it. Further, this state should drive international asset prices, including the S&P 500.

[1] The second assumption is satisfied if third countries are small relative to the US so that $a^q_{US,k} = 0$ or if market participants do not update their estimate of country k's state vector upon observing country i's macroeconomic news ($b^y_{k,i} = 0$).

B Data Appendix

In this Appendix, we provide an overview of the main datasets used in the paper. In Section B.1, we describe the data on macro news releases. In Section B.2 and Section B.3, we provide details on the intraday and daily financial markets data, respectively. In Section B.4, we discuss which data is used in which part of the paper.

B.1 Macroeconomic News Releases

Data Series For a given release, we use the following series in the paper, which if not otherwise noted are taken directly from Bloomberg:

- *Announcement time*
- *Forecast*: median survey estimate of professional forecasters in Bloomberg
- *Initial released number*: released number at time of announcement
- *Final revised number*: final revised number as of 2022
- *Reference period*: period which released number is referencing to (e.g., month X for a monthly release)
- *Surprise*: constructed from *forecast* and *initial released number* as shown in equation (1)
- *Category*: manual selection into real activity or price news based on Beechey and Wright (2009)
- *Reporting lag*: measure of inverse timeliness constructed from announcement time and reference period (see equation (8))
- *Revision magnitude*: measure of inverse quality constructed from *initial released number* and *final revised number* (see equation (9))
- *Relevance*: measure of relative popularity reflecting how many people within Bloomberg set an alert for a certain release relative to all alerts set for a given country. The measure is between 0 and 100 as it is measured in percent.

Sample Construction For both US and foreign countries, we obtain the final set of news releases based on the following two criteria: First, at least 50 observations with both initial released number and forecast are available in order to construct a surprise. Second, relevance of the series is greater than or equal to 30. We end up in total with 66 announcement series for the US, 23 for Canada, 16 for France, 23 for Germany, 16 for Italy, 50 for Japan, and 43 for the United Kingdom. Table B1 lists all 66 releases for the US. Table B2 provides an overview of the 60 major releases of the other G7 countries. Note that for each announcement, we remove surprises which are more than 6 standard deviations in absolute value.

Table B1: Overview of All US Macroeconomic News

Announcement	Frequency	Category	Observations	Announcement	Frequency	Category	Observations
ADP Employment	Monthly	Real Activity	160	ISM Chicago Index	Monthly	Real Activity	275
Average Hourly Earnings	Monthly	Price	258	ISM Mfg Index	Monthly	Real Activity	277
Building Permits	Monthly	Real Activity	208	ISM Non-Mfg Index	Monthly	Real Activity	251
Business Inventories	Monthly	Real Activity	269	ISM Prices Paid	Monthly	Price	234
CB Consumer Confidence	Monthly	Real Activity	273	Import Price Index	Monthly	Price	253
CB Leading Economic Index	Monthly	Real Activity	272	Industrial Production	Monthly	Real Activity	277
CPI	Monthly	Price	277	Initial Jobless Claims	Weekly	Real Activity	1166
Capacity Utilization	Monthly	Real Activity	274	Mfg Payrolls	Monthly	Real Activity	252
Capital Goods Orders	Monthly	Real Activity	112	NAHB Housing Market Index	Monthly	Real Activity	201
Capital Goods Shipments	Monthly	Real Activity	95	NFIB Small Business Optimism	Monthly	Real Activity	118
Chicago Fed Nat Activity Index	Monthly	Real Activity	107	NY Fed Mfg Index	Monthly	Real Activity	206
Construction Spending	Monthly	Real Activity	252	Net Long-term TIC Flows	Monthly	Real Activity	117
Consumer Credit	Monthly	Real Activity	277	New Home Sales	Monthly	Real Activity	267
Continuing Claims	Weekly	Real Activity	863	Nonfarm Payrolls	Monthly	Real Activity	274
Core CPI	Monthly	Price	275	Nonfarm Productivity F	Quarterly	Real Activity	86
Core PCE Price Index	Monthly	Price	174	Nonfarm Productivity P	Quarterly	Real Activity	87
Core PPI	Monthly	Price	275	PPI	Monthly	Price	263
Current Account Balance	Quarterly	Real Activity	87	Pending Home Sales	Monthly	Real Activity	176
Dallas Fed Mfg Index	Monthly	Real Activity	131	Personal Consumption Expenditure	Monthly	Real Activity	273
Durable Goods Orders	Monthly	Real Activity	266	Personal Income	Monthly	Real Activity	274
Durables Ex Transportation	Monthly	Real Activity	217	Philly Fed Business Outlook	Monthly	Real Activity	273
Employment Cost Index	Quarterly	Price	91	Private Payrolls	Monthly	Real Activity	116
Existing Home Sales	Monthly	Real Activity	178	Retail Sales	Monthly	Real Activity	275
FHFA House Price Index	Monthly	Price	138	Retail Sales Ex Auto	Monthly	Real Activity	270
Factory Orders	Monthly	Real Activity	277	Richmond Fed Mfg Index	Monthly	Real Activity	170
GDP A	Quarterly	Real Activity	91	Total Vehicle Sales	Monthly	Real Activity	82
GDP Price Index A	Quarterly	Price	87	Trade Balance	Monthly	Real Activity	277
GDP Price Index S	Quarterly	Price	87	UM Consumer Sentiment F	Monthly	Real Activity	248
GDP Price Index T	Quarterly	Price	85	UM Consumer Sentiment P	Monthly	Real Activity	247
GDP S	Quarterly	Real Activity	90	Unemployment Rate	Monthly	Real Activity	273
GDP T	Quarterly	Real Activity	91	Unit Labor Costs F	Quarterly	Price	81
Government Budget Balance	Monthly	Real Activity	273	Unit Labor Costs P	Quarterly	Price	81
Housing Starts	Monthly	Real Activity	260	Wholesale Inventories	Monthly	Real Activity	270

Notes: This table provides information on all US macroeconomic series utilized in the paper. The sample ranges from October 1996 to December 2019. *Observations* refers to number of observations (surprises) of a macroeconomic series in the sample and *Frequency* to the frequency of the data releases. Abbreviations: A—advanced; S—second; T—third; P—preliminary; F—final; Mfg—Manufacturing; ADP—Automatic Data Processing Inc; CB—Chicago Board; ISM—Institute for Supply Management; UM—University of Michigan; NFIB—National Federation of Independent Business; NAHB—National Association of Home Builders.

Table B2: Overview of Major Foreign Macroeconomic News

Announcement	Frequency	Observations	Announcement	Frequency	Observations
Canada			*Italy*		
Capacity Utilization	Quarterly	79	Consumer Confidence	Monthly	221
Core CPI	Monthly	226	CPI P	Monthly	259
GDP	Quarterly	81	GDP F	Quarterly	80
Housing Starts	Monthly	233	Industrial Production	Monthly	248
Intl. (Merchandise) Trade	Monthly	273	Industrial Sales	Monthly	63
IPPI (Industrial Product Price Index)	Monthly	255	Mfg Confidence	Monthly	233
Mfg Sales	Monthly	273	PPI	Monthly	190
PMI (Purchasing Managers Index)	Monthly	195	Retail Sales	Monthly	173
Retail Sales	Monthly	266	Trade Balance	Monthly	76
Unemployment Rate	Monthly	274	Unemployment Rate	Monthly	146
France			*Japan*		
BoF Industry Sentiment	Monthly	135	BoJ (Tankan) Mfg Index	Quarterly	86
Consumer Confidence	Monthly	237	BoJ (Tankan) Mfg Outlook	Quarterly	60
CPI P	Monthly	259	Consumer Confidence	Monthly	153
GDP P	Quarterly	89	CPI	Monthly	219
Industrial Production	Monthly	271	Exports	Monthly	130
Mfg Confidence	Monthly	218	GDP P	Quarterly	89
PPI	Monthly	159	Industrial Production P	Monthly	239
Production Outlook	Monthly	187	PPI	Monthly	237
Trade Balance	Monthly	270	Retail Sales	Monthly	199
Unemployment Rate	Monthly/Quarterly	174	Unemployment (Jobless) Rate	Monthly	239
Germany			*United Kingdom*		
CPI P	Monthly	242	Core CPI	Monthly	172
GDP	Quarterly	90	Core PPI (Output)	Monthly	168
GfK Consumer Confidence	Monthly	159	Exports	Quarterly	59
IFO Business Climate	Monthly	271	GDP A	Quarterly	86
Industrial Production	Monthly	270	GfK Consumer Confidence	Monthly	205
PPI	Monthly	275	House Price Index	Monthly	187
Retail Sales	Monthly	255	Industrial Production	Monthly	275
Trade Balance	Monthly	273	Jobless Claims	Monthly	240
Unemployment Change	Monthly	274	Retail Sales	Monthly	118
ZEW Survey Expectations	Monthly	214	Unemployment Rate	Monthly	211

Notes: This table provides information on the macroeconomic series of non-US G7 countries utilized in Section 7. The data is obtained from Bloomberg's Economic Calendar and the sample ranges from October 1996 to December 2019. *Observations* refers to number of observations (surprises) of a macroeconomic series in the sample and *Frequency* to the frequency of the data releases. Note that the reported number of observations in Table 6 is smaller than the one reported here due to the unavailability of the E-mini S&P 500 futures on certain dates. Abbreviations: A—advanced; BoF—Bank of France; BoJ—Bank of Japan; F—final; GFK—Society for Consumer Research; IFO—Institute for Economic Research; ILO—International Labor Organization; Mfg—Manufacturing; P—preliminary.

B.2 Intraday Financial Markets Data

All intraday data on asset prices comes from *Thomson Reuters Tick History* dataset and is obtained via *Refinitiv*. We inspect each data series for potential misquotes, and remove them if necessary. As discussed in Section 3, our sample of countries is based on the trading hours, market liquidity, and availability of historical data. Table B3 provides an overview of the full dataset. Table B4 provides an overview of which stock markets are open for each of the twelve major US macro releases. Table B5 displays an overview of the other intraday data series used throughout the paper. Note that the intraday data which is used in the context of the monetary policy shocks is detailed in Table S3.1.

Table B3: Overview of Intraday Data on International Financial Markets

Country	ISO	Stock Index		Dollar Exchange Rate		1-Y Govt. Bond Yield		10-Y Govt. Bond Yield	
		Ticker	Sample	Ticker	Sample	Ticker	Sample	Ticker	Sample
Argentina	ARG	.MERV	1996–2019	ARS=	1996–2019			AR10YT=RR	1999–2017
Brazil	BRA	.BVSP	1996–2019	BRL=	1996–2019	BR1YT=RR	2007–2019	BR10YT=RR	1998–2019
Canada	CAN	.TSE300/.GSPTSE	2000–2019	CAD=	1996–2019			CA10YT=RR	1996–2019
Switzerland	CHE	.SSMI	1996–2019	CHF=	1996–2019	CH1YT=RR	2002–2019	CH10YT=RR	1996–2019
Chile	CHL	.IPSA/.SPCLXIPSA/.SPIPSA	1996–2019	CLP=	1996–2019			CL10YT=RR	2007–2019
Czech Republic	CZE	.PX50/.PX	1999–2019	CZE=	1996–2019	CZ1YT=RR	1998–2019	CZ10YT=RR	2000–2019
Denmark	DNK	.KFMX/.OMXCXC20PI	2000–2019			DK1YT=RR	1996-2017	DK10YT=RR	1996–2019
United Kingdom	GBR	.FTSE	1996–2019	GBP=	1996–2019	GB1YT=RR	1996-2019	GB10YT=RR	1996–2019
Hungary	HUN	.BUX	1997–2019	HUF=	1996–2019			HU10YT=RR	1999–2019
Mexico	MEX	.MXX	1996–2019	MXN=	1996–2019			MX10YT=RR	2002–2019
Norway	NOR	.OBX	1996–2019	NOK=	1996–2019			NO10YT=RR	1996–2019
Poland	POL	.WIG20	1997–2019	PLN=	1996–2019			PL10YT=RR	1999–2019
Russia	RUS	.MCX/.IMOEX	2001–2019	RUB=	1998–2019	RU1YT=RR	2001–2019	RU10YT=RR	2003–2019
Sweden	SWE	.OMX	1996–2019	SEK=	1996–2019			SE10YT=RR	1996–2019
Turkey	TUR	.XU030	1997–2019	TRY=	2004–2019			TR10YT=RR	2010–2019
South Africa	ZAF	.JTOPI	2002–2019	ZAR=	1996–2019			ZA10YT=RR	1997–2019
Euro Area	EUR			EUR=	1999–2019				
Austria	AUT	.ATX	1996–2019			AT1YT=RR	2002–2019	AT10YT=RR	1996–2019
Belgium	BEL	.BFX	1996–2019			BE1YT=RR	2004–2019	BE10YT=RR	1996–2019
Germany	DEU	.GDAXI	1996–2019			DE1YT=RR	2004–2019	DE10YT=RR	1996–2019
Spain	ESP	.IBEX	1996–2019			ES1YT=RR	2010–2019	ES10YT=RR	1996–2019
Finland	FIN	.HEX25	2001–2019					FI10YT=RR	1996–2019
France	FRA	.FCHI	1996–2019			FR1YT=RR	1996–2019	FR10YT=RR	1996–2019
Greece	GRC	.ATF	1997–2019					GR10YT=RR	1998–2019
Ireland	IRL	.ISEQ	1996–2019			IE1YT=RR	1998–2019	IE10YT=RR	1998–2019
Italy	ITA	.MIB30/.SPMIB/.FTMIB	1996–2019			IT1YT=RR	1996–98,09–2019	IT10YT=RR	1996–2019
Netherlands	NLD	.AEX	1996–2019			NL1YT=RR	1996–2019	NL10YT=RR	1996–2019
Portugal	PRT	.PSI20	1996–2019			PT1YT=RR	2004–2019	PT10YT=RR	1996–2019

Notes: This table gives an overview of part of the cross-country intraday data from *Thomson Reuters Tick History* utilized in the paper. For all series the sample period ends in December 2019. *Ticker* refers to the Reuters Instrument Code (RIC). For a given country, the table provides details of the major stock index, US exchange rate, and 10-year government bond yield with the respective samples periods. For members of the Euro Area, we do not use country-specific exchange rates prior to the inception of the currency union due to the short sample length. Further, we drop Denmark from the sample since the Danish Krone is tightly and credibly pegged to the Euro. Abbreviations: ISO—3 digit ISO country code.

Table B4: Overview of Open/Closed Equity Markets during US Macroeconomic News Announcements

Event	ARG	AUT	BEL	BRA	CAN	CHE	CHL	CZE	DEU	DNK	ESP	FIN	FRA	GBR
Capacity Utilization	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
CB Consumer Confidence	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Core CPI	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
Core PPI	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
Durable Goods Orders	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
GDP A	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
Initial Jobless Claims	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
ISM Mfg Index	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
New Home Sales	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Nonfarm Payrolls	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
Retail Sales	Closed	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open	Open
UM Consumer Sentiment P	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open

	GRC	HUN	IRL	ITA	MEX	NLD	NOR	POL	PRT	RUS	SWE	TUR	ZAF
Capacity Utilization	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
CB Consumer Confidence	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Core CPI	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
Core PPI	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
Durable Goods Orders	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
GDP A	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
Initial Jobless Claims	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
ISM Mfg Index	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
New Home Sales	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open
Nonfarm Payrolls	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
Retail Sales	Open	Open	Open	Open	Closed	Open	Open	Open	Open	Open	Open	Open	Open
UM Consumer Sentiment P	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open	Open

Notes: *Green* indicates that the corresponding equity market is usually open at the time of the news release. *Orange* indicates that the equity market is usually open but that the news release is around market opening or closing. In the case of Brazil, it indicates that the news release moves outside the trading hours during the US daylight saving time since Sao Paulo, the location of the Brazilian stock market, does not observe daylight saving time. *Red* indicates that the equity market is usually closed at the release time.

Table B5: Overview of Other Intraday Financial Data

Name	Ticker	Sample
Stock Index Futures		
E-mini S&P 500 Futures	ESc1	1997–2019
AEX Futures (NLD)	AEXc1	1997–2019
CAC 40 Futures (FRA)	FCEc1	1999–2019
DAX Futures (DEU)	FDXc1	1996–2019
FTSE 100 Futures (GBR)	FFIc1	1998–2019
SMI Futures (CHE)	FSMIc1	1998–2019
Bovespa Futures (BRA)	INDc1	1996–2019
S&P/TSX 60 Futures (CAN)	SXFc1	1999–2019
Volatility Indexes		
VIX	.VIX	1996–2019
VIX Futures	VXc1:VE/VXc1	2011–2019
VSTOXX	.V2TX	2005–2019
VDAX	.V1XI	2005–2019
VFTSE	.VFTSE	2006–2019
VCAC	.VCAC	2007–2019
Interest Rates		
1- & 4-Quarter Eurodollar Futures	EDcm1/EDcm4	1996–2019
2-Year Treasury Futures	TUc1/TUc2	1996–2019
10-Year Treasury Futures	TYc1/TYc2	1996–2019
Commodity Indexes		
S&P GSCI Agriculture	.SPGSAG	2007–2019
S&P GSCI Energy	.SPGSEN	2007–2019
S&P GSCI Industrial Metals	.SPGSINTR	2007–2019

Notes: This table gives an overview of additional intraday data series utilized in the paper, complementing Table B3. The data comes from *Thomson Reuters Tick History*. For all series, the sample period ends in December 2019. *Ticker* refers to the Reuters Instrument Code (RIC). Abbreviations: ISO—3 digit ISO country code.

B.3 Daily Financial Markets Data

This section provides details on the daily data employed in the paper. Table B6 documents for each series its source, sample period, and reference paper if applicable. Based on these series, we construct a proxy for the equity premium and for growth expectations, as well as stock price (semi-)elasticities. All of these are used in our analysis in Section 7.3. We next discuss the construction of the variables of interest. Note that since the associated analysis exclusively focuses on the US, we omit the country subscript for brevity.

We start with the equity premium. Under the assumption that Martin's (2017) lower bound on the equity premium binds (as argued by Martin, 2017), the *1-year equity premium* on day d, i.e., the expected excess return over the next year, can be calculated as

$$ep_{d,1} = (1 + r^f_{d,1}) svix^2_{d,1}, \tag{B1}$$

where $svix_{d,1}$ is the 1-year SVIX on day d and $r^f_{d,1}$ is the expected risk-free rate over the next 1-year on day d. As shown in Table B6, we take the former series directly from Martin (2017) and the

Table B6: Overview of Daily Data

Series	Reference	Source	Sample
S&P 500		CRSP via WRDS	1996–2019
VIX		CBOE via WRDS	1996–2019
VSTOXX		Bloomberg (Ticker: V2X)	1999–2019
VDAX		Bloomberg (Ticker: V1X)	1992–2019
VFTSE		Bloomberg (Ticker: VFTSE)	2000–2019
VCAC		Bloomberg (Ticker: VCAC)	2000–2019
S&P 500 Dividend Futures		Bloomberg (Tickers: ASD1–ASD10)	2015/2017–2019
SVIX	Martin (2017)	Martin and Wagner (2019)	1996–2014
Treasury Yields	Gürkaynak, Sack, and Wright (2007)	Federal Reserve Bank	1996–2019
Expected Short Rates & Term Premia	Adrian, Crump, and Moench (2013)	Federal Reserve Bank of New York	1996–2019

Notes: This table provides an overview of the daily data series employed in the paper including literature reference where applicable, source, and available sample period.

latter from Adrian, Crump, and Moench (2013). With the equity premium in hand, it is convenient to define the 1-year gross discount rate

$$\theta_{d,1} = 1 + r^f_{d,1} + ep_{d,1}. \tag{B2}$$

$\theta_{d,1}$ discounts the next year's expected dividend of the market which we define next.

To proxy for *1-year growth expectations* on day d, we employ the next year's expected dividend, which can be expressed as

$$\begin{aligned} div_{d,1} &= \frac{(1+\theta_{d,1})f_{d,1}}{1+r^f_{d,1}}, \\ &= \frac{((1+r^f_{d,1}) + (1+r^f_{d,1})svix^2_{d,1})f_{d,1}}{1+r^f_{d,1}}, \\ &= \left(1+svix^2_{d,1}\right) f_{d,1}, \end{aligned} \tag{B3}$$

where $div_{d,1} \equiv E_d[div_{d+365}]$, and $f_{d,1}$ is the price of 1-year dividend futures contract at date d.[2] The first equality shows the relationship between expected dividend and dividend futures contract as shown in Gormsen and Koijen (2020). Plugging in equations (B1) and (B2) yields the last term.

We next turn to the construction of *stock price (semi-)elasticities*. To do so, we define the returns that we use in Section 7.3. These are $\Delta q_{d,1} \equiv q_{d,1} - q_{d-1,1}$, $\Delta ep_{d,1} \equiv ep_{d,1} - ep_{d-1,1}$, $\Delta r^f_{d,1} \equiv r^f_{d,1} - r^f_{d-1,1}$, and $\Delta div_{d,1} \equiv \frac{div_{d,1}-div_{d-1,1}}{div_{d-1,1}}$. Under the assumptions discussed in Knox and Vissing-Jorgensen (2022), we can construct *stock price (semi-)elasticities* as follows. The elasticity of the S&P 500 with respect to the next year's expected dividend $div_{d,1}$ is given by

$$\frac{\Delta q_d}{\Delta div_{d,1}} = \frac{f_{d-1,1}}{(1+r^f_{d-1,1})q_{d-1}},$$

[2] Note that the price of 1-year fixed-horizon dividend futures contract $f_{d,1}$ is interpolated based on the prices of current and the next year S&P 500 Annual Dividend Index futures contracts which have an annual fixed expiration. The underlying security is the S&P 500 Annual Dividend Points Index which tracks the total dividends from S&P 500 constituents over a year before resetting to zero at the end of each year.

where the right-hand side is the weight on the 1-year dividend strip on day $d-1$.

The semi-elasticity of the stock price with respect to 1-year equity premium and risk-free rate is given by

$$\frac{\Delta q_d}{\Delta r^f_{d,1}} = \frac{\Delta q_d}{\Delta ep_{d,1}} = -\frac{1}{\theta_{d-1,1}}.$$

With the (semi-)elasticities in hand, we next turn to several practical issues we face. Since the SVIX is not available to us over the entire sample, we set the SVIX to its sample average on missing days when we construct the elasticity (changes in the equity premium are only based on days for which the SVIX is available). This allows us to construct the discount rate $\theta_{d,1}$ for our entire period. Further, as we do not have data on the SVIX and the dividend futures contract for an overlapping sample period, we assume that daily changes in the SVIX are roughly zero. Based on equation (B3), this allows us to construct changes in the expected dividends directly from price changes in the dividend futures contract, i.e., $\Delta div_{d,1} = \Delta f_{d,1}$. While this induces a small bias, we know in case of our analysis in Section 7 in which direction this bias goes. As Panel B of Table 10 shows that positive real activity news decreases the 1-year equity premium and increases the risk-free rate, we can infer from equation (B1) that it decreases the SVIX. Hence, the response of the price of the futures contract will slightly overstate the effect of real activity news on expected dividends.

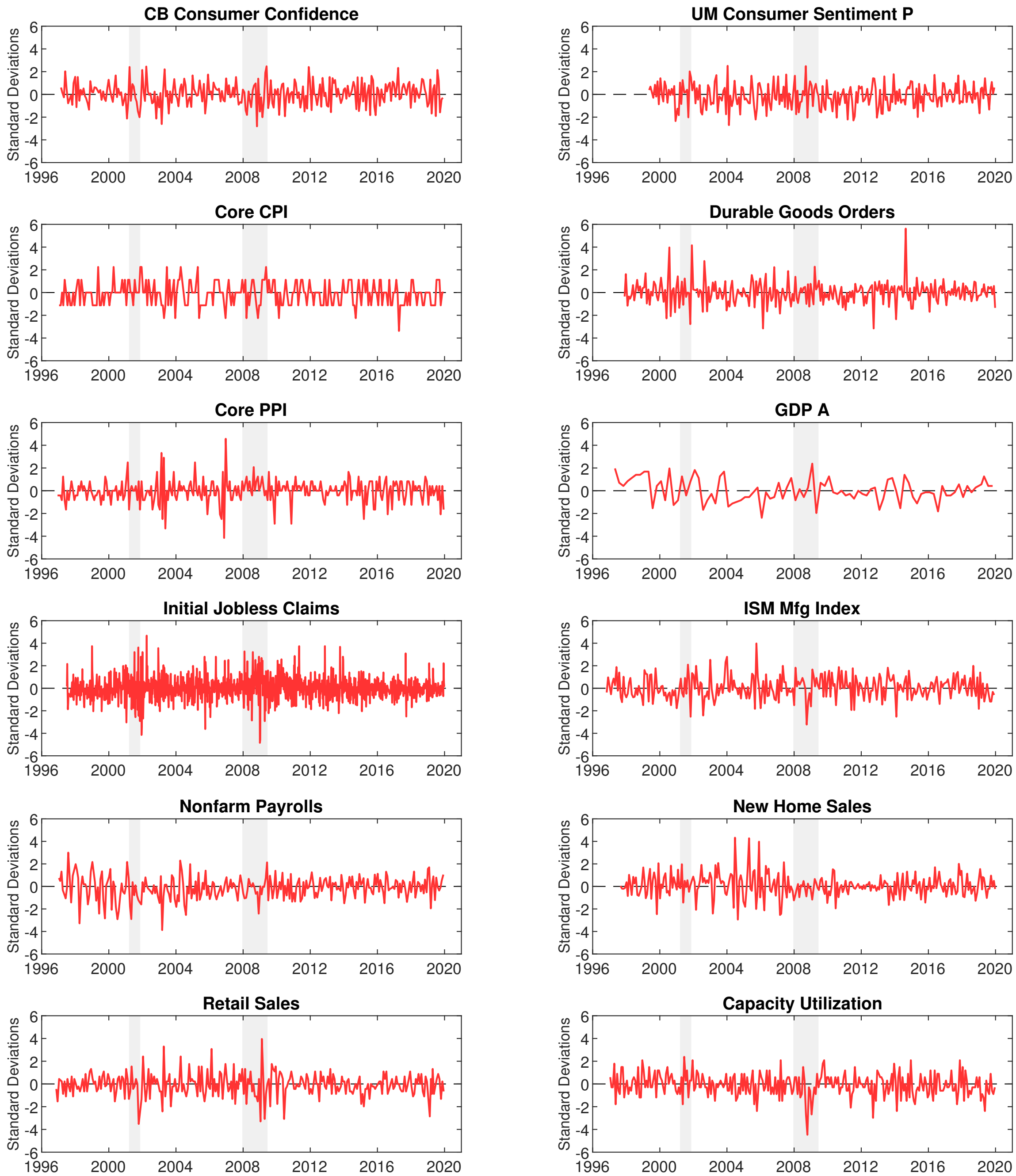
B.4 Overview of Data Usage

Main Text In Section 4, we employ news *surprises* for US releases (see Table B1), as well as the intraday data on international stock indexes (see Table 2). We also use S&P 500 futures and volatility indexes (see Table B5). In Section 5, we use the same financial data at lower frequencies except for the US, where we directly use the daily S&P 500 (see Table B6). We also substitute the volatility indexes with the daily versions from Bloomberg to extend the sample (see Table B6). In Section 6, we use *surprises* for foreign countries (see Table B2). We also employ the *reporting lag* and the *revision magnitude* for both US and foreign news releases. In Section 7, we use the US *surprises* again, as well as the *relevance* indexes to construct the daily series. Further, we use the daily financial market data discussed in Section B.3.

Appendices In Appendix C, we present multiple results which use various different series. If the data reference is not clear from the main text, the notes below the figure or table provide the data source. In Supplementary Appendix S1, we employ the commodity indexes (see Table B5), as well as the news *surprises* for US releases. In Supplementary Appendix S2, we use the news *surprises* for US releases and the daily data on Treasury yields (see Table B6). In Supplementary Appendix S3, we use additional data from *Thomson Reuters Tick History* which is detailed in the appendix. In Supplementary Appendix S4, we employ data to gauge the state of the US and foreign business cycles in addition to the US news *surprises*. Details on the data are provided there. In Supplementary Appendix S5, we employ news *surprises* for US releases, as well as the intraday data on international stock indexes and US dollar exchange rates (see Table B3). In Supplementary Appendix S6, we use, besides US news *surprises*, external sources for measures of cross-country linkages. Details on the data are provided in that appendix.

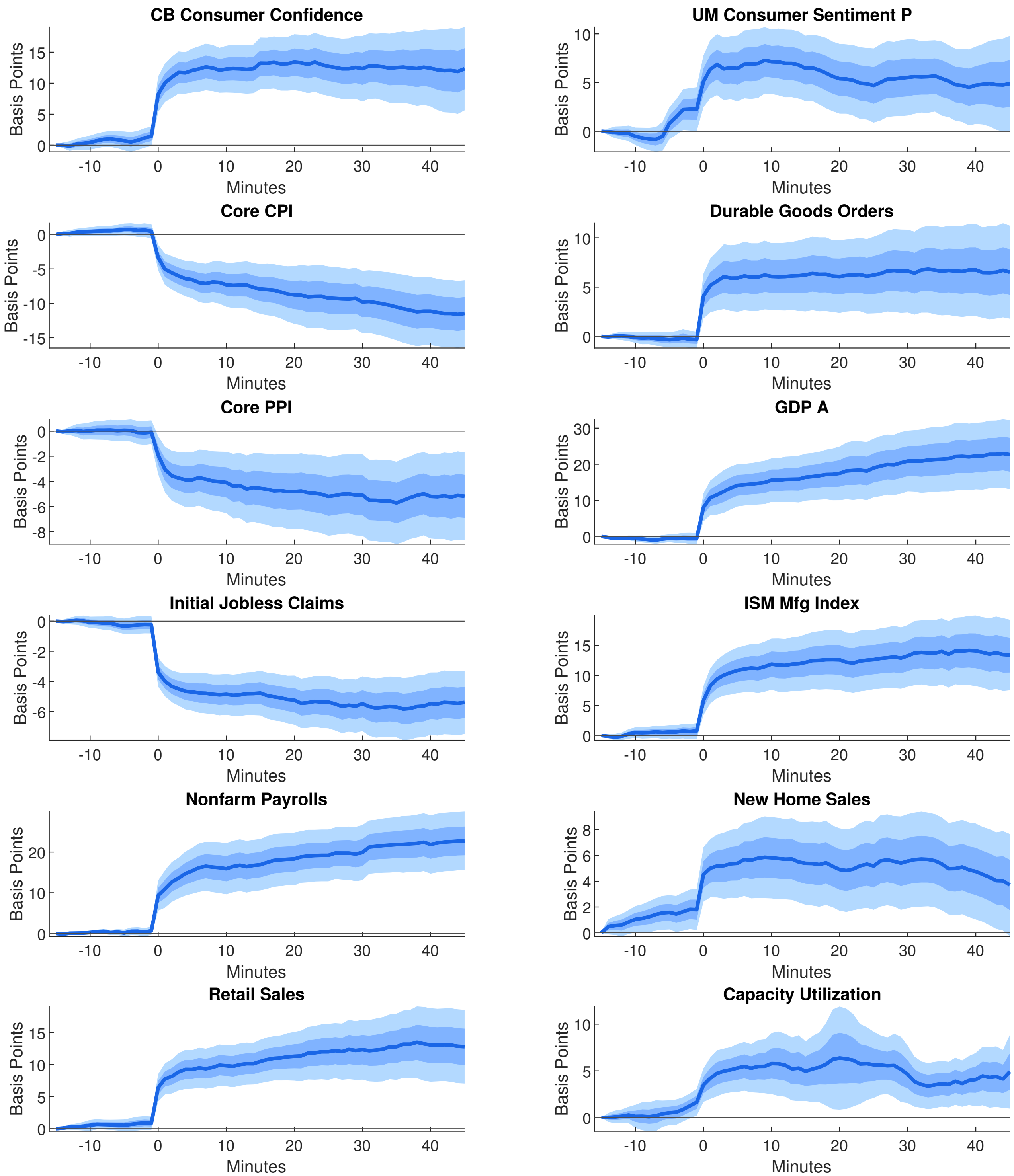
C Additional Results

Figure C1: Time Series of Standardized Surprises



Notes: This figure shows the standardized surprises for the 12 major macroeconomic series over the sample period. The construction follows equation (1) in the text. Shaded areas indicate NBER recession periods.

Figure C2: Impulse Response Functions for Major Announcements

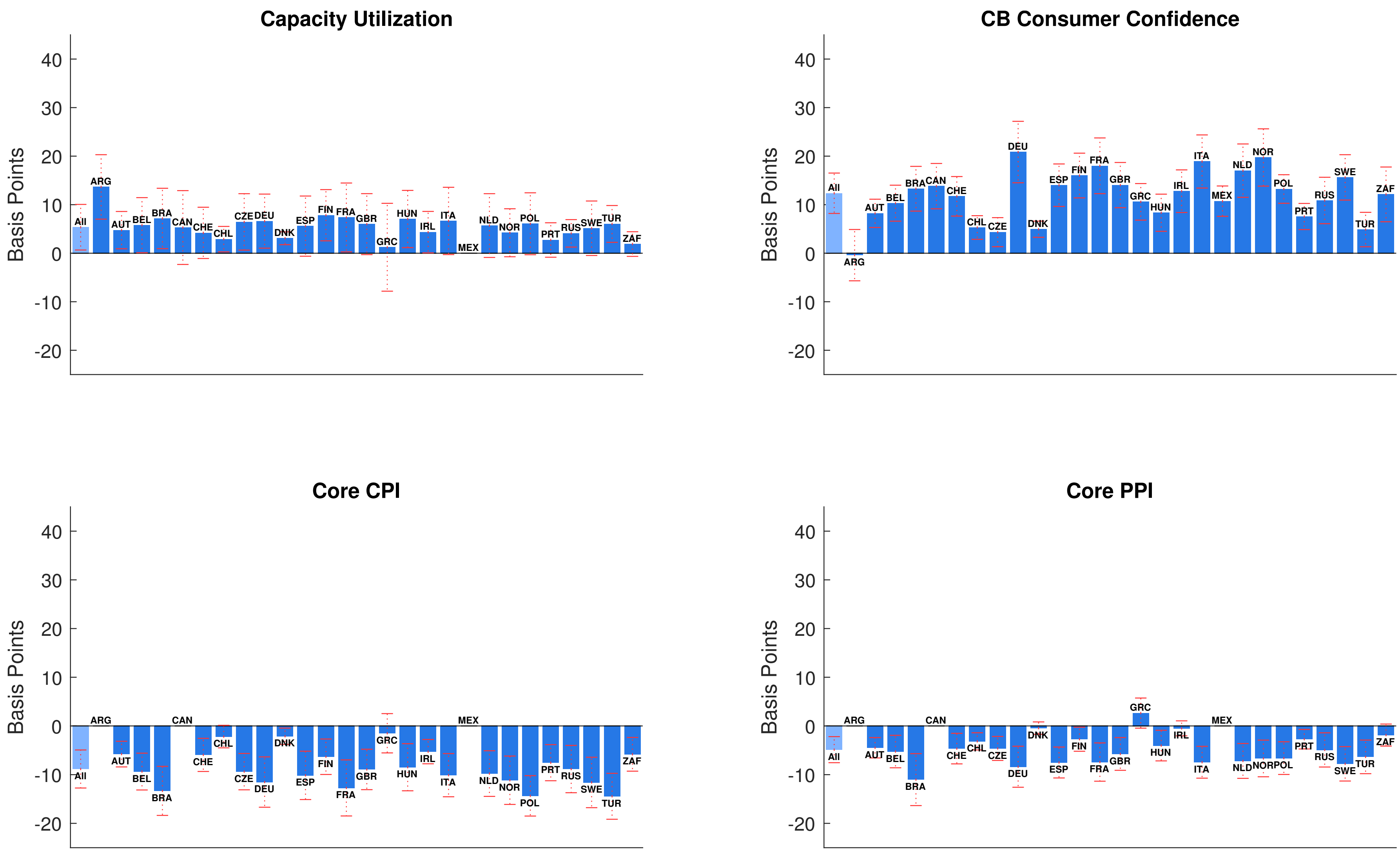


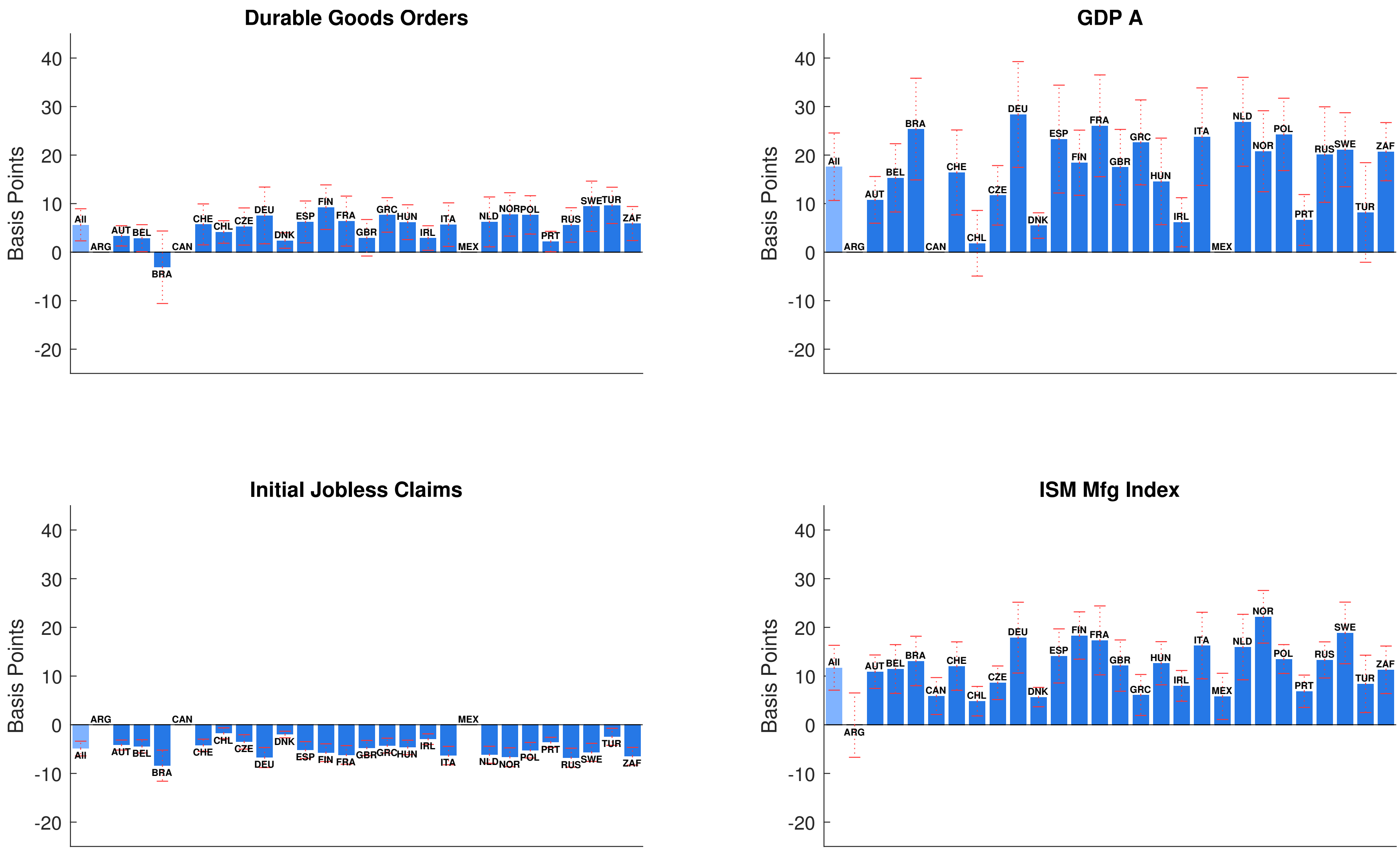
Notes: This figure displays impulse response functions for stock indexes over a 60-minute window for a given news release, estimated from specification

$$q_{i,t+h} - q_{i,t-15} = \alpha_i + \gamma^y s^y_{US,t} + \sum_{k \neq y} \gamma^k s^k_{US,t} + \varepsilon_{i,t},$$

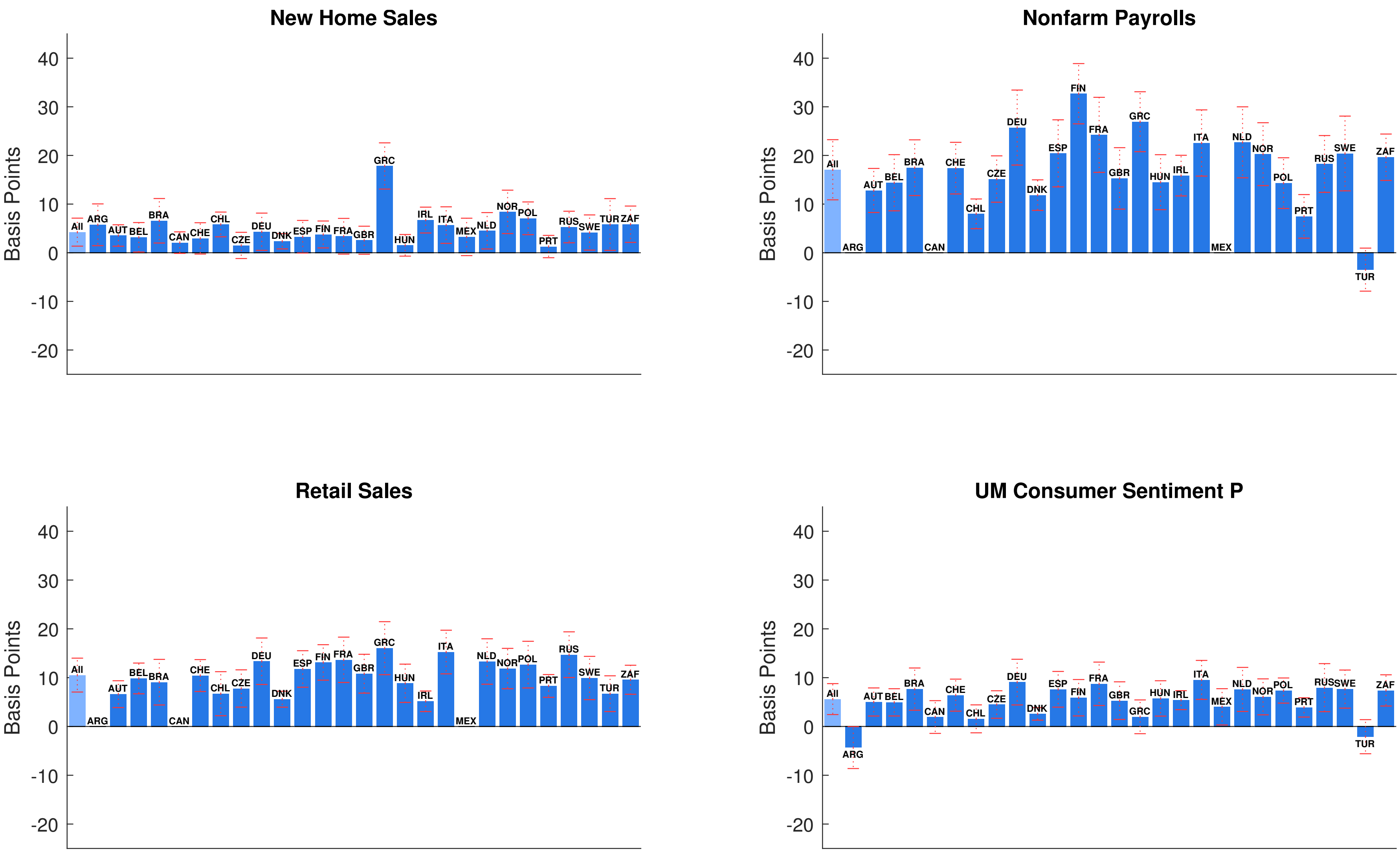
where $q_{i,t}$ is the log price index and $h = -14, ..., 45$. The stock index changes are expressed in basis points. The dark and light blue bands display the 68 percent and 95 percent confidence bands, respectively. Standard errors are two-way clustered by announcement and by country.

Figure C3: Effects of US News on International Stock Markets by Country





Durable Goods Orders
GDP A
Initial Jobless Claims
ISM Mfg Index
Basis Points
40
30
20
10
0
-10
-20
All
ARG
AUT
BEL
BRA
CAN
CHE
CHL
CZE
DEU
DNK
ESP
FIN
FRA
GBR
GRC
HUN
IRL
ITA
MEX
NLD
NOR
POL
PRT
RUS
SWE
TUR
ZAF



This figure shows the equity market responses for all releases. For a given announcement, the light blue bar represents the pooled effect, i.e., the estimate of common coefficient γ^y of equation (3), while the dark blue bars represent the country-specific effects, i.e., the estimates of γ_i^y obtained from estimating equation (4). Missing country bars indicate cases in which the country is dropped because it had fewer than 24 observations for a given announcement. The red error bands depict 95 percent confidence intervals, where standard errors are two-way clustered by announcement and by country.

Table C1: Effects of US News on Other Implied Volatility Indexes

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
VDAX (bp)						
News	-20.10***	-40.05***	35.66***	24.91**	-27.08***	-89.30***
	(6.68)	(8.84)	(11.56)	(10.71)	(9.78)	(14.40)
R^2	0.06	0.14	0.12	0.27	0.16	0.35
Observations	175	171	175	175	173	59
VCAC (bp)						
News	-33.28*	-33.38**	43.42*	7.56	-15.79	-54.12*
	(16.89)	(16.33)	(25.96)	(18.92)	(11.33)	(28.85)
R^2	0.06	0.08	0.08	0.20	0.13	0.15
Observations	146	145	146	146	145	49
VFTSE (bp)						
News	-22.74	-46.16***	3.02	-31.82	4.11	-106.77***
	(18.39)	(17.33)	(15.83)	(28.55)	(13.24)	(24.89)
R^2	0.02	0.15	0.03	0.07	0.17	0.47
Observations	128	121	124	124	126	41
	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
VDAX (bp)						
News	-24.19***	-85.38***	-33.69**	-137.03***	-49.86***	-45.76***
	(4.46)	(18.00)	(14.98)	(18.37)	(7.96)	(12.29)
R^2	0.13	0.23	0.11	0.28	0.26	0.10
Observations	751	162	173	171	175	176
VCAC (bp)						
News	-43.40***	-94.30***	-34.65	-149.67***	-59.67***	-21.42
	(11.74)	(21.66)	(24.28)	(26.55)	(19.14)	(26.10)
R^2	0.08	0.18	0.09	0.30	0.16	0.02
Observations	629	136	143	143	146	147
VFTSE (bp)						
News	-30.91***	-79.87***	-31.58	-59.98	-35.56	-71.54***
	(8.54)	(23.78)	(20.62)	(54.67)	(32.59)	(17.48)
R^2	0.12	0.18	0.06	0.09	0.09	0.11
Observations	541	112	122	121	122	124

Notes: For all 12 announcements, this table shows estimates of γ^y obtained from equation (5), where the left-hand side is the 30-minute log-change in the VFTSE, the VDAX, or the VCAC. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

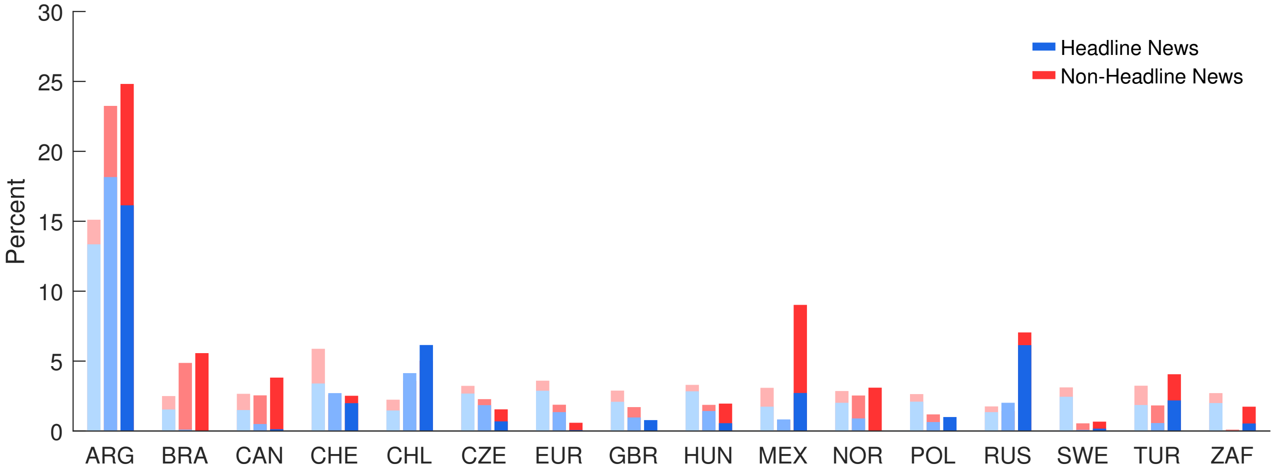
Table C2: Low Frequency Analysis—Stock Indexes

Coefficient $\beta_i^{(h)}$	USA	ARG	AUT	BEL	BRA	CAN	CHE	CHL	CZE	DEU	DNK	ESP	FIN	FRA
Headline News Index														
1-month	1.05	2.37	1.28	1.13	0.75	1.18	0.89	0.69	1.70	1.11	2.28	1.10	0.93	1.06
	(0.41)	(0.44)	(0.71)	(0.81)	(0.37)	(0.45)	(0.35)	(0.45)	(0.64)	(0.38)	(0.99)	(0.56)	(0.35)	(0.43)
1-quarter	2.10	3.06	2.37	1.78	2.35	2.15	1.52	0.81	2.95	2.02	4.04	2.36	2.09	1.96
	(0.56)	(0.53)	(0.95)	(1.03)	(0.63)	(0.76)	(0.46)	(0.44)	(0.92)	(0.73)	(1.71)	(0.82)	(0.52)	(0.67)
Broad News Index														
1-month	0.61	1.59	1.55	1.09	0.63	0.85	0.94	0.97	1.56	1.40	2.26	1.41	1.08	1.05
	(0.17)	(0.32)	(0.55)	(0.34)	(0.22)	(0.18)	(0.16)	(0.32)	(0.27)	(0.23)	(0.63)	(0.39)	(0.26)	(0.17)
1-quarter	1.27	2.75	2.88	1.60	1.75	1.89	1.38	1.33	3.16	1.94	3.66	2.47	2.00	1.65
	(0.25)	(0.28)	(0.72)	(0.37)	(0.27)	(0.35)	(0.20)	(0.50)	(0.38)	(0.32)	(0.81)	(0.49)	(0.41)	(0.21)

	GBR	GRC	HUN	IRL	ITA	MEX	NLD	NOR	POL	PRT	RUS	SWE	TUR	ZAF
Headline News Index														
1-month	0.82	1.40	1.53	1.46	0.94	0.92	1.29	0.62	1.61	0.84	0.58	0.86	1.38	0.58
	(0.44)	(0.54)	(0.66)	(0.76)	(0.55)	(0.46)	(0.51)	(0.57)	(0.47)	(0.69)	(0.35)	(0.42)	(0.61)	(0.35)
1-quarter	1.88	2.42	2.10	2.66	1.94	2.29	2.10	1.91	2.40	2.08	1.52	2.39	1.17	1.03
	(0.53)	(0.60)	(1.09)	(1.02)	(0.73)	(0.78)	(0.62)	(0.57)	(0.66)	(1.26)	(0.46)	(0.75)	(0.79)	(0.49)
Broad News Index														
1-month	0.95	1.65	1.71	1.28	1.28	0.52	1.31	1.02	1.65	1.00	0.90	1.13	1.60	0.48
	(0.20)	(0.36)	(0.46)	(0.39)	(0.34)	(0.31)	(0.25)	(0.50)	(0.32)	(0.33)	(0.40)	(0.28)	(0.46)	(0.28)
1-quarter	1.54	2.81	2.42	2.17	2.13	1.37	1.68	2.07	2.74	2.01	2.46	2.26	1.93	0.68
	(0.21)	(0.60)	(0.88)	(0.52)	(0.27)	(0.45)	(0.24)	(0.46)	(0.50)	(0.33)	(0.61)	(0.53)	(0.70)	(0.32)

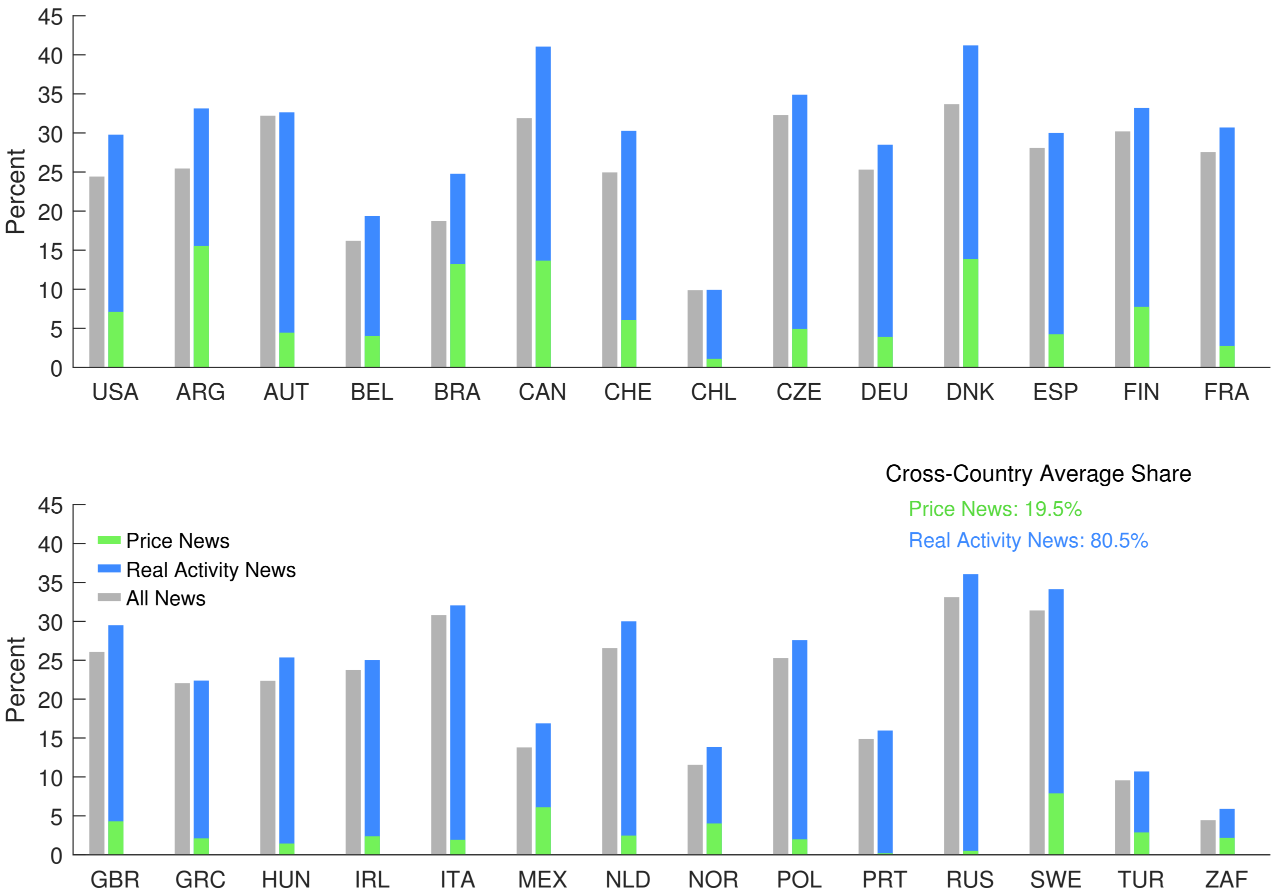
Notes: This table reports for each country the coefficients $\beta_i^{(h)}$ of equations (7) and (S2.3) for stock indexes at the monthly and quarterly frequency. The estimates of equation (7) are displayed under "Headline News Index" whereas results of equation (S2.3) are shown under "Broad News Index". The corresponding R-squared are illustrated in Figure 5. The sample ranges from January 1, 2000 to December 31, 2019. Newey-West standard errors are reported in parentheses. For the US, we use the S&P 500. Daily data on the S&P 500 is obtained from the Center of Research in Security Prices (CRSP).

Figure C4: Daily, Monthly, and Quarterly R-Squared for US Dollar Exchange Rates



Notes: For each US dollar-denominated exchange rate, this figure plots the R-squared of equations (6) and (S2.2) for the daily frequency, and the R-squared of equations (7) and (S2.3) for the monthly and quarterly frequency. The left, middle, and right bars indicate the R-squared of the daily, monthly, and quarterly regression, respectively. For a given country and frequency, the blue bar represents the R-squared of the headline surprises of US macroeconomic news, whereas the red bar displays the increment in R-squared once non-headline news is included. The sample runs from January 1, 2000 to December 31, 2019.

Figure C5: Quarterly R-Squared for Stock Indexes—Price vs. Real Activity



Notes: For each country's stock index, this figure plots the quarterly R-squared as shown in Figure 5 in grey, as well as a decomposition into the relative contributions of price (green) and real activity news (blue). These are constructed by calculating the fitted values of the daily regression separately for price and real activity news using the estimates from the baseline analysis. While the daily fitted values are orthogonal to one another, those at the monthly and quarterly frequency need not be. Indeed, the combined explanatory power of price and real activity news is larger then the total, indicating that there is overlapping information in the two categories. The sample runs from January 1, 2000 to December 31, 2019. Appendix Table B1 provides an overview of the news releases and their classification into the two groups.

Table C3: Effects of Foreign News on US Dollar Exchange Rates

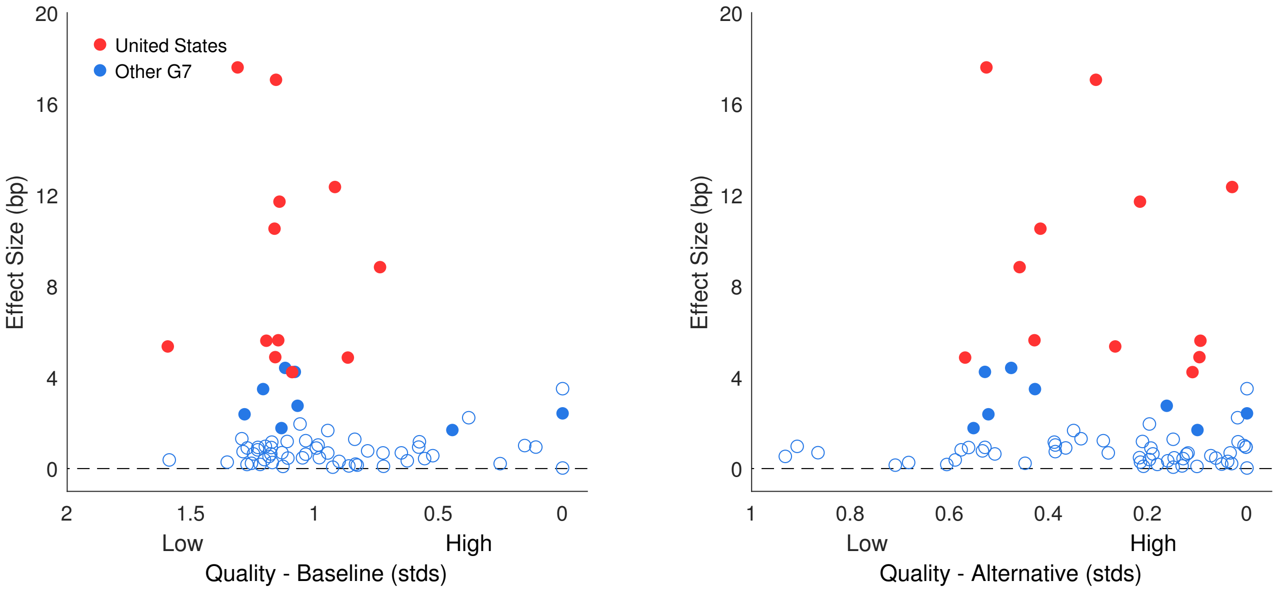
Canada	Capacity Utilization	Core CPI	GDP	Housing Starts	Intl. Trade	IPPI	Mfg Sales	PMI	Retail Sales	Unemployment Rate
Exchange Rate (bp)										
News	1.02	9.06***	10.43***	2.09**	9.70***	1.42	3.77***	8.23***	6.10***	-7.21***
	(1.82)	(1.70)	(2.27)	(0.89)	(1.69)	(1.08)	(0.86)	(1.30)	(1.73)	(1.65)
Observations	79	225	81	231	270	253	272	193	265	274
France	BoF Industry Sentiment	Consumer Confidence	CPI P	GDP P	Industrial Production	Mfg Confidence	PPI	Production Outlook	Trade Balance	Unemployment Rate
Exchange Rate (bp)										
News	1.35*	2.39*	0.51	2.11	-0.33	-0.54	0.55	0.41	0.66	-0.78
	(0.77)	(1.30)	(0.73)	(1.37)	(0.61)	(0.77)	(0.98)	(1.08)	(0.63)	(0.77)
Observations	135	237	258	89	268	217	158	185	268	173
Germany	CPI P	GDP	GfK Consumer Confidence	IFO Business Climate	Industrial Production	PPI	Retail Sales	Trade Balance	Unemployment Change	ZEW Survey Expectations
Exchange Rate (bp)										
News	1.90	6.10***	-0.29	8.65***	1.70***	-0.03	1.56***	1.57**	0.70	3.31***
	(1.28)	(1.04)	(0.83)	(1.17)	(0.59)	(0.58)	(0.58)	(0.72)	(0.90)	(0.75)
Observations	242	89	159	269	267	274	255	273	274	213
Italy	Consumer Confidence	CPI P	GDP F	Industrial Production	Industrial Sales	Mfg Confidence	PPI	Trade Balance	Retail Sales	Unemployment Rate
Exchange Rate (bp)										
News	0.11	0.52	1.34*	0.14	3.70*	0.08	0.71	-0.40	0.26	-0.22
	(0.63)	(0.72)	(0.71)	(0.83)	(2.18)	(0.96)	(1.03)	(1.53)	(0.71)	(1.02)
Observations	221	256	78	246	63	233	189	75	173	145
Japan	BoJ Mfg Index	BoJ Mfg Outlook	Consumer Confidence	CPI	Exports	GDP P	Industrial Production P	PPI	Retail Sales	Unemployment Rate
Exchange Rate (bp)										
News	3.17**	5.52***	-0.34	0.34	0.53	3.40	1.56**	0.11	0.34	-1.81**
	(1.52)	(1.96)	(0.55)	(0.92)	(0.78)	(2.33)	(0.78)	(0.63)	(0.61)	(0.80)
Observations	84	60	153	215	130	89	237	230	199	234
United Kingdom	Core CPI	Core PPI	Exports	GDP A	GfK Consumer Confidence	House Price Index	Industrial Production	Jobless Claims	Retail Sales	Unemployment Rate
Exchange Rate (bp)										
News	10.91***	0.60	-0.10	20.19***	0.78*	3.47***	2.70**	-3.15*	12.94***	-6.09***
	(1.63)	(1.68)	(1.98)	(3.40)	(0.41)	(1.22)	(1.09)	(1.66)	(1.65)	(1.22)
Observations	172	168	59	86	205	186	273	239	118	211

Notes: The table presents the response of the US dollar exchange to foreign macroeconomic news releases. For each non-US G7 country, this table shows estimates of ζ^y obtained from specification

$$\Delta q_{US,t} = \alpha_i + \zeta_i^y s_{i,t}^y + \sum_{k \neq y} \zeta_i^k s_{i,t}^k + \sum_{w} \zeta_{US}^w s_{US,t}^w + \varepsilon_{i,t},$$

where $s_{i,t}^y$ is the surprise of interest, $s_{i,t}^k$ and $s_{US,t}^w$ are other surprises of country i and the US released within the same time window, and $\Delta q_{US,t}$ is the 30-minute change of country i's US dollar denominated exchange rate. Exchange rates are expressed in US dollars so that an increase reflects a depreciation of the US dollar relative to the foreign currency. The units are in basis points. Heteroskedasticity-robust standard errors reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

Figure C6: Relation of Effect Size to Quality of Releases—Robustness



Notes: This Figure shows how the effect size of a release relates to its quality. The left panel shows the relationship when quality is proxied by the revision magnitude as defined in equation (9). The right panel shows the relationship with an alternative measure of quality, which is defined as $\frac{1}{N_i^y}\sum_{n=1}^{N_i^y}\frac{|y_{i,n}^F - y_{i,n}|}{\sigma_{y_{i,n}^F}}$, where $y_{i,n}$ and $y_{i,n}^F$ denote the initial and final revised value of release n, $\sigma_{y_{i,n}^F}$ denotes the standard deviation of the final revised time series, and N^y denotes the total number of announcements for series y in our sample. For US releases (red) the effect size corresponds to the absolute value of the coefficients shown in Table 3. For the foreign releases (blue), the coefficients in Table 6 are used. Filled circles indicate significance at the 10 percent level.

Table C4: Effects of US News on 1-Year Bond Yield

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
1-Year Bond Yield (bp)						
News	0.05	0.10	-0.05	0.20**	0.07	0.31**
	(0.07)	(0.20)	(0.12)	(0.08)	(0.10)	(0.13)
R^2	0.02	0.02	0.01	0.03	0.01	0.04
Observations	1894	1916	1916	1935	1884	584
	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
1-Year Bond Yield (bp)						
News	0.27***	0.37***	-0.40	1.13***	-0.03	0.13
	(0.07)	(0.09)	(0.37)	(0.20)	(0.10)	(0.13)
R^2	0.01	0.05	0.10	0.05	0.02	0.04
Observations	8468	1844	1888	2005	1951	1899

Notes: This table presents estimates of γ^y of equation (3) for each of the 12 macroeconomic announcements. The units are in basis points. Standard errors are clustered by announcement and reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

Table C5: Effects of US News on US Yield Curve

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
1-Q Eurodollar Rate (bp)						
News	0.23***	0.50***	0.50***	0.41***	0.21***	0.61***
	(0.05)	(0.17)	(0.09)	(0.07)	(0.08)	(0.15)
R^2	0.08	0.15	0.18	0.21	0.18	0.23
Observations	231	239	258	261	256	89
4-Q Eurodollar Rate (bp)						
News	0.52***	1.18***	1.48***	1.02***	0.68***	1.65***
	(0.12)	(0.22)	(0.24)	(0.18)	(0.24)	(0.37)
R^2	0.10	0.27	0.22	0.33	0.22	0.32
Observations	263	259	267	274	260	88
2-Y Treasury Yield (bp)						
News	0.46***	0.96***	1.19***	0.80***	0.57***	1.42***
	(0.10)	(0.21)	(0.22)	(0.14)	(0.20)	(0.32)
R^2	0.13	0.24	0.20	0.36	0.21	0.33
Observations	244	240	265	270	253	89
10-Y Treasury Yield (bp)						
News	0.45***	1.15***	1.31***	0.98***	0.44*	1.56***
	(0.10)	(0.17)	(0.23)	(0.15)	(0.26)	(0.34)
R^2	0.09	0.37	0.22	0.36	0.25	0.30
Observations	270	195	264	274	187	90
	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
1-Q Eurodollar Rate (bp)						
News	0.27***	0.69***	0.21***	1.54***	0.46***	0.23***
	(0.04)	(0.08)	(0.06)	(0.17)	(0.10)	(0.07)
R^2	0.12	0.32	0.14	0.37	0.23	0.07
Observations	1108	259	243	273	263	227
4-Q Eurodollar Rate (bp)						
News	0.66***	2.01***	0.77***	4.71***	1.37***	0.63***
	(0.07)	(0.23)	(0.15)	(0.51)	(0.24)	(0.12)
R^2	0.22	0.36	0.25	0.45	0.29	0.12
Observations	1146	268	259	274	271	242
2-Y Treasury Yield (bp)						
News	0.58***	1.79***	0.64***	4.15***	1.23***	0.50***
	(0.07)	(0.21)	(0.12)	(0.44)	(0.18)	(0.11)
R^2	0.23	0.40	0.25	0.47	0.33	0.10
Observations	1111	249	239	270	268	233
10-Y Treasury Yield (bp)						
News	0.59***	2.14***	0.73***	4.18***	1.46***	0.60***
	(0.07)	(0.18)	(0.13)	(0.42)	(0.21)	(0.12)
R^2	0.22	0.47	0.27	0.46	0.37	0.13
Observations	1025	273	190	274	271	243

Notes: For all 12 announcements, this table shows estimates of γ^y obtained from the following specification:

$$\Delta q_t = \alpha + \gamma^y s^y_{US,t} + \sum_{k \neq y} \gamma^k s^k_{US,t} + \varepsilon_t,$$

where $s^y_{US,t}$ is the surprise of interest, $s^k_{US,t}$ are other surprises released in the same time window, and Δq_t is the 30-minute change in the yield of interest. The dependent variables are constructed as in Gürkaynak, Kısacıkoğlu, and Wright (2020). See Boehm and Kroner (2021) for more details on this. The units of the dependent variables are in basis points. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

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Supplementary Appendix
for
The US, Economic News, and the Global Financial Cycle*

February 15, 2023

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Table of Contents

*The views expressed are those of the authors and do not necessarily reflect those of the Federal Reserve Board or the Federal Reserve System.
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S1 Commodity Prices

To ensure that our results hold for a large set of risky asset prices, we study the effect of US macro news on commodity prices in this appendix. Gorton and Rouwenhorst (2006) show that commodities and equities have similar return profiles. Bastourre et al. (2012) and Etula (2013) emphasize the relationship of commodity prices and risk appetite. In our analysis, we focus on three commodity classes: energy, agriculture, and industrial metals and measure them using the corresponding S&P GS commodity sector indexes.[1] Table S1.1 provides additional information on the three indexes.

As documented by prior research, commodity prices co-move over time, and can be summarized by common factors (Pindyck and Rotemberg, 1990; Byrne, Fazio, and Fiess, 2013; Alquist, Bhattarai, and Coibion, 2019). Bastourre et al. (2012) find that such a commodity factor is also informative about global risk-taking capacity. We follow this literature and use principal component analysis on the 30-minute log-changes in the commodity indexes around the 12 macroeconomic announcements of interest. Table S1.2 summarizes the results. The first common factor explains around 55 percent of the variation, and loads with the same sign on all three commodity indexes. Hence, this factor captures the co-movement of commodity prices. The second factor, which explains 30 percent of the variation, loads positively on agricultural commodities, and negatively on energy commodities and industrial metals. This factor primarily explains variation of the agricultural index and is relatively unimportant for energy and industrial metals.

We proceed with studying the effects of US news on the first common factor within a 30-minute window of the release. Table S1.3 shows the results. For the majority of news releases, we find a significant effect on the factor. Further, the signs are as expected. Positive (negative) news about real activity leads to an increase (decrease) in commodity prices. Our results are in line with Kurov and Stan (2018), but differ somewhat from Kilian and Vega (2011). The former paper finds significant effects of macroeconomic news on energy prices using intraday data similar to us, whereas the latter, employing daily data, does not find significant effects.

Table S1.1: Compositions of Commodity Indexes

Energy		Industrial Metals		Agriculture	
WTI Crude Oil	0.41	LME Aluminium	0.35	Chicago Wheat	0.18
Brent Crude Oil	0.30	LME Copper	0.41	Kansas Wheat	0.08
RBOB Gasoline	0.07	LME Lead	0.06	Corn	0.31
Heating Oil	0.07	LME Nickel	0.08	Soybeans	0.20
Gasoil	0.10	LME Zinc	0.11	Cotton	0.08
Natural Gas	0.05			Sugar	0.10
				Coffee	0.04
				Cocoa	0.02

Notes: This table shows the underlying commodity prices and corresponding weights for each of the three S&P GS commodity indexes.

[1] Following the previous literature, we exclude precious metals as they behave differently compared to other commodities (Chinn and Coibion, 2014). We also exclude livestock commodities since intraday data is not available to us for early-morning (8:30 ET) announcements from 2014 onwards.

Table S1.2: Results of Principal Component Analysis

	Loadings		Explained Variance		
	Factor 1	Factor 2	Factor 1	Factor 2	Total
Energy	0.65	-0.27	0.70	0.07	0.76
Industrial Metals	0.65	-0.27	0.70	0.07	0.76
Agriculture	0.39	0.92	0.25	0.75	1.00
Total			0.55	0.30	0.84

Notes: This table shows the loadings and explained variance of the first two factors of the commodity data. They are estimated using principal components on 30-minute changes of the S&P GS energy, industrial metals, and agriculture commodity index around the 12 macroeconomic announcements.

Table S1.3: Effects of US News on Commodity Prices

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
Commodity Factor (bp)						
News	0.72	18.12***	-3.75	-1.58	6.90*	24.34**
	(3.87)	(4.80)	(3.70)	(2.99)	(3.57)	(11.01)
R^2	0.00	0.15	0.12	0.11	0.17	0.31
Observations	152	151	151	152	151	50

	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
Commodity Factor (bp)						
News	7.15***	15.63***	11.66**	38.42***	15.15***	0.37
	(1.74)	(4.29)	(4.64)	(8.68)	(3.20)	(4.11)
R^2	0.12	0.23	0.11	0.24	0.24	0.01
Observations	658	151	151	148	151	152

Notes: For all 12 announcements, this table shows estimates of γ^y obtained from the following specificaton:

$$\Delta q_t = \alpha + \gamma^y s^y_{US,t} + \sum_{k \neq y} \gamma^k s^k_{US,t} + \varepsilon_t,$$

where $s^y_{US,t}$ is the surprise of interest, $s^k_{US,t}$ are other surprises released within the same time window, and $\Delta q_t = q_{t+20} - q_{t-10}$ is the 30-minute log-change in the commodity factor estimated from 30-minute changes in the energy, industrial metals, and agriculture commodities. See text and Supplementary Appendix Table S1.2 for details on the construction of the factor. Heteroskedasticity-robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

S2 Non-Headline News

In this section, we provide details on the estimation of the non-headline factors used in Section 5. We also show that the key finding, which is that these non-headline factors increase the explanatory power for international stock markets, is robust to different specification choices.

S2.1 Factor Estimation

Gürkaynak, Kısacıkoğlu, and Wright (2020) argue that macro announcements elicit effects on asset prices beyond the headline variables, which are measured through surveys. Following their approach, we estimate these effects for the twelve major announcements $l \in L$, which we focus on in our paper. Specifically, we estimate the following specification

$$\Delta i_{US,d} = \alpha + \sum_k \beta^k s^k_{US,d} + \sum_l d^l_d \gamma^l f^l_{US,d} + \varepsilon_d, \tag{S2.1}$$

where ε_d is i.i.d. normal with mean zero and diagonal variance-covariance matrix. The factors $\{f^l_{US,d}\}^L_{l=1}$ are all standard normal and independent over time and of one another, d^l_d is a dummy that is 1 if announcement l occurs on day d. On the left-hand side, we use a vector of daily changes in two-, five-, and ten-year US yields, i.e., $\Delta i_{US,d} \equiv \{\Delta i^2_{US,d}, \Delta i^5_{US,d}, \Delta i^{10}_{US,d}\}$, as used by Gürkaynak, Kısacıkoğlu, and Wright (2020) in their lower frequency analysis.[2]

The latent factor $f^l_{US,d}$ captures the effects of announcement l beyond the surprise $s^l_{US,d}$ in the headline variable. Note that as some macroeconomic series come out simultaneously—for example, nonfarm payrolls is released jointly with other numbers such as the unemployment rate—an estimated latent factor can complement more than one headline surprise. While one could in principle incorporate non-headline news for all announcements, we restrict ourselves to these twelve as Gürkaynak, Kısacıkoğlu, and Wright (2020) show that the latent factors are well identified for major macro announcements as we consider them here. That being said, we consider alternative specifications in the next section and show that our baseline results are generally robust.

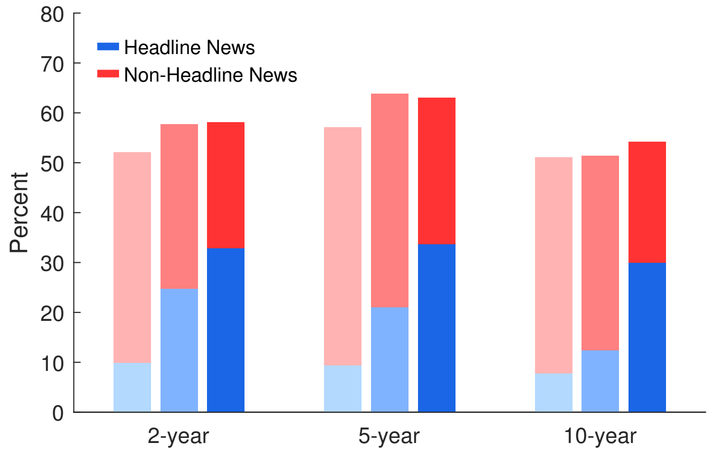
We estimate equation (S2.1) via the Kalman filter approach of Gürkaynak, Kısacıkoğlu, and Wright (2020). As a in "traditional" heteroskedasiticty identification (e.g., Rigobon, 2003), the latent factors are estimated by exploiting the difference in the variances on announcement and non-announcement days after taking out the variation attributable to the headline surprises.[3] While the sample period and the set of announcements differ, our results are similar to Gürkaynak, Kısacıkoğlu, and Wright (2020) in that the latent factors explain almost all of the remaining variation in yields on announcement days (not reported). In the following, we report the overall explanatory power (that is, for announcement and non-announcement days) for the US yield curve. To do so, we estimate versions of equations (S2.2) and (S2.3) below with the daily yield changes $\Delta i_{US,d}$ on the left hand side. While we estimate our factors, i.e., equation (S2.1), for a extended sample starting in 1997, we implement this exercise for the same sample as in Section 5, i.e., starting in 2000.

Figure S2.1 shows the results of this analysis. US headline macro news has increasing explanatory power for the US yield curve at lower frequencies consistent with the findings by Altavilla, Giannone, and Modugno (2017). Comparing our results to Gürkaynak, Kısacıkoğlu, and Wright (2020, Table

[2] Following Gürkaynak, Kısacıkoğlu, and Wright (2020), we use the daily zero coupon yields from Gürkaynak, Sack, and Wright (2007) for this exercise.

[3] To mitigate complications arising from monetary policy, we exclude days of FOMC releases in our set of announcement and non-announcement days.

Figure S2.1: Daily, Monthly, and Quarterly R-Squared for US Treasury Yields



Notes: This figure plots the R-squared of equations (6) for the daily frequency, and the R-squared of equations (7) and (S2.3) for the monthly and quarterly frequency, where we now use two-, five-, and ten-year US Treasury yields instead of country i's stock index. The left, middle, and right bar indicates the R-squared of the daily, monthly, and quarterly regression, respectively. For a given country and frequency, the blue bar represents the R-squared of the headline surprises of US macroeconomic news, whereas the red bar displays the increment in R-squared once non-headline news is included. The sample runs from January 1, 2000 to December 31, 2019.

15), we see that the results are very similar. They also find that while non-headline news increases the explanatory power substantially at lower frequencies, the relative contribution decreases. The total explanatory power is somewhat higher in our case. This mostly comes the fact that we consider a broader set of headline announcements, resulting in higher explanatory power of headline news. Overall, our findings are consistent with previous results in the literature.

S2.2 Explanatory Power of Headline and Non-Headline News

We use the latent factors for our explanatory power estimates in Section 5. To do so, we estimate the following specification:

$$\Delta q_{i,d} = \alpha_i + \sum_k \beta_i^k s_{US,d}^k + \sum_l \gamma_i^l f_{US,d}^l + \varepsilon_{i,d}, \tag{S2.2}$$

where $f_{US,d}^l$ is the latent non-headline news factor of major announcement l, estimated from equation (S2.1) above. Based on equation (S2.2), we define the daily broad news index $bni_{i,d}$ as the fitted value, and aggregate it to the desired time horizon h (in days), $bni_{i,d}^{(h)} = \sum_{j=0}^{h-1} bni_{i,d-j}$. Analogous to the procedure for headline news, we then calculate the R-squared of specification

$$\Delta q_{i,d}^{(h)} = \alpha_i^{(h)} + \beta_i^{(h)} bni_{i,d}^{(h)} + \varepsilon_{i,d}^{(h)} \tag{S2.3}$$

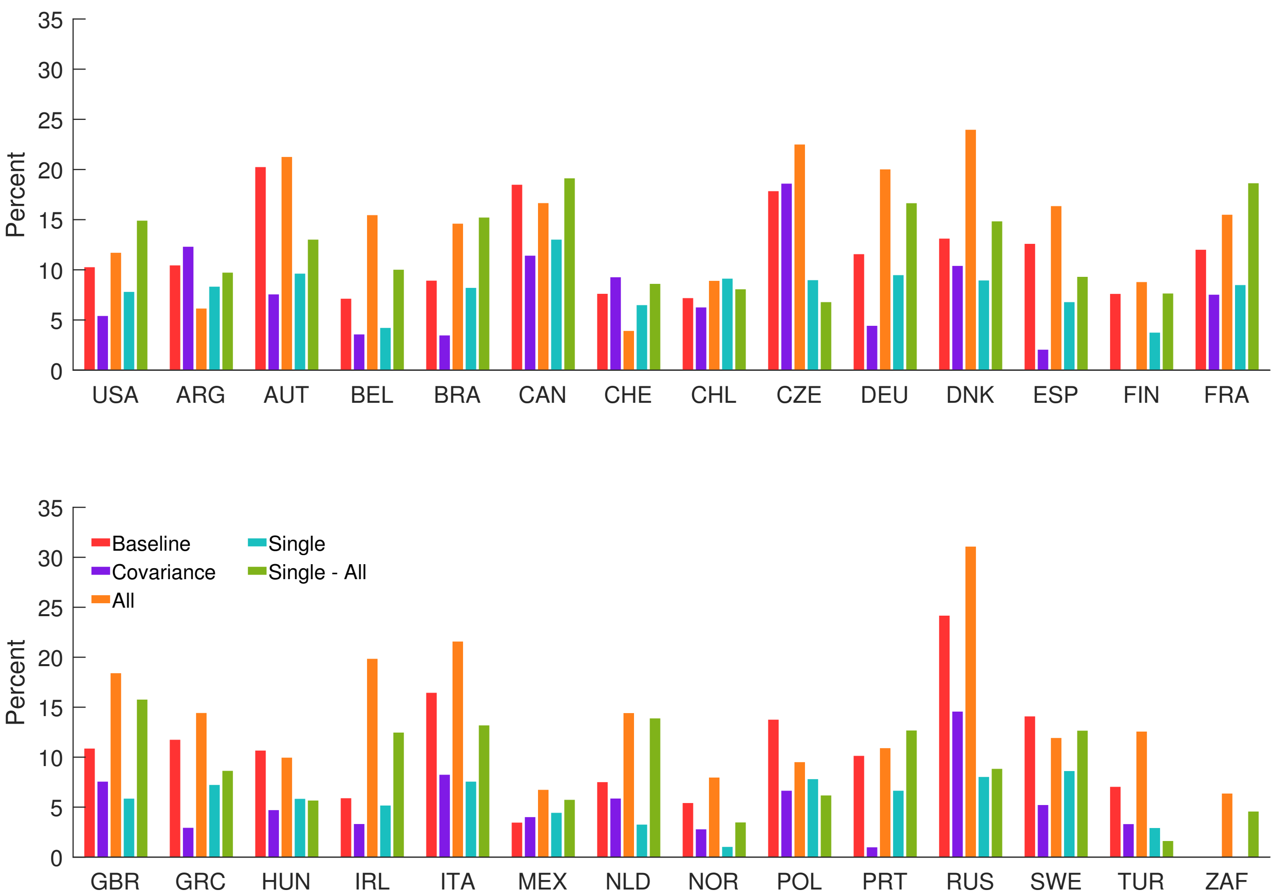
to measure the joint explanatory power of headline and non-headline news at the monthly and quarterly frequency. Note the red bars in Figure 5, which display the R-squared of non-headline news, are estimated as the difference in R-squared values of equations (S2.2) and (6) for the daily frequency, and the difference in R-squared values of equations (S2.3) and (7) for the monthly and quarterly frequency.

S2.3 Alternative Specifications

In this section, we look at alternative ways of estimating non-headline news and compare the results with the baseline specification. In particular, we do this by repeating the explanatory exercise in Section 5 for each specification. Figure S2.2 shows the comparison for the stock indexes, and Figure S2.3 for the volatility and commodity indexes. In what follows, we go over each alternative specification as well as the corresponding results, and discuss how they compare to the baseline.

In the first one, labeled as *covariance* in Figure S2.2 and S2.3, we follow the robustness check of Gürkaynak, Kısacıkoğlu, and Wright (2020) and allow for an unrestricted variance-covariance matrix of ε_d in equation (S2.1). This specification allows for the possibility of ever-present factors, i.e., drivers which lead to systematic movements on announcement and non-announcement days. Looking at Figure S2.2, the explanatory power falls for some countries compared to the baseline, while it increases for others. On average, the specification finds a smaller role for non-headline news which is broadly consistent with the findings by Gürkaynak, Kısacıkoğlu, and Wright (2020). Similar conclusions can be drawn from Figure S2.3.

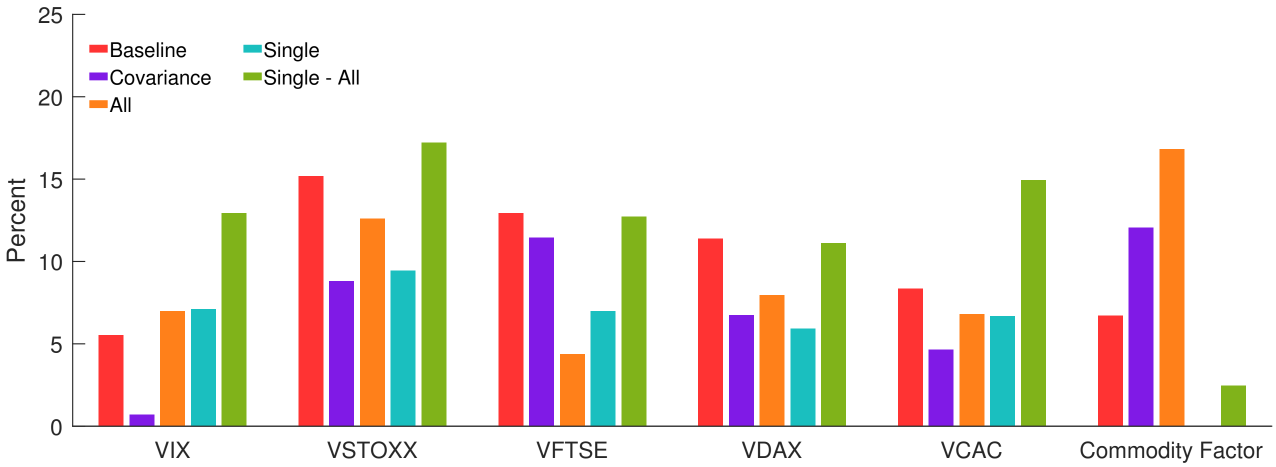
Figure S2.2: Quarterly R-Squared of Non-Headline News for Stock Indexes



Notes: For each country's stock index, this figure plots the increment in R-squared of non-headline news for the quarterly frequency. The red bars (most left) correspond to the *Baseline* specification and are the same as the red bars in Figure 5. The purple, orange, turquoise, and green bars depict alternative specifications *Covariance*, *All*, *Single*, and *Single—All*, respectively. These specifications are explained in Supplementary Appendix S2.3. The sample runs from January 1, 2000 to December 31, 2019.

In the second specification, labeled as *all* in Figure S2.2 and S2.3, we estimate equation (S2.1) with non-headline factors for all 66 announcement series. As some series are released jointly, we end up with 45 factors. As expected, this leads to an increase in the explanatory power in the vast majority of outcomes we consider. Note that an reduction in the R-squared is possible as the non-headline factors are likely not as precisely estimated for minor announcements. If they pick up noise, this can lead to a reduction in the explanatory power at the quarterly frequency.

Figure S2.3: Quarterly R-Squared of Non-Headline News for Volatility and Commodity Indexes



Notes: For each country's asset price, this figure plots the increment in R-squared of non-headline news for the quarterly frequency. The red (leftmost) bars correspond to the *Baseline* specification and are the same as the red bars in Figure 5. The purple, orange, turquoise, and green bars depict alternative specifications *Covariance*, *All*, *Single*, and *Single—All*, respectively. These specifications are explained in Supplementary Appendix S2.3. The sample runs from January 1, 2000 to December 31, 2019 for the volatility indexes, and from May 7, 2007 to December 31, 2019 for the commodity factor.

In the third specification, labeled as *single* in Figure S2.2 and S2.3, we estimate a single non-headline factor for all twelve major announcements. Hence, this restricts the effect on the US yield curve to be the same across announcements. Note that this is the specification for which Gürkaynak, Kısacıkoğlu, and Wright (2020) run their lower frequency analysis. Despite being estimated over a different sample and using a different set of announcement series (e.g., Gürkaynak, Kısacıkoğlu, and Wright (2020) include FOMC announcements in their estimation) our factor has a correlation of 0.84 with their factor for the overlapping announcements. As illustrated in Figures S2.2 and S2.3, this specification leads to reduced explanatory power compared to the baseline in the large majority of cases. This implies that the common factor assumption is likely too restrictive to understand the international effects.

For completeness, we lastly estimate a single common factor for all announcements. The results are labeled as *single—all* in Figures S2.2 and S2.3. While this specification leads to an increase in explanatory power compared to the *single* specification, it is generally smaller than the *all* specification—again indicating that the common factor assumption is too restrictive in our context.

With these results in hand, we briefly discuss why we chose the current *baseline* specification as it is. While specifications *all* and *single—all* lead to greater R-squared values, additional unreported checks indicate that these values are not very robust. This likely comes from the fact that in the former case many of the factors are not well identified, and that in the latter case the common factor is identified from a relatively small set of non-announcement days. Further, the *single* specification seems to restrictive—as discussed earlier. Lastly, while we view the *covariance* specification as similarly justifiable, we already consider our entire estimation as conservative since it is only based on US yields. In light of that, we decided to go with our current baseline, which leads to slightly greater R-squared values.

S3 Monetary Policy Analysis

S3.1 Construction of Shocks

For each central bank, we use high-frequency surprises in interest rates around monetary policy announcements to construct monetary policy shocks. Following Gürkaynak, Sack, and Swanson (2005) and Swanson (2021), we construct three shocks: a *target rate shock*, a *forward guidance shock*, and a *quantitative easing shock*. We next describe the shock construction for each central bank.

S3.1.1 Fed Dataset

For the Federal Reserve, we use scheduled FOMC announcements from January 1996 till December 2019. We focus on scheduled releases because unscheduled meetings are potentially accompanied with exceptional financial market responses. Our sample covers 190 announcements. Following Swanson (2021), our shocks are based on eight variables ($MP1$, $MP2$, $ED2$, $ED3$, $ED4$, $T2$, $T5$, and $T10$), which capture interest rates for maturities of up to 10 years. The shocks are constructed from 30-minute changes in interest rate futures contracts and are standard in the literature. All data comes from *Thomson Reuters Tick History*. The dataset is also used in Boehm and Kroner (2021). In that paper, we provide details on the shock construction and show that the 30-minute changes align well with those of prior work. See Table S3.1 for more details.

Following Swanson (2021), we construct three monetary policy shocks. To do so, we first extract three factors via principal components from the eight variables. Using the Cragg and Donald (1997) test, we confirm that the data is best explained by three factors. We rotate these factors such that only one factor loads on changes in the current federal funds rate, which we refer to as the target rate shock. The other two factors have no effect on the federal funds rate. To disentangle them, we impose that one factor minimizes the variation in the data prior to the zero lower bound period starting on December 16, 2008. We call this factor the quantitative easing shock. We refer to the last factor as the forward guidance shock. For details on how to impose these restrictions, see Swanson (2021).

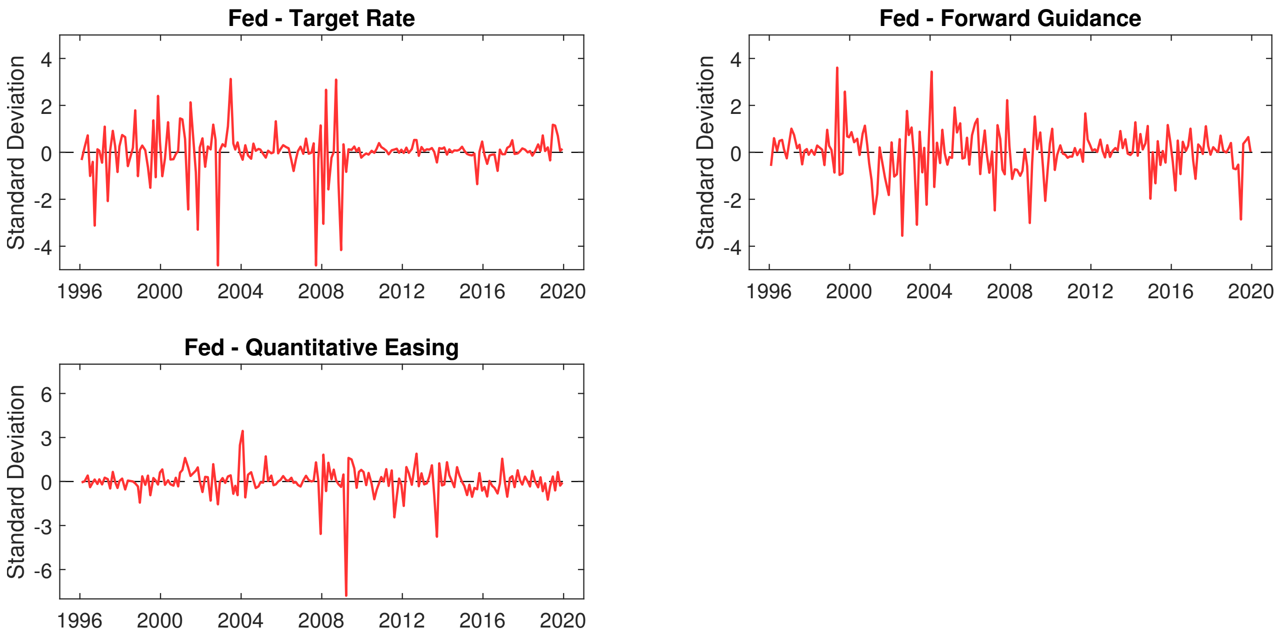
The resulting time series of each shock are shown in Figure S3.1. We also compare our shocks to those from Swanson (2021). For the overlapping sample, the correlations are 97 percent for the target rate shock, 87 percent for the forward guidance shock, and 78 percent for the quantitative easing shock. Further, we show below in Supplementary Appendix S3.3 that our main findings are robust to directly using the shocks by Swanson (2021).

S3.1.2 ECB Dataset

To construct the shocks for the Euro Area, we use an updated version of the high-frequency event study dataset by Altavilla et al. (2019). Due to the announcement structure of the ECB, we have a press release, as well as a press conference window. We have 195 press releases and 190 press conferences between January 2002 and December 2019. For each of the two releases, we construct 30-minute changes in asset prices following Altavilla et al. (2019). We use the seven variables (OIS_{1M}, OIS_{3M}, OIS_{6M}, OIS_{1Y}, OIS_{2Y}, OIS_{5Y}, OIS_{10Y}). Note that the maturities of these contracts match those in the other datasets relatively well. See Table S3.1 for more details.

Following Altavilla et al. (2019), we extract one factor for the press release window, which we refer to as the target shock. For the press conference window, we extract three factors, apply the restrictions as in Swanson (2021), and use the two factors that have no effect on the short rate. We refer to these as the forward guidance and quantitative easing shocks.

Figure S3.1: Times Series of US Monetary Policy Shocks



Notes: This figure shows the time series of the three monetary policy shocks of the Federal Reserve. The units are in standard deviations.

Figure S3.2 shows the time series of each shock. We also compare our shocks to those constructed by Altavilla et al. (2019). For the overlapping sample, the correlations are 99 percent for the target rate shock, 79 percent for the forward guidance shock, and 84 percent for the quantitative easing shock. Further, we show below in Supplementary Appendix S3.3 that our main findings are robust to directly using the shocks from Altavilla et al. (2019).

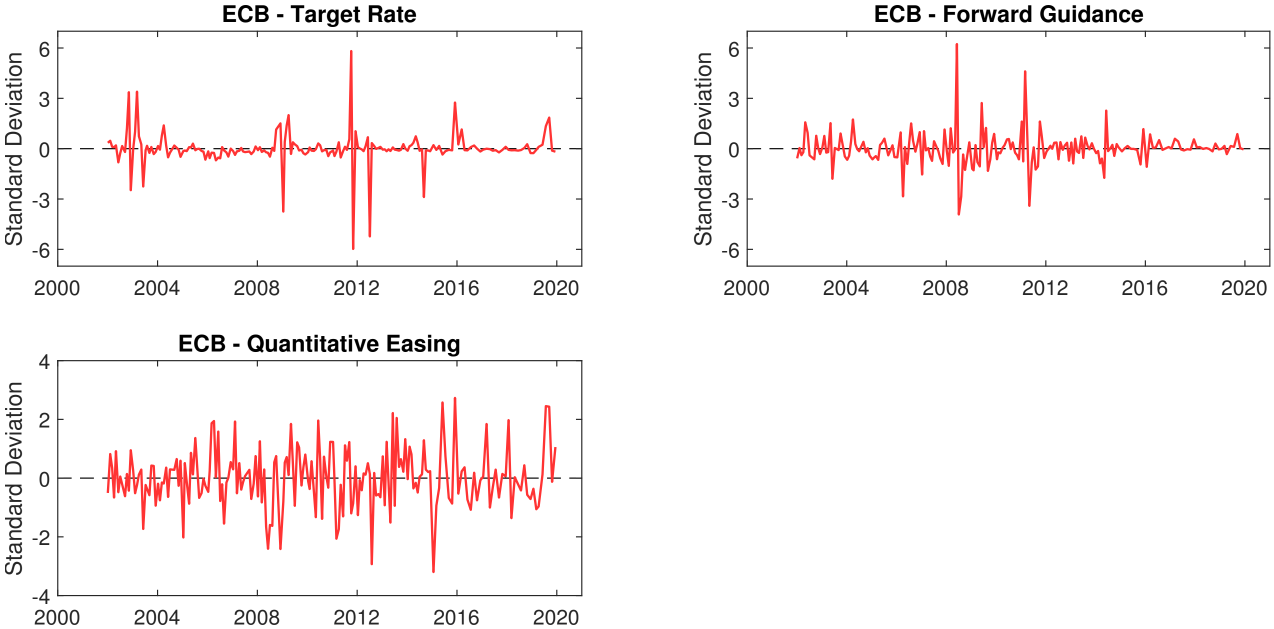
S3.1.3 BoE Dataset

For the Bank of England, we focus on scheduled Monetary Policy Committee (MPC) announcements. The sample ranges from June 1997, when the Bank of England became independent, to December 2019. The dates and times are from Bloomberg, as well as the Bank of England online archive on news, publications and events (`www.bankofengland.co.uk/news`). We drop the exceptional 150 basis points rate cut on November 6, 2008, leaving us with 256 announcements.

The construction of the shocks is based on seven variables, the first four short Sterling futures contracts ($FSS1$–$FSS4$), as well as the 2-year, 5-year, and 10-year Gilt yields ($G2$, $G5$, and $G10$). All data comes from *Thomson Reuters Tick History* and each variable is constructed as a 30-minute change around announcements. See Table S3.1 for more details. We then again construct three monetary policy shocks following the procedure of Swanson (2021). We start by showing that the data is best explained by three dimensions using the Cragg and Donald (1997) test, and subsequently extract three principal components. The restrictions to obtain the target rate, forward guidance, and quantitative easing shocks are similar to those described above for the US. For the BoE shocks, the sample for which the explained variation by the quantitative easing shock is minimized ends in February 5, 2009, the last MPC meeting before the asset purchasing program started.

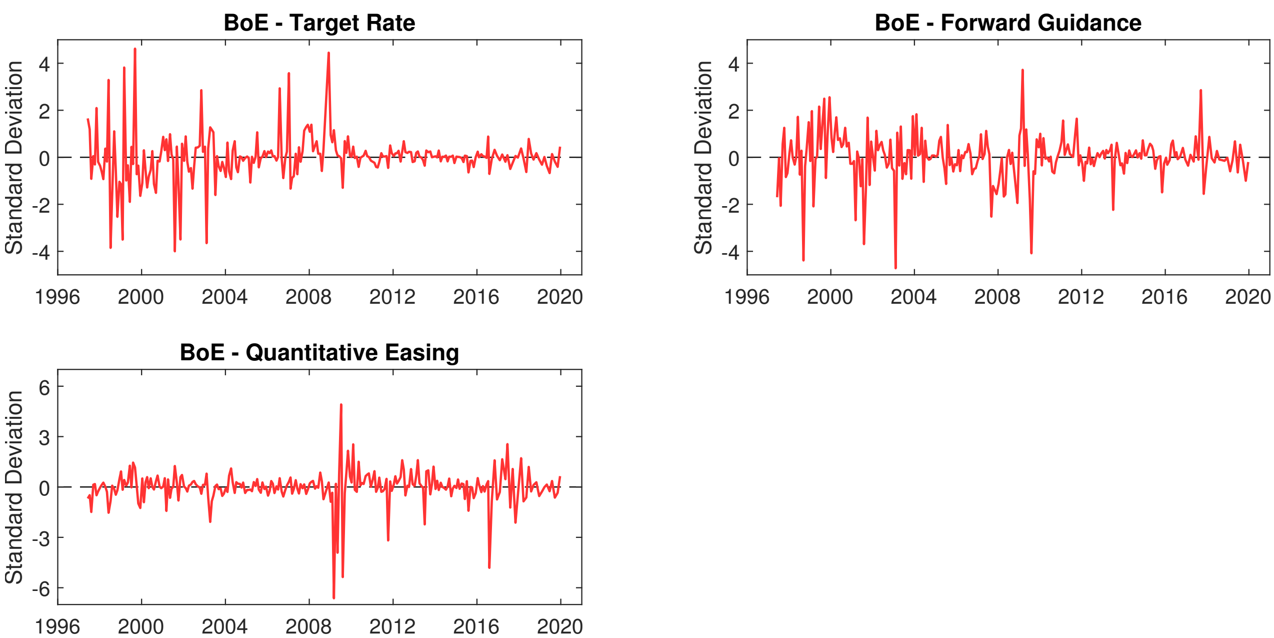
Figure S3.3 shows the time series for each shock. Broadly, the shocks are consistent with the idea that forward guidance and quantitative easing played a more dominant role since the Great

Figure S3.2: Times Series of ECB Monetary Policy Shocks



Notes: This figure shows the time series of the three monetary policy shocks of the European Central Bank. The units are in standard deviations.

Figure S3.3: Times Series of BoE Monetary Policy Shocks



Notes: This figure shows the time series of the three monetary policy shocks of the Bank of England. The units are in standard deviations.

Recession. While we do not have access to comparable shock series from a previous paper, other papers have used some of the underlying 30-minute changes as shocks. Our series of changes in the nearest Sterling futures contract ($FSS1$) has a 89 percent correlation with the series by Miranda-

Agrippino (2016), and a 91 percent correlation with the series by Gerko and Rey (2017), where for the latter comparison our series is aggregated to the monthly level. Our series of changes in the second nearest Sterling futures contract ($FSS2$), aggregated to the monthly level, has a 91 percent correlation with the series by Cesa-Bianchi, Thwaites, and Vicondoa (2020). All of these shock series from the previous literature correspond most closely to our target rate shock.

Table S3.1: Intraday Data for Monetary Policy Shocks

Variable in Text	Underlying Instruments	Ticker	Sample
Fed Shocks			
$MP1$	Federal Funds Rate Futures	FFc1–FFc2	1996–2019
$MP2$	Federal Funds Rate Futures	FFc3–FFc4	1996–2019
$ED2$	Eurodollar Futures	EDcm2	1996–2019
$ED3$	Eurodollar Futures	EDcm3	1996–2019
$ED4$	Eurodollar Futures	EDcm4	1996–2019
$T2$	2-Year Treasury Futures	TUc1/TUc2	1996–2019
$T5$	5-Year Treasury Futures	FVc1/FVc2	1996–2019
$T10$	10-Year Treasury Futures	TYc1/TYc2	1996–2019
ECB Shocks			
OIS_{1M}	1-Month Overnight Index Swap Rate	EUREON1M=	2002–2019
OIS_{3M}	3-Month Overnight Index Swap Rate	EUREON3M=	2002–2019
OIS_{6M}	6-Month Overnight Index Swap Rate	EUREON6M=	2002–2019
OIS_{1Y}	1-Year Overnight Index Swap Rate	EUREON1Y=	2002–2019
OIS_{2Y}	2-Year Overnight Index Swap Rate	EUREON2Y=	2002–2019
OIS_{5Y}	5-Year Overnight Index Swap Rate	EUREON5Y=*	2002–2019
OIS_{10Y}	10-Year Overnight Index Swap Rate	EUREON10Y=*	2002–2019
BoE Shocks			
$FSS1$	1-Quarter Short Sterling Futures	FSScm1/FSSc1–FFc3	1997–2019
$FSS2$	2-Quarter Short Sterling Futures	FSScm2/FSSc4	1997–2019
$FSS3$	3-Quarter Short Sterling Futures	FSScm3/FSSc5	1997–2019
$FSS4$	4-Quarter Short Sterling Futures	FSScm4/FSSc6	1997–2019
$G2$	2-Year Gilt Yield	GB2YT=RR	1997–2019
$G5$	5-Year Gilt Yield	GB5YT=RR	1997–2019
$G10$	10-Year Gilt Yield	GB10YT=RR	1997–2019
Stock Indexes (Figure S3.6)			
S&P 500		.SPX	1996–2019
STOXX 50 Index		.STOXX50E	2002–2019
FTSE 100		.FTSE	1997–2019

Yield Curve (Figure S3.5)	Fed	ECB	BoE
3-Month Yield	US3MT=X	EUREON3M=	GB3MT=RR
1-Year Yield	US1YT=X	EUREON1Y=	GB1YT=RR
2-Year Yield	US2YT=X	EUREON2Y=	GB2YT=RR
5-Year Yield	US5YT=X	EUREON5Y=*	GB5YT=RR
10-Year Yield	US10YT=X	EUREON10Y=*	GB10YT=RR

Notes: This table provides an overview of the intraday data from *Thomson Reuters Tick History* used to construct the monetary policy shocks. *Ticker* refers to the Reuters Instrument Code (RIC). For Fed shocks, details are provided in Boehm and Kroner (2021). For ECB shocks, the data comes from Altavilla et al. (2019) where we are providing the underlying data as shown in their Appendix Table B.1. The *Stock Indexes* and the *Yield Curve* panel refer to the additional data used for Figure S3.6 and Figure S3.5, respectively. *Following Altavilla et al. (2019), we use German bond yields of the corresponding maturity before 2011 as the 2-year and 5-year OIS rates are not available.

S3.2 Additional Results

The first two rows of Figure S3.4 show the effects of forward guidance shocks on international stock markets. As the pooled effects show (labelled "All"), a one standard deviation contractionary forward guidance shock of the Fed reduces international stock prices by approximately 10 basis points. This effect is statistically significant at the 5 percent level. This contrasts to the forward guidance shocks of the ECB and the BoE, which have substantially smaller effects that are not significant at conventional levels. The country-specific effects shown in the figure are of varying sizes and significance. An important feature of these estimates, however, is that whenever we can estimate the effects of multiple central banks on a given countries' stock market, the point estimates for the Fed are greater (in absolute value) than those of the ECB and the BoE. Similar to the conclusions from the target rate shock, the results in Figure S3.4 are consistent with our previous interpretation that the outsized effect of US macro news is driven by the transmission of US-specific shocks as opposed to the presence of common shocks.

Rows three and four of Figure S3.4 show analogous effects of quantitative easing shocks. While the relative magnitudes of the effects display a pattern across central banks that is qualitatively similar to that of target rate and forward guidance shocks, almost all effects are imprecisely estimated. The usefulness of these shock series for comparing effect sizes across central banks is therefore limited.

S3.3 Robustness

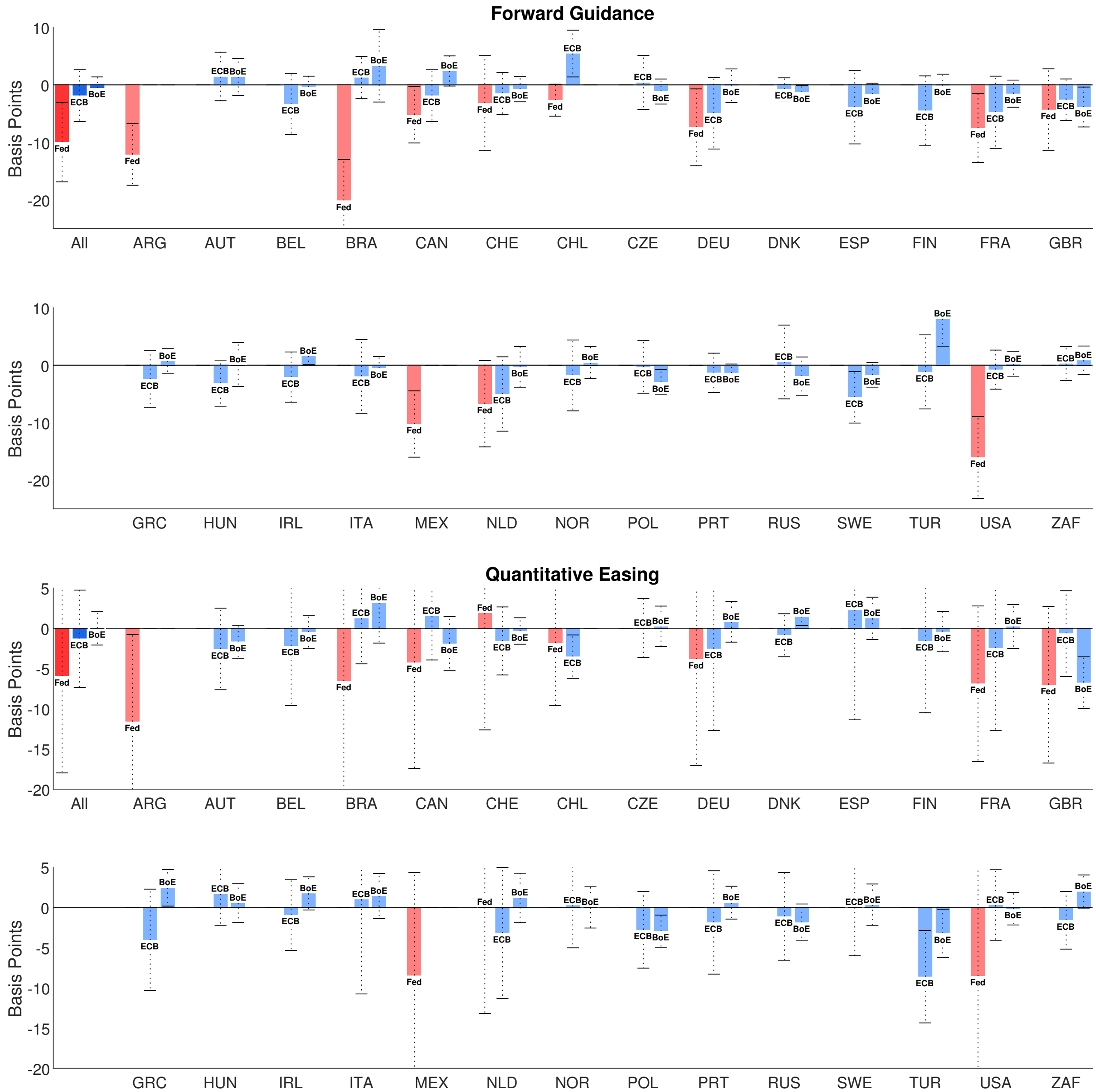
S3.3.1 Unit of Comparison

To ensure the comparability of shock magnitudes across central banks in the baseline analysis, we expressed each shock in units of standard deviations—like the macroeconomic news surprises. The idea here is to compare the average effects of a typical one standard deviation monetary policy surprise on financial markets. However, since central bank policies are generally difficult to compare, an alternative is to normalize the shocks in terms of their effects on the domestic yield curve. We next present results of this alternative strategy as a robustness check.

The top row of Figure S3.5 shows the loadings of each shock on the domestic yield curve in a 30-minute window around announcements. These loadings are constructed from government bond yields; specifically, we regress the respective shock (in standard deviations) on the 30-minute changes of various domestic government bond yields—in separate regressions with one regressor at a time. Note that these government bond yields are not necessarily the same as the yields from which the shocks are constructed. The advantage of using government bonds in this exercise is that they allow for a direct comparison of magnitudes across central banks at the exact same maturity. (For the ECB shocks, we use OIS rates of the relevant maturity instead of government bond yields.) The conclusion from the top row of Figure S3.5 is that while the shapes are similar across central banks, the magnitudes generally differ, in particular for the BoE.

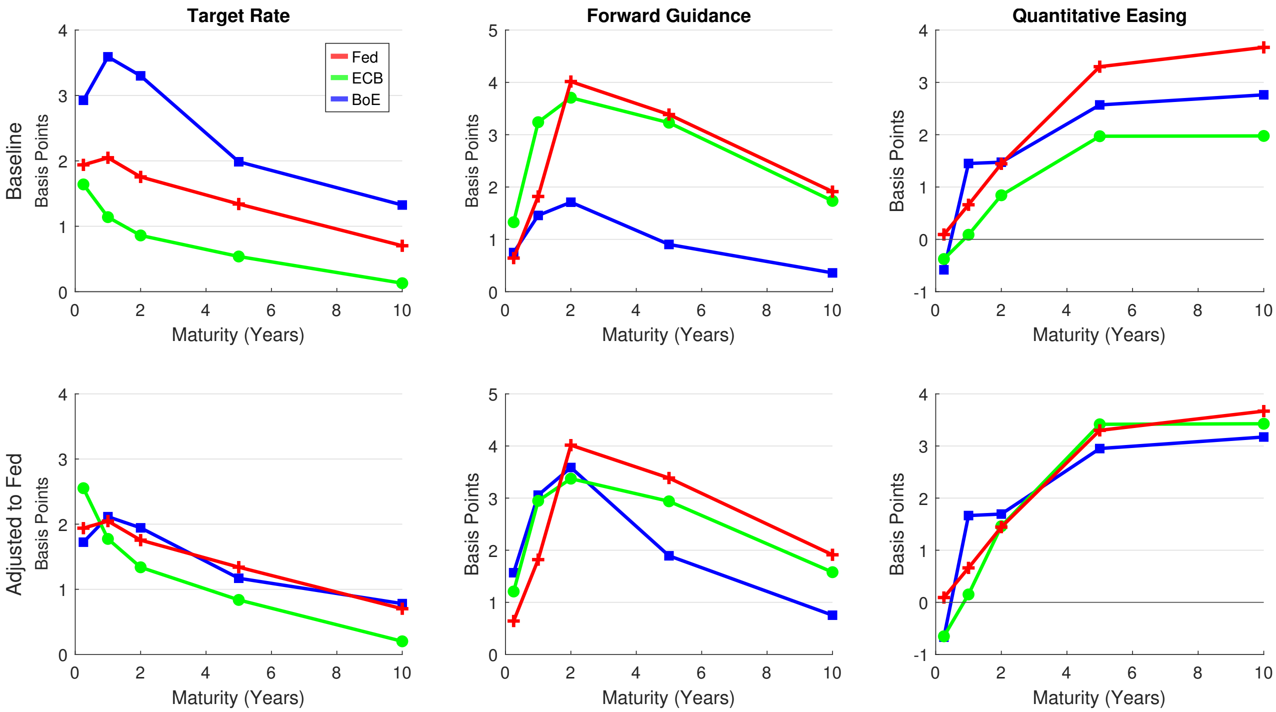
To mitigate concerns that these differences drive our results, we re-scale the ECB and BoE shocks such that the new loadings minimize the (Euclidean) distance to the respective Fed loadings, which are left unchanged. The new loadings are shown in the bottom row of Figure S3.5. The pooled effects of these shock after re-scaling are shown in the top-left panel of Figure S3.6. The results show that the asymmetry documented in Section 6.3 and Supplementary Appendix S3.2 is robust to this alternative normalization of shocks.

Figure S3.4: Effects of Unconventional Monetary Policy Shocks on International Stock Markets



Notes: This figure shows the effects of forward guidance and quantitative easing shocks of the Federal Reserve (Fed), the European Central Bank (ECB), and the Bank of England (BoE) on international stock markets. The leftmost bars in the first and third row (labelled "All") show the pooled effects across countries for each central bank. Each of the other bars represent the effect of a given central bank's shock on a country's stock market. Missing bars indicate instances in which the country is dropped because it had less than 24 observations for a given monetary policy shock. The coefficients are estimated analogously to equations (3) and (4). The units of the stock index changes are in basis points. Each shock corresponds to an increases in interest rates and is of one standard deviation in magnitude. The black error bands depict 95 percent confidence intervals, where standard errors are two-way clustered by announcement and by country.

Figure S3.5: Effects of Monetary Policy Shocks on Domestic Yield Curve



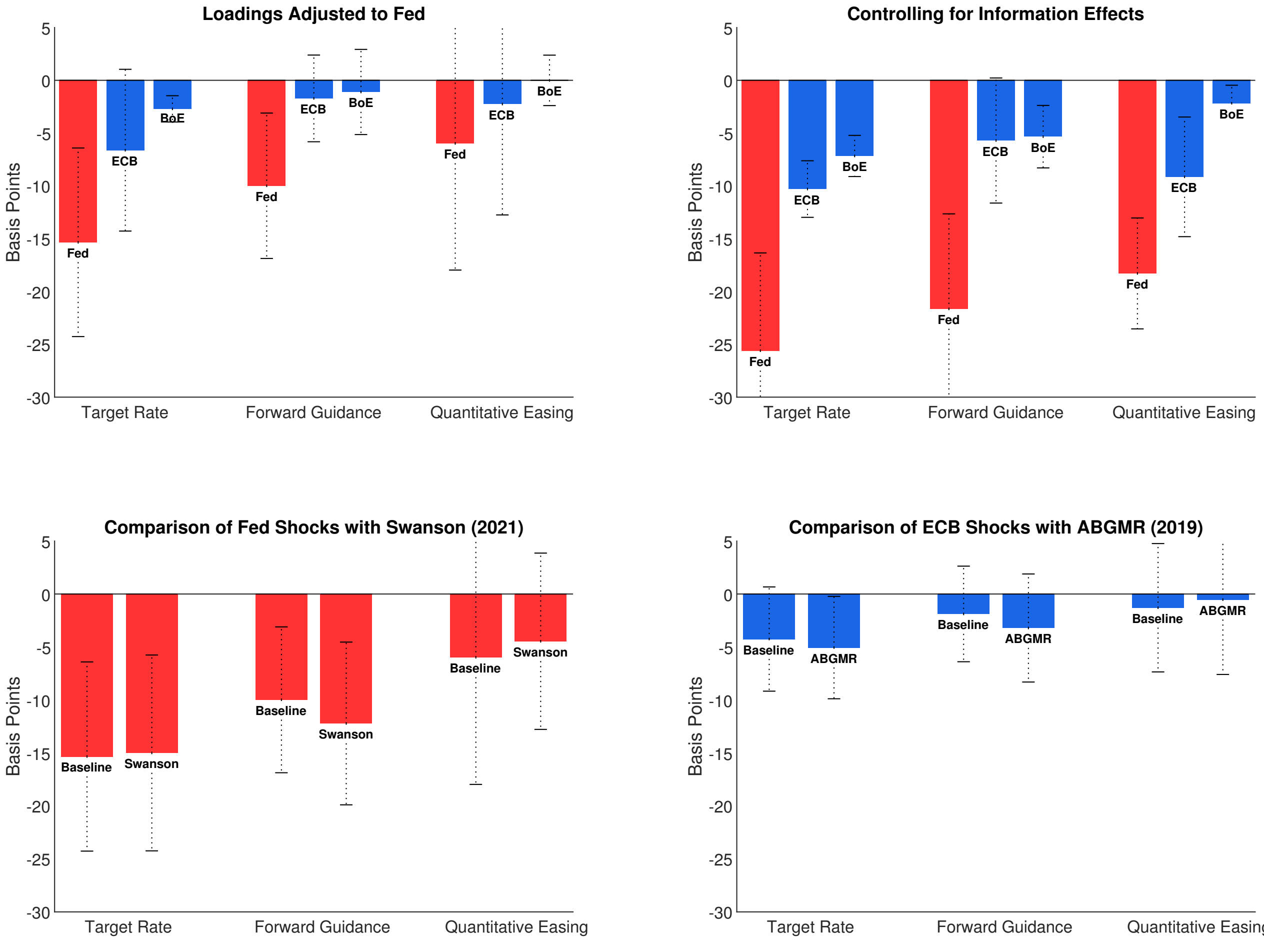
Notes: This figure illustrates the estimated effects of each shock on the domestic yield curve. The shown maturities are 3 months, 1 year, 2 years, 5 years, and 10 years. See the bottom panel of Table S3.1 for details on the data. The red, green, and blue lines correspond to the estimates for the Fed, the ECB, and the BoE, respectively. The top row shows the estimates for a one standard deviation shock as used in the main text. The bottom row displays the estimates for the ECB and BOE shocks after re-scaling as discussed in the text.

S3.3.2 Controlling for Information Effects

We next turn to the issue of information or signaling effects of monetary policy. The idea here is that a central bank could signal information about the state of the economy to the public through its policy. These effects would push stock markets in the opposite direction of traditional monetary policy shocks. If the strength of the information effects differ across central banks, this could potentially explain the asymmetry documented above. To check this, we follow the approach by Miranda-Agrippino and Nenova (2022), which is based on the "poor man's" identification of Jarociński and Karadi (2020), and only considers announcements for which the domestic stock market index responds negatively to contractionary shocks and positively to expansionary shocks. Here, we use the STOXX 50 index as the domestic stock market index for the ECB.

The top-right panel of Figure S3.6 shows the results of this exercise. First, and most importantly the asymmetry documented earlier is robust to controlling for information effects. Second, consistent with previous papers, the effect sizes are substantially greater and so is the precision of the estimates—in particular for the forward guidance and quantitative easing shocks. Hence, the results indicate that information effects are potentially responsible for the noisy estimates in Figure S3.2. They cannot, however, explain the asymmetry.

Figure S3.6: Effects of Monetary Policy Shocks on International Stock Markets—Robustness



Notes: This figure illustrates the results for four different robustness checks, showing the pooled effects across central banks and type of policy shocks. The top-left panel shows estimates when ECB and BoE shocks are re-scaled as described in Supplementary Appendix S3.3.1. The top-right panel shows the results when information effects are removed as described in Supplementary Appendix S3.3.2. The bottom-left panel shows the comparison of our baseline estimates with those obtained when directly using the shocks by Swanson (2021). The bottom-right panel does the analogous exercise for the ECB shocks where we now use the shocks by Altavilla et al. (2019).

S3.3.3 Comparison with Shocks of Previous Literature

As mentioned above, we also contrast our estimates with those obtained from shocks by previous papers. For the Fed, we employ the shocks by Swanson (2021). The results are shown in the bottom-left panel of Figure S3.6. For the ECB, we use the shocks by Altavilla et al. (2019) and the bottom-left panel of Figure S3.6 shows the results for that comparison. In both cases, the estimates are very similar to our baseline case.

S4 State-Dependent Effects of US Macro News

Prior work has established that the effects of news on equity prices are not stable over time (e.g., McQueen and Roley, 1993; Boyd, Hu, and Jagannathan, 2005; Andersen et al., 2007; Goldberg and Grisse, 2013; Gürkaynak, Kısacıkoğlu, and Wright, 2020; Gardner, Scotti, and Vega, 2022; Elenev et al., 2022, among others). In this appendix, we extend our analysis to allow for such time-varying effects. We confirm prior findings that the effects of news on stock prices vary along several dimensions. However, we also show that the average effects we report in the main text are not driven by large effects in extreme episodes such as deep recessions or slumps, or episodes at the zero lower bound (ZLB), but are present in normal times.

Our setup in this paper differs from most prior applications since we study how news in the US affects *foreign* asset prices. For a given economic indicator of interest (e.g., recession vs. expansion), this international setting leads to the possibility that the effect size depends on the indicator's value in the US (where the news originates), its value in the foreign country (whose stock price response we study), or both. Hence, for given measure, our regression specification will allow for the effect size to vary with the value of the measure in the US and in the foreign country.

Based on the prior literature, we consider the following four measures. First, we contrast recessions and expansions using simple recession indicators (e.g., Boyd, Hu, and Jagannathan, 2005; Andersen et al., 2007). More specifically, we consider an indicator function, $\mathbf{1}_{i,t}^{rec}$, which equals one if and only if country i's economy is in recession. To measure US recession periods, we use the business cycle dates from the National Bureau of Economic Research (NBER). For the other countries, we use the dates provided by the Organisation for Economic Co-operation and Development (OECD).

Second, we will allow the effect size to depend on a measure of business cycle slack constructed from the unemployment rate (similar to, e.g., McQueen and Roley, 1993; Elenev et al., 2022; Gardner, Scotti, and Vega, 2022). Our preferred measure for whether an economy experiences slack is the empirical cumulative distribution function (cdf) of a country's unemployment rate. This function is defined as

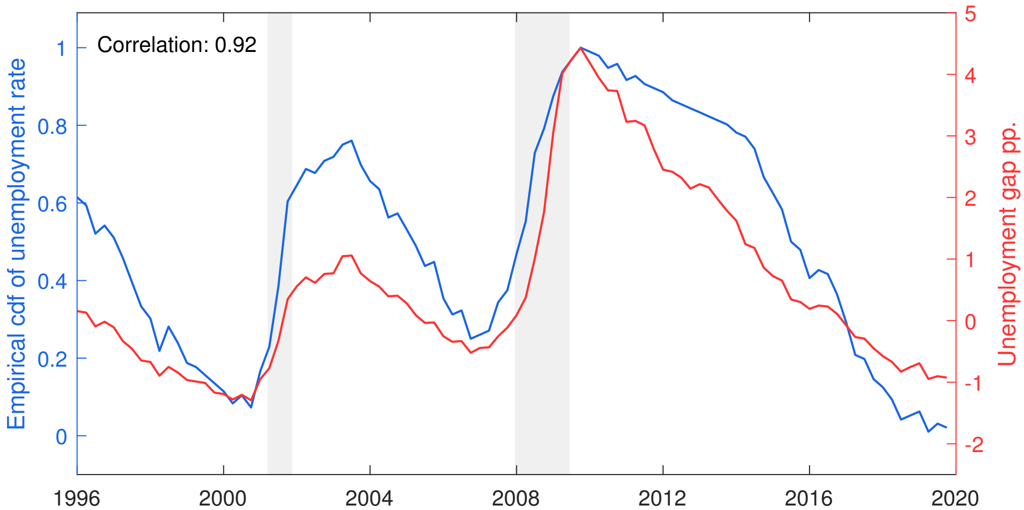
$$F_i^u(u) = \frac{1}{N_i} \sum_{\tau=1}^{N_i} \mathbf{1}\left(u_{i,\tau} \leq u\right),$$

where $u_{i,\tau}$ is the unemployment rate in country i at time τ, and N_i is the number of unemployment rate observations of country i from which the cdf is estimated. The empirical cdf maps a generic value of the unemployment rate u into the unit interval $[0, 1]$. This measure captures in a non-parametric way whether the countries' unemployment rate is high in comparison to its own history and future. Relative to other measures, the empirical cdf has a number of advantages.[4] Most importantly, it can be constructed from data on the unemployment rate alone. Relative to alternative measures such as the unemployment gap, it does not require data on the natural rate of unemployment, which is difficult to estimate and to our knowledge not available for most foreign countries in our sample.

Figure S4.1 compares the empirical cdf of the unemployment rate, evaluated at the unemployment rate at time t, $F_i^u(u_{i,t})$, to the unemployment gap for the case of the US. As in Gardner, Scotti, and Vega (2022), the unemployment gap is constructed as the difference between the unemployment

[4]For example, unlike the measure proposed by Auerbach and Gorodnichenko (2012), it does not require calibration of any parameters. Further, in contrast to the approach by Ramey and Zubairy (2018), it does not require taking a stance on a threshold value.

Figure S4.1: Comparison of Empirical cdf of Unemployment Rate and Unemployment Gap



Notes: This figure compares the empirical cdf of the unemployment rate in the US with the unemployment gap in the US. Shaded areas indicate NBER recession periods.

rate and the natural rate of unemployment.[5] The figure shows that our measure of the empirical cdf correlates very highly with the unemployment gap (the correlation is 0.92). In order to preserve the interpretation of the main effect in the regressions below, we subtract 0.5 from our measure of the empirical cdf and include the interaction term of $F^u_{i,t} := F^u_i(u_{i,t}) - 0.5$ with the surprise of interest in the regression. The data on unemployment rates is quarterly and come from the OECD.

Third, we study whether the effect size depends on whether the economy is at the ZLB (or effective lower bound). The ZLB introduces a non-linearity in the monetary reaction function and prior work has argued that time-varying responsiveness of monetary policy could drive the time-varying effects of news on equity prices (e.g., Goldberg and Grisse, 2013). Following Boehm (2020), the indicator function, $\mathbf{1}^{ZLB}_{i,t}$, equals one if and only if the countries' short-term interest rate is below 75 basis points. The data on short-term interest rates is monthly and comes from the OECD. This dataset defines the short-term rate as a three-month money market rate.[6]

Lastly, we use the FOMC Sentiment Index as constructed by Gardner, Scotti, and Vega (2022). This index is based on textual analysis of FOMC statements and captures an assessment of current and future economic conditions as perceived by the Fed. High values of the index typically occur at times when the US economy is doing well. Gardner, Scotti, and Vega (2022) show that the sensitivity of equity prices to US macro news varies strongly with this index. We de-mean this measure in order to obtain our preferred interpretation of the main effect in the regression. For ease of interpretation of the interaction effect, we also divide the de-meaned index by its standard deviation. In the regression below, this measure is denoted by $SI_{US,t}$.

[5]For the US an estimate of the natural rate of unemployment is available from the Congressional Budget Office.

[6]While data is missing for Turkey and Brazil, we confirm through other sources that neither country had a policy rate close or below 75 basis points over our sample period. Hence, we set the indicator for both countries to zero throughout.

With these measures at hand, we then estimate the following joint specification:

$$
\begin{aligned}
\Delta q_{i,t} = \alpha_i + \gamma^y s^y_{US,t} + \sum_{k \neq y} \gamma^k s^k_{US,t} \\
& + \chi^y_r s^y_{US,t} \mathbf{1}^{rec}_{US,t} + \psi^y_r s^y_{US,t} \mathbf{1}^{rec}_{i,t} + \sum_{k \neq y} \left(\chi^k_r s^k_{US,t} \mathbf{1}^{rec}_{US,t} + \psi^k_r s^k_{US,t} \mathbf{1}^{rec}_{i,t} \right) + \theta^y_r \mathbf{1}^{rec}_{US,t} + \phi^y_r \mathbf{1}^{rec}_{i,t} \\
& + \chi^y_u s^y_{US,t} F^u_{US,t} + \psi^y_u s^y_{US,t} F^u_{i,t} + \sum_{k \neq y} \left(\chi^k_u s^k_{US,t} F^u_{US,t} + \psi^k_u s^k_{US,t} F^u_{i,t} \right) + \theta^y_u F^u_{US,t} + \phi^y_u F^u_{i,t} \\
& + \chi^y_Z s^y_{US,t} \mathbf{1}^{ZLB}_{US,t} + \psi^y_Z s^y_{US,t} \mathbf{1}^{ZLB}_{i,t} + \sum_{k \neq y} \left(\chi^k_Z s^k_{US,t} \mathbf{1}^{ZLB}_{US,t} + \psi^k_Z s^k_{US,t} \mathbf{1}^{ZLB}_{i,t} \right) + \theta^y_Z \mathbf{1}^{ZLB}_{US,t} + \phi^y_Z \mathbf{1}^{ZLB}_{i,t} \\
& + \chi^y_S s^y_{US,t} SI_{US,t} + \sum_{k \neq y} \chi^k_S s^k_{US,t} SI_{US,t} + \theta^y_S SI_{US,t} + \varepsilon_{i,t}.
\end{aligned}
\tag{S4.1}
$$

Note that in this specification, the measures $F^u_{US,t}$, $F^u_{i,t}$, and $SI_{US,t}$ have (approximately) mean zero, and hence the main effect γ^y captures the effect of US macroeconomic surprise $s^y_{US,t}$ on the foreign asset price $q_{i,t}$ when (i) both the US and the foreign country's economy are expanding, (ii) when the two countries' unemployment rates are at their mean, (iii) when the two countries' monetary authorities are not constrained by the ZLB, and (iv) when the Fed Sentiment Index is at its mean. Note that the period over which we estimate specification (S4.1) begins in 2000 as the FOMC Sentiment Index is not available before.

Table S4.1 shows the estimates. Several interaction coefficients are statistically significant and in some cases economically large. The two most important of these are the interactions of the surprise with the empirical cdf of the US unemployment rate as well as with the FOMC Sentiment Index. The effects are larger if the US unemployment rate is high and if the FOMC Sentiment Index is low—in line with prior findings that the effects are larger during bad times. The estimates also suggest that the effect size varies more with the state of the US economy than with the state of the foreign economy.

For our analysis, the most important result in Table S4.1 is that the main effects remain similar to the estimates reported in Table 3. They also remain statistically and economically significant. Recall that given the construction of the interaction terms, these main effects capture the average effects of US news on foreign stock markets when (i) both the US and the foreign economy are in an expansion, (ii) the US and the foreign unemployment rate are at their median value, (iii) neither economy is at the ZLB, and (iv) when the FOMC Sentiment Index is at its mean. The similarity to our baseline results implies that the estimates reported in the text are not driven by very large effects in extreme business cycle states such as deep recessions, episodes of extreme slack, or times at the ZLB. They are also present in normal times.

To provide one concrete example, we discuss the case of nonfarm payrolls. As Table S4.1 shows, the main effect is 15.60 basis points per standard deviation surprise. Besides this main effect, the interaction terms of the surprise with the empirical cdf of the US unemployment rate, with the foreign ZLB indicator, and with the FOMC Sentiment Index are statistically significant. To understand the economic significance of these effects, note that, all else equal, the main effect of 15.69 basis points increases by 7.62 (= 30.47 × 0.25) basis points if the US unemployment rate is changed from its median to the 75th percentile. Further, and again holding all else equal, the effect size increases by 13.78 basis points if the foreign country's monetary authority is constrained by the ZLB. Lastly,

Table S4.1: Time-Varying Effects of US News

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
Stock Index (bp)						
News	6.17***	9.85***	-10.59***	-7.32***	11.80***	16.40***
	(1.99)	(2.49)	(2.20)	(1.73)	(2.58)	(3.79)
News × Recession USA	8.53	10.60	-7.44	11.83*	-14.40**	5.65
	(5.40)	(6.21)	(6.19)	(5.78)	(6.05)	(6.66)
News × Recession Foreign	-0.63	1.59	4.01**	0.47	3.20	2.37
	(1.09)	(1.73)	(1.45)	(1.36)	(2.00)	(4.34)
News × Unemployment USA	13.24*	20.55***	18.30**	0.75	25.78***	27.89**
	(7.33)	(7.36)	(6.81)	(4.68)	(6.20)	(11.45)
News × Unemployment Foreign	-2.76	-3.33*	0.36	-1.25	-5.87**	-2.10
	(1.93)	(1.94)	(2.08)	(2.10)	(2.18)	(5.22)
News × ZLB USA	-4.91	-4.98	-2.53	3.97	-9.17*	-16.95*
	(3.82)	(4.20)	(3.18)	(2.43)	(4.61)	(8.47)
News × ZLB Foreign	-0.61	2.94	6.94***	3.92**	-1.41	5.51
	(1.80)	(1.95)	(2.31)	(1.48)	(1.82)	(4.27)
News × FOMC Sentiment	-0.82	-3.12*	0.72	-0.05	-1.96	-1.29
	(1.36)	(1.81)	(1.40)	(1.34)	(1.64)	(3.17)
R^2	0.13	0.28	0.31	0.34	0.25	0.57
Observations	5215	5281	4963	5055	4957	1658

	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
Stock Index (bp)						
News	4.92***	6.95**	6.87***	15.69***	6.11**	9.11***
	(0.89)	(3.13)	(1.83)	(3.56)	(2.31)	(2.17)
News × Recession USA	-2.84	1.33	2.90	-5.51	8.02	-12.56*
	(2.13)	(9.11)	(8.73)	(8.63)	(6.39)	(7.16)
News × Recession Foreign	-1.10	3.23	-5.60***	-2.54	-2.16	-2.41
	(0.80)	(2.81)	(1.69)	(2.76)	(2.32)	(1.88)
News × Unemployment USA	5.78*	-8.58	-3.94	30.47***	4.69	13.49*
	(2.94)	(9.90)	(6.48)	(10.85)	(8.47)	(6.83)
News × Unemployment Foreign	-1.20	-3.42	-0.64	-2.13	-4.93**	-0.59
	(1.29)	(2.86)	(1.22)	(3.61)	(1.94)	(1.94)
News × ZLB USA	0.98	12.21*	10.52***	8.93	8.86*	-2.66
	(2.03)	(6.33)	(3.27)	(7.88)	(5.00)	(4.09)
News × ZLB Foreign	-1.10	3.40	-0.23	13.78***	1.93	-0.69
	(0.93)	(3.13)	(2.26)	(4.12)	(1.65)	(1.97)
News × FOMC Sentiment	-3.06***	-4.17*	-4.96***	-10.90***	-1.22	-0.86
	(0.77)	(2.24)	(1.56)	(3.53)	(2.09)	(2.08)
R^2	0.25	0.30	0.17	0.39	0.34	0.10
Observations	21470	4822	5220	4945	5036	5350

Notes: This table presents estimates of γ^y, χ^y_r, χ^y_u, χ^y_Z, χ^y_S, ψ^y_r, ψ^y_u, and ψ^y_Z obtained using specification (S4.1) with the change in stock indexes as the dependent variable. The interaction terms are constructed as discussed in the main text. Units are in basis points. Standard errors are two-way clustered by announcement and by country, and reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

ceteris paribus, a one standard deviation decrease in the FOMC Sentiment Index raises the effect by 10.90 basis points. Hence, these findings confirm prior work documenting that there is sizable state-dependence in the effects of US macro news on equity prices.

S5 The Role of the US Dollar Exchange Rate

In this appendix, we investigate the effect of US macro news on exchange rates, i.e., the US dollar vis-a-vis the other countries' currencies in our sample.[7] The US dollar exchange rate is a key variable in international finance (Gourinchas, Rey, and Sauzet, 2019), and a potential amplification mechanism of cross-border financial spillovers as shown by Bruno and Shin (2015). They lay out a model in which foreign firms borrow funds in US dollar but finance assets in local currency and therefore have currency mismatch. A dollar depreciation improves their balance sheets and reduces credit risk for their lenders (local banks). This reduction in credit risk, in turn, raises banks' lending capacity and therefore improves global liquidity. If the Bruno and Shin (2015) mechanism is dominant, we expect to observe a US dollar appreciation (depreciation) simultaneously with a decrease (increase) in international stock markets.

To see whether this prediction is consistent with our findings, we re-estimate the pooled regression (3), where $\Delta q_{i,t} = q_{i,t+20} - q_{i,t-10}$ is now the 30-minute change of country i's US dollar exchange rate.[8] Exchange rates are measured in US dollars per one unit of foreign currency so that a positive coefficient indicates a depreciation of the US dollar. Table S5.1 reports the results of this exercise, jointly with the previously obtained estimates for stock indexes from Table 3.

As the table demonstrates, the US dollar typically appreciates after positive surprises about both US real activity, which is in line with Andersen et al. (2007). Further, stock prices increase while the dollar appreciates. This relationship suggests that the mechanism by Bruno and Shin (2015) is not dominant. Overall, the exchange rate effect is comparatively weaker as only four out of ten announcements lead to a significant effect.

After positive news about inflation, international stock markets decrease while the dollar appreciates. These responses echo earlier findings on the effects of contractionary monetary policy shocks in the literature (Eichenbaum and Evans, 1995; Miranda-Agrippino and Rey, 2020). They are also in line with our earlier evidence of a potentially dominant interest rate channel for price news. In this case, the joint response of exchange rates and stock prices is consistent with the mechanism by Bruno and Shin (2015).

As price news only plays a minor role in our results (see Section 7), most of our evidence suggests that the exchange rate is not central to the transmission of US macro news. That being said, our results do not rule out that the international dominance of the US dollar is the source of the asymmetric effects documented in Section 6. For example, Jiang, Krishnamurthy, and Lustig (2020) build a model of the global financial cycle based on the safety of the US dollar. In their model, the response of the exchange rate to productivity shocks depends on the endogenous response of monetary policy.

[7] See Andersen et al. (2003) for prior work on the effects of macroeconomic news on US dollar exchange rates.

[8] For members of the Euro Area, we do not use country-specific exchange rates prior to the inception of the currency union due to the short samples. We further drop Denmark from the sample because the Danish Krone is tightly and credibly pegged to the Euro. See Online Appendix Table B3 for details.

Table S5.1: Effects on International Stock Markets and US Dollar Exchange Rates

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
Stock Index (bp)						
News	5.36**	12.35***	-8.84***	-4.87***	5.63***	17.60***
	(2.28)	(2.02)	(1.89)	(1.29)	(1.60)	(3.36)
R^2	0.04	0.13	0.10	0.15	0.10	0.26
Observations	6054	6041	5717	5828	5610	1911
Exchange Rate (bp)						
News	-0.01	-0.40	-5.77***	-3.32***	-1.40	-7.85***
	(1.09)	(1.21)	(1.33)	(0.82)	(0.81)	(2.54)
R^2	0.00	0.02	0.08	0.07	0.06	0.11
Observations	3943	3974	3812	3896	3787	1286
	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
Stock Index (bp)						
News	4.89***	11.71***	4.23***	17.06***	10.52***	5.61***
	(0.73)	(2.24)	(1.40)	(2.99)	(1.68)	(1.54)
R^2	0.09	0.12	0.03	0.13	0.15	0.04
Observations	24334	5548	5908	5688	5786	5726
Exchange Rate (bp)						
News	-0.58	-4.03**	-1.38*	-12.16***	-2.12	-0.96
	(0.50)	(1.40)	(0.73)	(2.75)	(1.47)	(0.82)
R^2	0.03	0.07	0.04	0.16	0.10	0.01
Observations	16497	3971	3915	3868	3862	3682

Notes: The table presents results of the pooled regression for stock indexes, as shown in Table 3, and US dollar denominated local exchange rates, i.e., estimates of γ^y of equation (3), where the left-hand variable is now the 30-minute change of country i's exchange rate. Exchange rates are expressed in US dollars so that an increase reflects a depreciation of the US dollar relative to the local currency. The units are in basis points. Standard errors are two-way clustered by announcement and by country, and reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level. See Online Appendix Table B3 for details on the sample.

S6 Inspecting the Cross-Sectional Heterogeneity

In this appendix, we explore the heterogeneity of responses documented in Section 4.1. As Figure 4 illustrated, some countries' stock markets, including Germany's, France's, Italy's, and the Netherlands' respond systematically more strongly to US macroeconomic news than stock markets in Austria, Denmark or Portugal. It is therefore natural to ask whether countries' responsiveness to news is correlated with observables. Perhaps surprisingly, we find no robust correlation of the effect size with financial integration, trade integration, a measure of industry dissimilarity, or exposure to dollar valuation effects after appropriately controlling for other determinants of the effect size.

We consider four different exposure measures that could plausibly impact how strongly a countries' stock market responds to US news. First, we are interested in a measure of global financial integration, an intuitive exposure measure to international financial conditions. One may expect that countries with greater financial openness respond more strongly—consistent with theoretical explanations of the global financial cycle as discussed in Rey (2016). As is common in the literature, we measure financial integration of country i in year t as

$$\text{finInt}_{i,t} = \frac{\text{FA}_{i,t} + \text{FL}_{i,t}}{\text{GDP}_{i,t}}, \tag{S6.1}$$

where $\text{FA}_{i,t}$ and $\text{FL}_{i,t}$ denote the stocks of foreign assets and liabilities, respectively. Note that $\text{FA}_{i,t}$ and $\text{FL}_{i,t}$ include asset holdings and liabilities vis-à-vis *all* countries and not only vis-à-vis the US, in line with recent work emphasizing the importance of multilateral effects (Huo, Levchenko, and Pandalai-Nayar, 2020). All series are measured in current US dollars. The data is annual and taken from Lane and Milesi-Ferretti (2007, 2017).[9]

As Figure S6.1 shows, a handful of countries experiences an enormous growth in financial integration, most notably Ireland (IRL). The main concerns with these countries are (i) that the financial integration measure (S6.1) could reflect their tax haven character rather than exposure to the global financial cycle and (ii) that extreme values of these countries' financial integration measures could unduly drive the estimates. While we have checked that the results are broadly similar in a sample including all countries (estimates not reported), we prefer a set of baseline results, which excludes the most extreme outliers (Ireland (IRL), Switzerland (CHE), the Netherlands (NLD), the United Kingdom (GBR), and Belgium (BEL)).

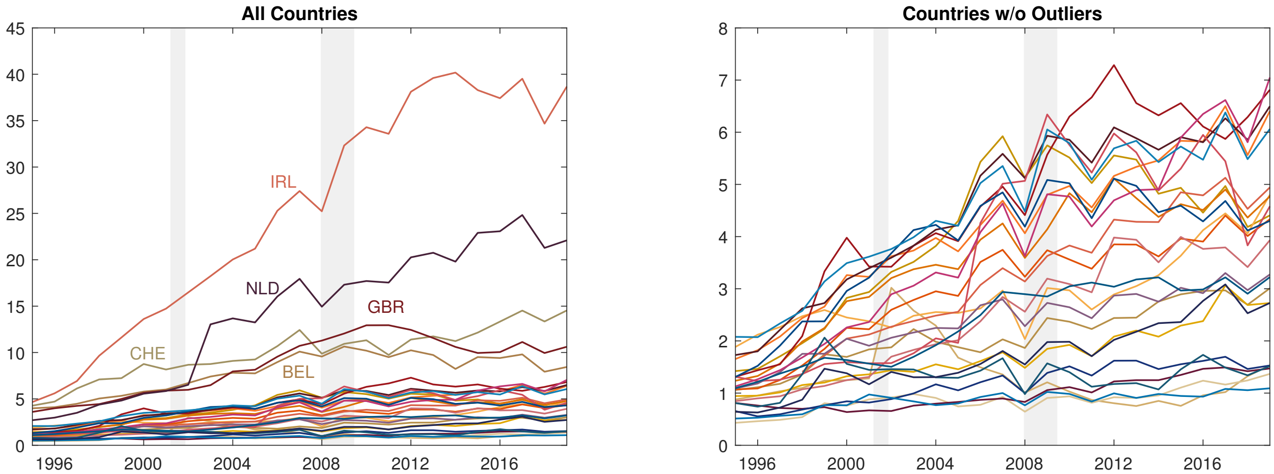
Second, we study the role of trade integration. It is known since Frankel and Rose's (1998) seminal work that countries that trade more have more correlated business cycles. This correlation suggests that trade transmits shocks across countries. Indeed, a large literature provides direct evidence for the transmission of shocks through trade linkages (see, e.g., Di Giovanni and Levchenko, 2010; Boehm, Flaaen, and Pandalai-Nayar, 2019, among many others). Again taking into account the role of multilateral effects, we calculate trade integration (or openness) for country i and year t as

$$\text{tradeInt}_{i,t} = \frac{\text{Imports}_{i,t} + \text{Exports}_{i,t}}{\text{GDP}_{i,t}}. \tag{S6.2}$$

Data on nominal imports, exports, and GDP is annual and obtained from the United Nations Statis-

[9]The asset and liability measures include portfolio equity and debt, foreign direct investment, other investment (including loans, deposits, and trade credit), financial derivatives, and reserve assets. Excluding foreign direct investment does not substantially affect our results.

Figure S6.1: Time Series of Financial Integration Measure by Country



Notes: This figure shows the time series of financial integration from 1995 to 2019. The construction of the measure follows equation (S6.1). The left hand side panel shows the time series for all countries in the sample. The right-hand side excludes the time series for the five outliers, i.e., Belgium, Ireland, Netherlands, Switzerland, and the United Kingdom. Note that the Euro Area is a separate line in both panels.

tics Division.

Third, we consider a measure of sectoral dissimilarity relative to the US. To the extent that business cycle shocks are sector-specific or have differential effects across sectors, one would expect countries with greater sectoral similarity to experience greater business cycle synchronization (Imbs, 2004). In the context of our empirical setup, US news may disproportionately capture the effects of shocks reflective of the US sectoral structure. This composition of shocks could result in greater effects on countries with an industrial structure similar to the US. We calculate country i's sectoral dissimilarity relative to the US as

$$\mathrm{dissim}_{i,t} = \sum_k |s_{i,k,t} - s_{US,k,t}|\,,$$

where $s_{i,k,t}$ is country i's share of gross output in sector k and in year t. The data is annual and obtained from EU KLEMS and the World Input-Output Database (Timmer et al., 2015).

Fourth, we consider exposure to dollar valuation effects (e.g., Lane and Shambaugh, 2010). As Supplementary Appendix S5 shows, the US dollar tends to appreciate after positive news about US real activity or higher-than-expected prices. Such dollar appreciations raise the value of dollar assets when measured in local currency. Similarly, they raise the cost of repaying dollar liabilities when measured in local currency. The net effect on a countries' balance sheet depends on the net exposure to dollar fluctuations, which is simply the difference between dollar assets $A^{\$}_{i,t}$ and dollar liabilities $L^{\$}_{i,t}$. After scaling this difference by nominal GDP, we have

$$\mathrm{USDnetExp}_{i,t} = \frac{A^{\$}_{i,t} - L^{\$}_{i,t}}{\mathrm{GDP}_{i,t}}.$$

The data to construct this measure is annual and comes from Bénétrix et al. (2019).[10,11]

With these measures in hand, we then estimate the specification

$$\begin{aligned}
\Delta q_{i,t} = \alpha_i &+ \gamma^y s^y_{US,t} + \sum_{k\neq y} \gamma^k s^k_{US,t} \\
&+ \chi^y_F s^y_{US,t}\text{finInt}_{i,t} + \sum_{k\neq y} \chi^k_F s^k_{US,t} \times \text{finInt}_{i,t} + \theta^y_F \text{finInt}_{i,t} \\
&+ \chi^y_T s^y_{US,t}\text{tradeInt}_{i,t} + \sum_{k\neq y} \chi^k_T s^k_{US,t} \times \text{tradeInt}_{i,t} + \theta^y_T \text{tradeInt}_{i,t} \\
&+ \chi^y_D s^y_{US,t}\text{dissim}_{i,t} + \sum_{k\neq y} \chi^k_D s^k_{US,t} \times \text{dissim}_{i,t} + \theta^y_D \text{dissim}_{i,t} \\
&+ \chi^y_\$ s^y_{US,t}\text{USDnetExp}_{i,t} + \sum_{k\neq y} \chi^k_\$ s^k_{US,t} \times \text{USDnetExp}_{i,t} + \theta^y_\$ \text{USDnetExp}_{i,t} \\
&+ \text{controls} + \varepsilon_{i,t}.
\end{aligned} \tag{S6.3}$$

For ease of interpretation, we standardize the measures $\text{finInt}_{i,t}$, $\text{USDnetExp}_{i,t}$, $\text{tradeInt}_{i,t}$, and $\text{dissim}_{i,t}$ by first subtracting the sample mean and then by dividing by the sample standard deviation. Hence, the main effect γ^y in equation (S6.3) captures the average response and, for example, the coefficient χ^y_F captures the differential response of a country with a one standard deviation greater-than-average degree of financial integration.

Recall that we documented in Supplementary Appendix S4 that US real activity news often has greater effects on foreign stock markets when the US experiences high unemployment (as measured by the empirical cdf of the US unemployment rate) and when the US economy is doing poorly as measured by the FOMC sentiment index of Gardner, Scotti, and Vega (2022). When estimating specification (S6.3) we include both of these measures and their interaction terms with all surprises as controls. This ensures that the estimates of interest are not driven by potential correlations with these two measures.[12]

Table S6.1 shows the estimates of equation (S6.3). The only interaction coefficient that is consistently significant across announcements is the coefficient on the interaction term of the surprise of interest with trade integration. However, the effect has the unanticipated sign, suggesting that trade integration *reduces* the effect size. The interaction effects of financial integration, industry dissimilarity, and dollar exposure with the surprises of interest do not robustly differ from zero for most announcements.

[10] Assets include portfolio equity, foreign direct investment (equity and debt), portfolio debt, other investment, and reserves. Liabilities include portfolio equity, foreign direct investment (equity and debt), portfolio debt and other investment (see Bénétrix et al., 2019, for details).

[11] Similar to the financial integration measure (S6.1), several countries experience an enormous growth of the exposure measure to dollar fluctuations. Ireland, for instance, reaches a value of over 400 percent in 2017—relative to a mean value of around 19 percent. We have confirmed that the sample restriction to drop Belgium, Ireland, Netherlands, Switzerland, and the United Kingdom, motivated by Figure S6.1, also ensures that the measure $\text{USDnetExp}_{i,t}$ is not extremely right-skewed.

[12] These controls are particularly important for the coefficient on the interaction term of the surprise with trade integration. The trade integration measure (S6.2) is procyclical since both exports and imports are procyclical and more volatile than GDP. It is therefore correlated with both the empirical cdf of the US unemployment rate and the FOMC Sentiment index. When neither of these confounders is controlled for, the coefficient on the interaction term of trade integration is biased downward.

Table S6.1: Heterogeneity in Effect Size (Outliers removed)

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
Stock Index (bp)						
News	6.76***	11.67***	-11.45***	-5.21***	8.01***	20.03***
	(1.61)	(1.94)	(2.10)	(1.37)	(1.74)	(3.49)
Fin. Integration × News	-1.86*	0.19	1.85	2.26*	-0.74	-5.38
	(1.05)	(1.51)	(1.08)	(1.08)	(1.78)	(3.17)
Trade Integration × News	0.08	-4.20***	0.80	1.52**	-0.97*	-3.69**
	(0.98)	(1.30)	(0.65)	(0.55)	(0.49)	(1.66)
Industry Dissimilarity × News	-1.48	-1.87	-0.60	1.03	-0.17	-4.87
	(1.27)	(1.57)	(0.92)	(0.87)	(1.77)	(2.90)
Dollar Exposure × News	1.02	2.13*	-1.42*	-1.52**	1.10	2.52
	(1.35)	(1.20)	(0.72)	(0.71)	(1.01)	(1.60)
R^2	0.09	0.27	0.24	0.27	0.22	0.51
Observations	3380	3273	3190	3254	3179	1062
	Initial Jobless Claims $\cdot(-1)$	ISM Mfg Index	New Home Sales	Nonfarm Payrolls	Retail Sales	UM Consumer Sentiment P
Stock Index (bp)						
News	3.48***	13.12***	6.44***	18.70***	7.95***	6.39***
	(0.72)	(2.92)	(1.86)	(3.23)	(1.73)	(1.66)
Fin. Integration × News	0.68	2.15	2.58**	7.12**	0.26	-0.63
	(0.64)	(2.16)	(1.15)	(3.17)	(1.38)	(1.41)
Trade Integration × News	-1.00**	-2.26	-2.12**	-3.38*	-1.32	-1.40
	(0.47)	(1.35)	(0.96)	(1.84)	(0.76)	(0.84)
Industry Dissimilarity × News	0.14	-0.19	2.46***	-0.18	-0.04	-0.99
	(0.62)	(1.92)	(0.77)	(2.18)	(1.37)	(1.39)
Dollar Exposure × News	1.00*	0.81	0.91	2.08	0.54	0.46
	(0.54)	(2.01)	(0.78)	(2.26)	(0.89)	(1.13)
R^2	0.19	0.25	0.13	0.36	0.31	0.08
Observations	13767	2996	3210	3163	3241	3308

Notes: This table presents estimates of γ^y, χ_F^y, $\chi_\$^y$, χ_T^y, and χ_D^y from equation (S6.3). The sample excludes Belgium, Ireland, Netherlands, Switzerland, and the United Kingdom. The various exposure measures are defined in the text. Standard errors are two-way clustered by announcement and by country, and reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

It turns out that the negative correlation of the effect size with trade integration is not robust across alternative specifications. Table S6.2 shows the estimates of specification (S6.3) after replacing the average main effect γ^y with a country-specific effect γ_i^y (and similarly for the controls where we replace γ^k with γ_i^k for all k). This modification addresses endogeneity concerns arising from the possibility that the confounding variation is country-specific and time-invariant. As the table shows,

Table S6.2: Heterogeneity in Effect Size (Outliers removed & Country-specific Main Effects)

	Capacity Utilization	CB Consumer Confidence	Core CPI	Core PPI	Durable Goods Orders	GDP A
Stock Index (bp)						
Fin. Integration						
× News	-9.12**	0.35	3.83	1.46	-1.32	-6.91
	(3.83)	(4.39)	(3.63)	(2.47)	(3.35)	(6.49)
Trade Integration						
× News	7.57	-10.24	-4.80	3.82	-4.86	3.17
	(5.37)	(6.19)	(4.56)	(3.06)	(2.87)	(2.98)
Industry Dissimilarity						
× News	-2.82	5.65	0.50	0.48	3.19	-3.45
	(3.63)	(5.83)	(5.16)	(2.06)	(4.40)	(7.86)
Dollar Exposure						
× News	4.91***	1.33	-1.81	-0.76	0.86	-0.46
	(1.69)	(1.92)	(1.37)	(1.22)	(1.42)	(2.29)
R^2	0.11	0.29	0.25	0.28	0.23	0.53
Observations	3380	3273	3190	3254	3179	1062
	Initial Jobless Claims $\cdot(-1)$	**ISM Mfg Index**	**New Home Sales**	**Nonfarm Payrolls**	**Retail Sales**	**UM Consumer Sentiment P**
Stock Index (bp)						
Fin. Integration						
× News	2.06	1.02	8.51**	21.09***	1.15	0.19
	(1.31)	(5.11)	(3.54)	(5.30)	(3.07)	(4.37)
Trade Integration						
× News	0.96	5.80	-1.76	0.07	10.97**	-11.50*
	(2.05)	(6.74)	(4.94)	(6.07)	(4.55)	(5.95)
Industry Dissimilarity						
× News	1.35	-0.57	3.01	2.35	-4.34	3.71
	(1.36)	(3.90)	(2.91)	(6.31)	(3.37)	(3.76)
Dollar Exposure						
× News	-0.24	-0.66	-1.41	-6.01**	-2.05	1.22
	(0.80)	(1.70)	(0.99)	(2.35)	(1.56)	(2.05)
R^2	0.19	0.27	0.14	0.38	0.32	0.09
Observations	13767	2996	3210	3163	3241	3308

Notes: This table presents estimates of χ_F^y, $\chi_\$^y$, χ_T^y, and χ_D^y obtained from equation (S6.3) after replacing the main effects on the surprises γ^y and γ^k with country-specific main effects γ_i^y and γ_i^k. The sample excludes Belgium, Ireland, Netherlands, Switzerland, and the United Kingdom. The various exposure measures are defined in the text. Standard errors are two-way clustered by announcement and by country, and reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

the interaction term with trade integration looses its significant coefficient in all but two instances. More generally, no interaction effect in Table S6.2 differs significantly from zero systematically across announcements.

The conclusion from this appendix is that it is difficult to systematically account for the variation in effect size as documented in Figure 4 with observables. While some interaction effects are highly statistically significant and economically large for individual announcements (see, e.g., the interaction effect on the product of financial integration and the nonfarm payrolls surprise in Table S6.2), no consistent patterns emerge that are robust across announcements. Of course, this lack of a consistent pattern does not rule out the existence of any of the four channels studied here. However, it does imply that they are not sufficiently salient to be statistically detectable in our sample. In our view, understanding the heterogeneity in effect size across countries is an interesting topic for future research. Specifically, studying a broader set of channels and alternative measures for a given channel may lead to useful insights.

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