What Moves Markets?

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Abstract

What share of asset price movements is driven by news? We build a large, time-stamped event database covering scheduled macro news as well as unscheduled events and find that news account for up to 35% of bond and stock price movements in the United States and euro area since 2002. This suggests that a much larger share of return variation can be traced back to observable news than previously thought. Moreover, we provide stylized facts about the *type* of news that matter most for asset prices, spillover effects between the US and euro area, and the predictability of monetary policy shocks.

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1. Introduction

A key question in macro-finance is to what extent macro news drive asset prices. Answering this question is hard since asset prices and macro variables are endogenous, move simultaneously, and are both driven by other – potentially unobservable – factors. In recent years, event studies using high-frequency asset price reactions around key news events have been one of the most fruitful lines of research in this area. The idea is that within these short time windows, causality runs from news to asset prices and not the other way around. This type of setup has been widely used to study the impact of, e.g., monetary policy news, macroeconomic data releases, debt auctions, uncertainty shocks, and oil shocks.[1]

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[1] Regarding monetary policy, see e.g. Kuttner (2001); Cochrane and Piazzesi (2002); Bernanke and Kuttner (2005); Gürkaynak et al. (2005); Nakamura and Steinsson (2018); Cieslak and Schrimpf (2019); Leombroni et al. (2021); Kroencke et al. (2021); Swanson (2021). Regarding macro data releases, see e.g. Andersen et al. (2003);

In this vast event study literature, each paper usually focuses on one type of news or a small subset of news items. In this regard, our paper is more ambitious: we want to quantify the *total* explanatory power of macro news for asset return variation. We thus combine and extend existing work to build a massive intraday event database that covers a much larger set of news items. Our database comprises both regular, scheduled news (such as macro data releases and central bank announcements) as well as unscheduled, ad hoc events (such as elections, natural catastrophes, terrorist attacks, etc.). Overall, the database covers roughly 100,000 scheduled news releases and 1,200 unscheduled events over a period of more than 18 years. We use this database in tandem with high-frequency asset price changes at the 15-minute frequency going back to 2002. The assets we study comprise sovereign yields with a two, five and ten year maturity, as well as stock prices, both for the US and the euro area. We then estimate the net impact of news on asset prices by regressing squared returns on event dummies that cover tight windows of -15 to $+30$ minutes around a news release, while controlling for (intraday) seasonalities and lagged variance. This regression approach allows us to estimate variance shares, i.e. the portion of asset price variation that is due to macro news.

Based on this new macro news database, we document the following stylized facts about news and asset prices. First, out of the wealth of news releases that continuously hit the market, only a small subset of news systematically affects return variation. The top 50-75 most important news releases already account for the lion's share of explained return variance across assets and increasing the set of macro news beyond this set of news does not add significant explanatory power. However, these 50-75 news releases alone can explain a large share of asset price variation, e.g. up to 35% for US yield changes. This number seems large relative to the existing literature, typically based on a handful of scheduled macro news, which finds that news can only explain less than 5% of stock price and bond yield variation.[2] That a large share of

Altavilla et al. (2017); Gürkaynak et al. (2020). Regarding debt auctions, see e.g. Gorodnichenko et al. (2023) and Phillot (2023). Regarding uncertainty shocks, see e.g. Piffer and Podstawski (2018). Regarding oil shocks, see e.g. Känzig (2021).

[2]For bond yields, Altavilla et al. (2017) find that macro *surprises*, i.e. the difference between headline figures and survey expectations, explain around 30% of the bond yield changes in 30 minute windows around releases, which translates into an unconditional R^2 of 3% since only few observations contain news releases. Gürkaynak

asset price movements can be traced back to observable news is noteworthy in itself but it also speaks to the recent literature on non-news driven returns by providing a benchmark for the amount of return variation that is potentially unrelated to macro news (see, e.g. Gabaix and Koijen, 2021, on the importance of flows in inelastic markets for driving return variation).

Second, the importance of scheduled macro news for asset returns is very unevenly distributed, even within the above-mentioned subset of highly important news. As an example, consider US ten-year government bond yield changes and two "important" news releases that significantly move asset prices: the US employment report and the ISM release. Employment report releases increases the variance of yield changes by a factor of about 30 relative to the unconditional variance but only by a factor of about five around US ISM releases. Similarly stark differences exist for other news and assets in both currency areas. Hence, our database allows us to estimate the statistical and economic significance of different types of news for bond yield and stock return variation. These results should be useful for future work in macro-finance, since they can be used to determine which type of news announcements to control for in empirical work. For example, Bauer and Swanson (2023) argue that one should control for important macro news announcement when interpreting the information content of high-frequency monetary policy shocks, Savor and Wilson (2014) show that macro news matter for the performance of the capital asset pricing model, whereas Cieslak and Pang (2021) propose an identification scheme to extract structural shocks from asset prices and use them to interpret the information contained in macro news. In all such applications, an important question is which news matter for which type of asset class. Our results provide answers to this question.

We further decompose asset price variation due to news into different *economic types* of news to better understand the sources of asset price movements. To do so, we classify scheduled macro news into four different categories and further differentiate between foreign and domestic news, i.e. domestic and foreign news about growth, inflation, fiscal policy, and monetary policy.

et al. (2020), in contrast, argue that virtually 100% of yield curve movements in tight event windows are due to news. But again, this is true only for a few tight intraday windows (roughly one event window every other trading day). For stock markets, Ogneva and Xia (2021) find that only about 5% of the daily variation in the S&P 500 index future occurs in 45-minute windows around selected macro announcements.

Based on this decomposition, a third stylized fact is that there are stark differences across assets and currency areas regarding the types of news that matter most. For US yields, we find growth news to be the most important driver, whereas euro area yields are dominated by news about monetary policy and ad hoc (unscheduled) news. Furthermore, US yield variation is dominated by domestic (US) news whereas foreign news are more important for euro area yield changes. A somewhat different picture emerges for equity markets, which are more strongly driven by foreign news and for which monetary policy news are relatively more important in both currency areas. These results contribute to a literature that tests for spillovers in international financial markets (e.g. Albagli et al., 2019; Kim and Ochoa, 2023) and provides new evidence based on much larger samples of macro news in the US and euro area.

Fourth, we contribute to the literature by documenting the importance of ad hoc, unscheduled news for asset prices, which are typically neglected in empirical work. We find that unscheduled news are an important driver of return variation, and especially so for stock markets in both currency areas. However, ad hoc news do *not* explain the bulk of *jumps* in asset prices. Especially for yields in the US and euro area, the overwhelming majority of news coinciding with jumps are *scheduled* macro news. This finding is relevant in light of the literature on jumps in asset prices (see, e.g. Ait-Sahalia et al., 2012; Johannes, 2004; Wachter and Zhu, 2022) that typically assumes random arrival times of jumps. Our empirical finding that jumps tend to occur around scheduled news releases favors alternative approaches (e.g. Kim and Wright, 2014).

In additional empirical work, we benchmark our findings to recent work by Gürkaynak et al. (2020) who estimate a latent factor model and show that news releases can explain *all* yield variation in tight event windows for a small set of highly important news. Our empirical approach is different from theirs, allows for different effects of news on asset price variance across different news releases, and nets out the effect of intraday seasonalities on return variance. Nevertheless, we show that the Gürkaynak et al. (2020) approach yields very similar R^2s compared to our results when focusing on a small set of highly important news. However, the more we expand the set of news releases, the more our R^2 estimates decrease relative to those based on

the Gürkaynak et al. (2020) assumption. This finding seems intuitive and has direct implications for future empirical work in this area. When working with a few highly important news, assuming that returns in tight event windows are fully driven by news seems justified. However, researchers employing larger sets of macro news need to take into account that different news releases can have very different effects on asset price variance. In addition, it is important to control for intraday seasonalities and lagged volatility in order to not overstate the importance of news.

As a final empirical exercise, we provide an application of our news database to the importance of monetary policy shocks for asset prices (e.g., Kuttner, 2001; Gürkaynak et al., 2005). More specifically, we test whether monetary policy shocks, i.e. two-year yield changes in tight event windows around monetary policy decisions, are predictable by publicly available news released *before* the monetary policy decision takes place (see e.g. Miranda-Agrippino and Ricco, 2021; Neuhierl and Weber, 2021). In a recent paper, Bauer and Swanson (2023) argue that such predictability is in line with a "response to news" channel, i.e. the central bank responds to news that hit the market prior to a monetary policy meeting. If market participants have imperfect knowledge of the central bank's reaction function, such publicly available information can predict monetary policy "surprises". We test for such a channel based on our large set of macro releases and indeed find that some news have predictive power for 2-year yield changes around monetary policy announcements by the Federal Reserve and the European Central Bank. Our results thus support a recent literature (e.g. Schmeling et al., 2022; Bauer and Swanson, 2023; Swanson, 2023b) that highlights the role of imperfect knowledge about a central bank's reaction function for asset price reactions to monetary policy news.

We provide several additional results and robustness checks in a separate Appendix. For example, we provide a list of the largest market movements during our sample period and coinciding news (if any), we check the sensitivity of our main results to changes in the length of event windows, we provide details on the importance of different news releases, and document the impact of intraday seasonalities for asset price variance.

2. Asset Prices and News

Section 2.1 provides details on our high-frequency asset price data. The remaining sections describe the type of news we include in our database. Since we do not try to measure the "surprise component" of news, as is commonly done in the literature (e.g., as deviations of actual headline figures from survey expectations), we are able to include a much wider set of potentially relevant news series for which no survey expectations exist.[3] If not mentioned otherwise, we use a 45-minute window for all events, i.e. from 15 minutes prior to 30 minutes after the news release. Appendix A provides details.

2.1. High-Frequency Asset Prices

We construct a dataset of continuous asset price changes at the 15-minute frequency. Our sample ranges from March 2002 to September 2020. It includes stock prices and sovereign bond yields with 2-, 5-, and 10-year maturity, both for the US and the euro area. In the latter case, sovereign bond yields refer to Germany.

All stock price and bond yield series are based on futures contracts and cover up to 23 hours of trading per day in the US and up to 20 hours in the euro area. For US assets, for example, we usually have one "overnight window" (from the end of trading at 5 p.m. till 6:15 p.m.) and up to 92 intraday windows (from 6:15 p.m. to 6:30 p.m., .., 4:45 p.m. to 5:00 p.m.) per trading day. If not stated otherwise, henceforth all times refer to US Eastern Time. In total, we have roughly 360,000 observations for US and 260,000 observations for EA assets.

Besides their longer trading hours, a key advantage of futures over cash securities is their high liquidity, thanks to their standardized nature and low trading costs. A potential drawback of using futures is that price changes do not perfectly match price changes in the underlying cash securities, e.g., due to the cost of carry. Since our focus is on high-frequency price movements in tight event windows, however, these differences should be negligible and we do not attempt to correct for the carry of the different futures contracts. To transform price changes of bond futures

[3] This is in line with Gürkaynak et al. (2020), who argue that news announcements contain much more relevant information beyond the few headline numbers that surveys ask about.

into yield changes, lastly, we divide price changes by the modified duration of the underlying cheapest-to-deliver bond. Appendix A provides further details on our high-frequency asset prices and Table A.2 provides basic descriptive statistics for US and euro area yield changes and stock returns.

2.2. Macroeconomic Data Releases

To start with a broad set of macroeconomic news, we include all available releases for 22 countries from Bloomberg Economic Calendar. The 22 countries are the US, the euro area aggregate, its first 12 member countries, six other European countries (the UK, Switzerland, Sweden, Denmark, Norway, and Poland) and China and Japan. The only restriction we impose is that a series has at least 50 releases during our sample.

Since we rely only on the timing of releases, we merge releases that always or almost always coincide. The US employment report, for example, is one type of news in our setting, even though it contains a wide range of economic information. Bloomberg e.g. provides data on 14 different headline figures. We treat different transformations of a release as one type of news.[4] We also add a handful of other releases manually, namely the ECB Bank Lending Survey, the ECB Survey of Professional Forecasters and "Weekly Petroleum Status Reports" by the US Energy Information Administration (EIA), see Crego (2020).

In total, we study 382 types of macro data series (comprising over 1,000 different underlying series or transformations) with over 75,000 distinct releases (comprising almost 150,000 distinct data points). Table B.3 in the Internet Appendix provides details.

2.3. Bond Auctions

For the US and the four largest euro area countries, we include bond auction results. We follow the US convention and differentiate between bills (debt instrument with up to one year maturity), notes (up to ten years maturity) and bonds (more than ten years maturity). For

[4]The same data is often released with different reference periods, e.g., as year-over-year or quarter-over-quarter changes, or with different adjustments, e.g., as seasonally or working-day adjusted values.

France, Italy and Spain, the data is from Bloomberg. For Germany, the data is from the website of the German debt management agency. For the US, the data is from the Treasury website.

Besides auction results, the US Treasury website also contains the exact times at which each debt auction was publicly announced. Hence, for the US, we also include auction announcements as news. For Germany, we include the debt agency's yearly "issuance preview", which contains the projected issuance dates and volumes for the forthcoming year. In total, we include over 14,000 auction-related news events. Table B.4 in the Internet Appendix provides details on these data.

2.4. Monetary Policy Announcements

Extending the database by Cieslak and Schrimpf (2019), we study announcements of eight major central banks, namely the Federal Reserve (Fed), European Central Bank (ECB), Bank of England (BoE), Bank of Japan (BoJ), Swiss National Bank (SNB), Swedish Riksbank, Bank of Canada (BoC), and Reserve Bank of Australia (RBA).

We distinguish various types of announcements, including press releases and press conferences by the main governing body of each central bank, speeches by the central banks' chair or president, ad hoc press releases and minutes of policy meetings. For the Fed, speeches include testimonies by the Federal Reserve Chair before Congress, and we further add Beige Book releases, Discount Rate Minutes and speeches by Federal Open Market Committe (FOMC) members other than the Fed Chair. For the ECB, speeches include hearings by the ECB President at the European Parliament, and we further add releases of the Economic Bulletin and speeches by Governing Council (GC) members other than the ECB president.[5] For the BoE, we add releases of the Inflation Report. For the BoJ, we add the Monthly Outlook Reports and Summary of Opinions releases. For the SNB, lastly, we include the annual General Meeting of SNB Shareholders and Quarterly Bulletin releases.

[5]Regarding ECB news, we also include (i) the results of open market operations, namely: main refinancing operations (MRO), regular and targeted longer-term refinancing operations ((T)LTRO), and other refinancing operations such as US Dollar and Swiss Franc operations; (ii) voluntary repayment amounts in the (T)LTRO operations; and (iii) news about the ECB's balance sheet: ECB weekly financial statements, the purchase volumes of the Securities Markets Programme (SMP) and the Asset Purchase Programmes (APP).

Regarding Fed and ECB speeches, we try to start with the full universe of speeches by FOMC and GC members and then filter out speeches that did contain information relevant to financial markets. Our filtering approach is similar but not identical to Swanson (2023a) and Swanson and Jayawickrema (2023), Appendix B.2 provides details.

Table B.5 in the Internet Appendix shows the types of announcements whereas Table B.6 lists the number of events per news type. In total, we include over 10,000 central bank news events.

For most central bank news, we use the usual 45 minute window. The only exception are press conferences and speeches, for which windows end 15 minutes after the conference or speech ended. If we have no exact timestamp for the end of a press conference or speech, we use a 75-minute window, i.e. from 15 minutes prior to 60 minutes after the start of the event.

2.5. Ad Hoc (unscheduled) Events

The above-mentioned recurring news are of course not the only news that move markets. Some of the largest asset price movements during our sample period are triggered by unexpected events like the Brexit referendum or the Lehman Brothers bankruptcy. Disregarding these "ad hoc" events severely understates the role of news in explaining market movements.

Hence, we build a database of ad hoc events, extending previous literature whenever possible. Rigobon and Sack (2005) and Wolfers and Zitzewitz (2009), for example, identify several key events related to the Iraq War. Guillen (2011) and Ait-Sahalia et al. (2012) chronicle the most important events of the global financial crisis. Bahaj (2020) constructs an event database for the European sovereign debt crisis. Känzig (2021) studies "oil supply news" related to OPEC meetings. Lastly, Wolfers and Zitzewitz (2018) identify key events related to the 2016 US presidential election and Bianchi et al. (2023) identify statements by Donald Trump regarding trade conflicts and US monetary policy.

Our database incorporates all these events and further adds various other types of news, e.g., terrorist attacks, natural disasters or election outcomes. Whenever necessary, we obtain intraday timestamps for events from news sources such as Factiva or Bloomberg. In total, we

collect over 1,200 clearly identifiable news events. Table B.7 in the Internet Appendix gives an overview.

For ad hoc events, we usually use a 75-minute event window from 15 minutes prior to 60 minutes after the start of the event. In many cases, such as political speeches, we can and do use exact timestamps for the end of an event.

3. Which News Move Markets?

This Section reports the main results of our empirical analysis using the news database described above. Section 3.1 reports results for the dummy regressions identifying the most important news events in our database. Section 3.2 presents our main result and estimates the share of market movements that can be attributed to news. Sections 3.3-3.4 decompose the explained R^2 into types of economic news as well as into domestic and foreign news. Section 3.5 studies the different role of news across the return distribution, linking our results to the literature on jumps. Section 3.6 shows how our baseline results change when we assume that *all* market movements around selected news are fully explained by news. Section 3.7 discusses our main findings and Section 3.8, lastly, applies our database to the predictability of monetary policy shocks.

3.1. Estimating the Importance of News

We estimate the impact of news on asset prices by running the following dummy regression separately for each asset:

$$y_t^2 = \alpha + \sum_{i}^{N} \beta_i \cdot D_{it} + \lambda_j \cdot FE_{jt} + \gamma_k \cdot vol_{kt} + \epsilon_t \tag{1}$$

where y_t are returns (i.e. either bond yield changes or stock price returns) and D_{it} are dummy variables that equal one if a given news series i is released around that window, with $N = 450$.[6] The coefficients β_i thus measure the effect of news item i on the conditional second moment of

[6]The 450 series consist of 382 macro news (see Table B.3), 16 bond auction news (see Table B.4), 44 central bank news (see Table B.6) and 8 types of ad hoc events (see Table B.7).

returns. Since $E[y] \approx 0$ for all returns, their uncentered second moments are identical to their variances for all practical purposes (see Table A.2). We will thus refer to β_i as the impact of news on the conditional variance of returns. FE_{jt} includes several calendar-based fixed-effects and vol_{kt} includes various lagged volatility measures.[7]

Here and in the following analyses, we conduct inference based on a bootstrap, i.e. we first estimate all coefficients in the full sample and then run re-run the entire estimation 1,000 times using bootstrap samples with replacement. See Appendix C for details. We use this bootstrap approach for two main reasons. First, we will make extensive use of variance shares (R^2s), for which we need to simulate confidence intervals. Second, we will frequently define sets of "important news", the composition of which are based on the statistical significance of β_is from the regression in Equation (1) above. The bootstrap allows us to take the selection uncertainty associated with defining sets of important news into account.

Figure 1 lists the 25 most important scheduled releases, as judged by the mean (bootstrap) t-statistic across all eight assets. Table D.12 in the Internet Appendix contains results for all 450 news types. Unsurprisingly, the US employment report is by far the most important news release and US news clearly dominate overall, with 17 out of the 25 most important scheduled releases concerning the US. Out of those US releases, most are macroeconomic data releases but three releases relate to monetary policy: FOMC press releases, FOMC minutes, and speeches by the Fed Chair. This is in line with Brusa et al. (2020), who show that news from the Federal Reserve are more important than news coming out of other countries' central banks and Swanson (2023a) and Swanson and Jayawickrema (2023), who highlight the importance of Fed Chair speeches. Two other releases in Figure 1 concern Treasury auctions. This is in line with Gorodnichenko et al. (2023), who study auction results to identify "debt demand shocks" and Phillot (2023) who studies auction announcements to identify "debt supply shocks". Of

[7]Following Ghysels et al. (2006), who find that "realized power" measures are the best predictor of future volatility, vol_t includes cumulated past squared returns over different horizons, namely 15 minutes, one hour, two hours and a day, week, month and quarter (σ^f with $f \in \{15m, 1h, 2h, d, w, m, q\}$), e.g. $\sigma^{15m} = y_{t-1}^2$ for intraday returns and $\sigma^d = \sum_{k=1}^{92} y_{t-k}^2$ if we have 92 observations within the last 24 hours. The fixed-effects include hour-of-day, day-of-week, overnight and "over-weekend" dummies. Appendix D.4 provides details.

the most important non-US news, three relate to monetary policy, namely ECB press releases, the subsequent press conferences, and speeches by the ECB president.

Figure 1: Most Important News. Each symbol-color combination refers to a t-statistic of β_i from a separate regression, one for each of the eight assets we study, see Equation (1). Each row label refers to a different news release. Monetary policy announcements are in bold font. See Figure D.3 for the next 50 most important scheduled news.

3.2. Share of Explained Market Movements

Having identified the relevant news, what fraction of total market movements can we reasonably attribute to news? Figure 2 gives the answer. For each asset price, we compute the

following measure:

$$\Omega(k) = \frac{\sum_{i=1}^{k} E\left(y_t^2 | D_{it} = 1\right) P\left(D_{it} = 1\right)}{E\left(y_t^2\right)} = \frac{\sum_{i=1}^{k} \hat{\beta}_i \cdot P\left(D_{it} = 1\right)}{E\left(y_t^2\right)} \tag{2}$$

where k is the rank of each news release for a given asset (for most assets, $k = 1$ is e.g. the US employment report, see Figure 1). The $\hat{\beta}_i$'s in Equation (2) correspond to estimates of the effect of news i on the conditional second moment. Weighing each coefficient by the frequency of releases and summing over all news gives us the second-moment share explained by all news. Since $E[y] \approx 0$ in tight event windows as discussed above, this measure is very close to a variance share and we thus label it R^2 for simplicity.[8]

Since we control for time fixed-effects and past volatility in Equation (1), Equation (2) attributes only that part of the volatility to news that goes above and beyond these effects. This is a rather conservative approach compared to the event study literature, which typically attributes *all* return variance around a news release as explained by the news (in line with Gürkaynak et al., 2020). We further discuss this issue in Section 3.6 below.

Figure 2 reports results for the share of explained variance of stock returns and yield changes in the US and euro area. The figure shows that the five most important types of news alone account for roughly 5-10% of total variance, for the top 30 news this share rises to around 15-25%, and the top 50 news account for roughly 20-30% of all market movements.[9] For both US and EA assets, the explanatory power of news is highest for short- and medium term yields and lowest for stock returns.

The second-to-last entry in Figure 2 is based on a variable selection method. In particular,

[8] We thank an anonymous referee for pointing this out.

[9] A potential problem here is that we first select important news based on their t-stat in Equation (2) and then compute R^2s based on the selected set of news. To take this selection uncertainty into account in our bootstrap, we first regress bootstrapped squared returns/yield changes on news and then select the top 5, 10, ... news according to their t-statistic in each simulation run. In other words, a news item that is selected as being in the set of, say, top 5 news in the full sample need not be selected in the top 5 group in (some of) the bootstrap samples. This news item would then be recorded with a coefficient of zero in this simulation run, decrease the variance share according to Equation (2) of this news item, and lead to a wider confidence interval in Figure 2.

we employ LASSO with 5-fold cross validation to identify "important" news and compute the R^2 from Equation (2) for the news items selected by the LASSO approach. Recall that LASSO selects the set of news that minimize the mean squared error.[10] As before, confidence intervals are also based on the bootstrap procedure outlined above and we let LASSO select the relevant news in each bootstrap simulation.

The results show that R^2s differ strongly across assets. LASSO selects few news items for stock returns, so that R^2s are quite low for US stocks (22% with 65 selected news items) and EA stocks (16% with 17 news selected by LASSO). On the other hand, R^2s are as high as 35% for US 5-year yields (with 102 news items selected by LASSO), which suggest a high importance of macro news for Treasury yields.[11] In what follows, we use the LASSO results as our benchmark. In particular, we use these results when decomposing R^2s into economic categories (Section 3.3) or into domestic and foreign news (Section 3.4) below.

For completeness, the last entry in Figure 2 ("all news") shows results from Equation (2) using *all* 450 news types in our database, even if their release has no significant impact on asset prices as judged by the regression in Equation (1). The share of explained variance is similar to the results based on LASSO, which is intuitive, since most additional news items have no significant impact on returns.

Table 1 reports β estimates from the regression in Equation (1), scaled by the asset's unconditional variance. This way, each estimate directly tells us how much the release of a news item raises the conditional variance of an asset net of fixed effects and intraday seasonality patterns relative to its unconditional variance. Note that the ranking of news items in Table 1 differs from the ranking in Figure 1 since the latter ranks news items based on their statistical significance (t-stat) whereas the former ranks news based on their economic significance (β

[10] In terms of practical implementation, we use Matlab's built-in function *lasso*, which uses a geometric sequence of 100 different penalty parameters to find the parameter that minimizes the cross-validated mean squared error. We use LASSO only to select important news but coefficient estimates are based on OLS. We also applied other variable selection methods, namely Ridge and elastic net. The elastic net methods yields very similar results to LASSO while Ridge would select more news as important compared to LASSO and elastic net.

[11] For the sake of completeness, LASSO selects 80/102/97 news for US 2-/5-/10-year yields and 55/74/33 news for analogous EA yields.

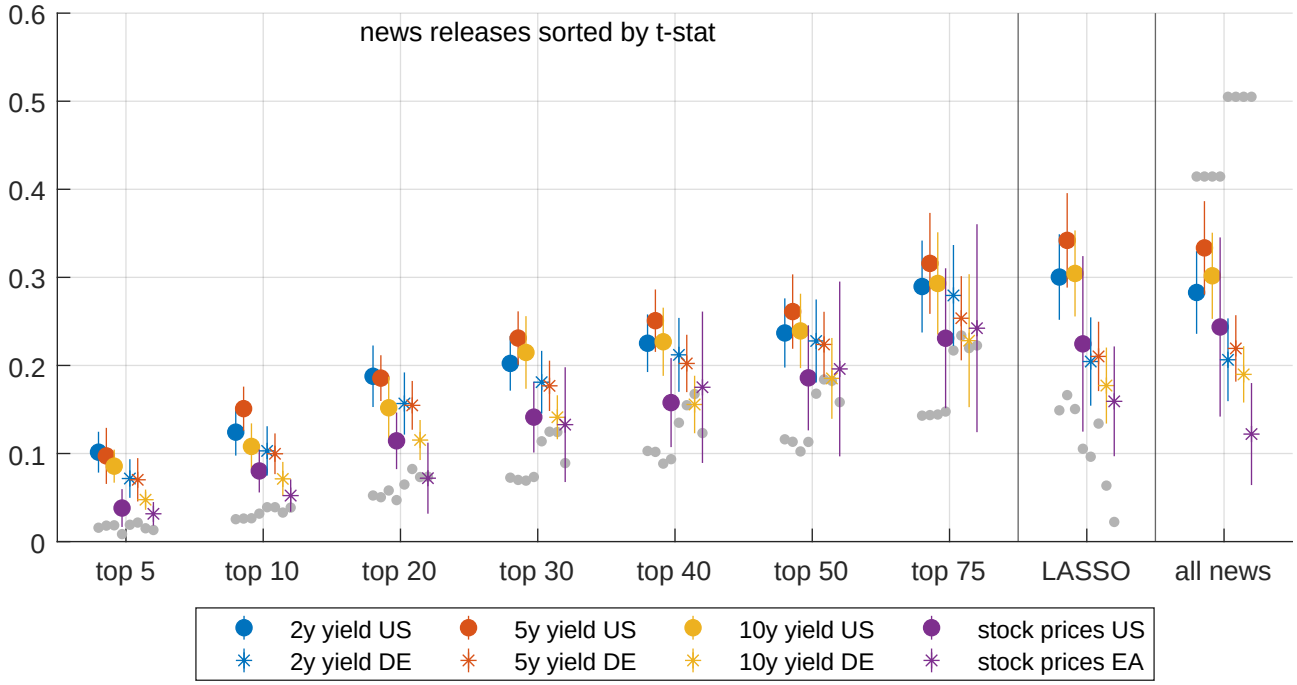

Figure 2: Explained variance shares. Each symbol refers to the cumulative variance share of an asset explained by news, see Equation (2). The first entries on the horizontal axis refer to the k most important news types for each asset, determined by their t-statistic from regression (1). The vertical lines mark 95% confidence bands based on bootstrap samples. The second-to-last entry refers to all windows around news that are selected by LASSO. The last entry on the horizontal axis refers to all news. For reference, the grey dots show the percent of observations covered by event windows.

estimate). Hence, these two rankings are complementary and provide different perspectives on the importance of news.

We focus on the top ten news releases for US assets (sorted by the average effect across all four assets). For example, the US employment report raises the conditional second moment of US yields roughly 30-fold, of EA yields roughly 10-fold, and of stock returns roughly threefold. FOMC press releases rank second, as they raise the conditional variance somewhat less for yields but are more important for stock returns.

Another noteworthy feature of Table 1 is that several types of ad hoc news feature prominently in this list especially for stock return variance. These ad hoc news occur less frequently than scheduled news and their effect is thus estimated less precisely (with lower t-stats), which explains why these news feature more prominently in Table 1 than in Figure 1. In that sense, the prominence of ad hoc news in Table 1 documents the economic significance and importance

of accounting for unscheduled news when estimating the response of asset prices to macro surprises. Moreover, the large effect of unscheduled news on variance is relevant for asset pricing models or hedging decisions more generally. The release of scheduled macro news is, by definition, known in advance so that there is no uncertainty about the timing of a shock whereas both the size and timing of shocks due to ad hoc news are unpredictable. A recent literature has investigated the effect of scheduled news on asset prices, e.g. Savor and Wilson (2014) or Wachter and Zhu (2022) and we will return to the importance of scheduled versus unscheduled news in Section 3.5 below.

Table 1: Variance Increase of Top 10 News

	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
US Employment Report	30.4^{***}	36.5^{***}	29.9^{***}	3.5^{***}	8.6^{***}	11.7^{***}	9.3^{***}	2.8^{***}
Fed: Press Release	21.9^{***}	26.2^{***}	28.3^{***}	9.4^{***}	6.4^{***}	7.3^{***}	7.5^{***}	6.6^{***}
BoJ: Ad Hoc Press Release	16.0^{*}	20.3^{**}	19.3^{**}	13.3^{*}	27.2	19.6^{*}	17.6^{*}	31.6^{**}
Ad Hoc: Iraq War	13.5^{***}	22.2^{***}	16.1^{***}	16.2^{***}	17.1^{***}	15.4^{***}	10.2^{***}	23.8^{***}
Fed: Ad Hoc Press Release	19.9^{***}	16.6^{**}	10.4^{**}	19.3^{***}	10.0^{**}	6.2^{**}	2.8	6.1^{***}
Ad Hoc: Covid-19	3.1^{*}	11.6^{**}	16.3^{***}	26.7^{***}	2.3	4.4^{***}	8.2^{***}	32.4^{***}
Ad Hoc: Global Financial Crisis	15.4^{***}	9.8^{***}	6.5^{***}	12.5^{***}	9.1^{***}	6.3^{***}	3.0^{***}	7.0^{***}
Ad Hoc: Other Unscheduled Event	6.6^{***}	7.9^{***}	7.5^{***}	4.0^{***}	16.7^{***}	11.8^{***}	14.5^{***}	21.0^{***}
ECB: Ad Hoc Press Release	3.8	6.6^{*}	9.8^{**}	2.9	7.1^{**}	6.4^{***}	9.5^{***}	12.5^{***}
US ISM Releases	4.9^{***}	5.4^{***}	5.5^{***}	1.4^{***}	1.4^{***}	1.8^{***}	2.0^{***}	1.4^{***}

Each entry shows the increase in volatility conditional on a news release relative to the unconditional volatility, i.e. $\hat{\beta}_i/var(y_t)$ from Equation (1). The ten news are sorted by their average variance increase across all US assets. *,**,*** indicate one-sided p-values below 10, 5 and 1% respectively. See Appendix C for details.

3.3. Economic Type of News

Our approach can also be used to shed light on the economic drivers underlying the observed market movements. To do so, we classify each news type as belonging to one or multiple economic categories, namely growth, inflation, fiscal and money. The "growth" category covers macro releases about (expected) real economic activity, "inflation" covers news releases about prices, "fiscal" mostly comprises bond auction news, and "money" mostly comprises central bank announcements, see Table B.8 for an overview.

As in Equation (2), we sum up the weighted $\hat{\beta}_i$ estimates for each economic category. For example, all coefficients for news by the Federal Reserve are attributed to the "money" category. If a news type belongs to multiple economic categories, we allocate its R^2 contribution equally

to each category. To be conservative, we apply this decomposition only to news selected by LASSO in the original sample. That means for each asset, the total R^2 across all economic categories is equal to the second-to-last entry in Figure 2.

Figure 3 shows the resulting decomposition for each asset and each type of news. We see that news about (expected) growth and money are the most important source of asset price variation in the US and euro area with growth being somewhat more (less) important than money in the US (euro area). News about fiscal matters and inflation rank lowest during our sample period. Ad hoc events, which are often neglected in empirical research, account for a sizeable share of the explained variance even though they occur less often than scheduled macro news.

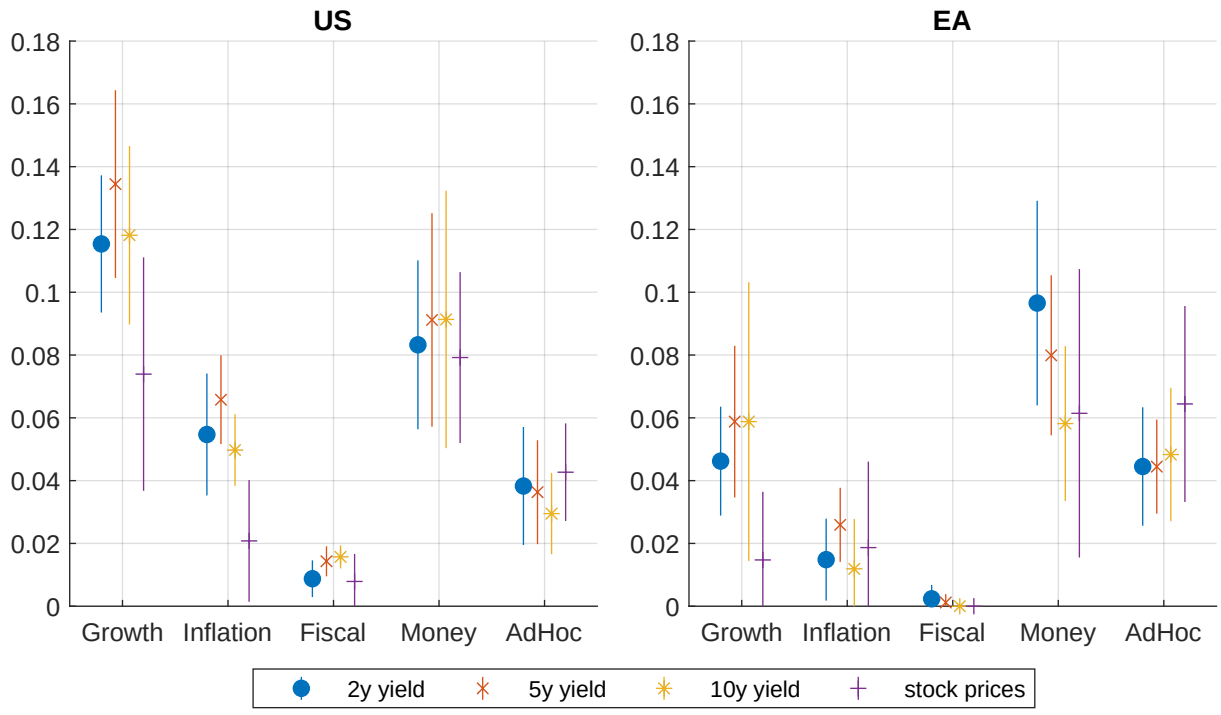

Figure 3: Explained variance shares by economic category. This figure decomposes the LASSO-based R^2 values (see Figure 2) into economic categories. See Table B.8 for the mapping of news into categories.

3.4. Domestic vs. Foreign News

In a similar exercise, we further decompose market movements into domestic and foreign news. Table 2 reports the results.[12] We see a stark contrast between US and euro area assets. For US bond yields, roughly 20% of the variation stems from domestic news, and slightly less than half of that from foreign news.[13] For US stock prices, the opposite is true and foreign news account for almost three times as much variance as domestic news. In contrast, foreign news are more important than domestic news for *all* euro area assets. For two-year and five-year yields, this difference is rather small, but for ten-year yields and stock prices, foreign news are roughly twice as important as domestic news.

To better understand this finding, Table 2 further breaks down the R^2 contribution of domestic and foreign news by category. The table shows that domestic growth news drive yields in the US, but not in the euro area. In fact, domestic growth news explain an insignificant share of euro area yield movements.[14] Foreign growth news in contrast, which include US growth news as an important component, are a major driver of euro area yield variation. In other words, US growth news seem to play an outsized role for both US and euro area yield variation.

Turning to equity price variation, we find that news in the "foreign money" category are important drivers in both the US and euro area, highlighting the important role of global monetary policy news for stock returns. One take-away for the literature on asset price reactions to monetary policy news is that stock prices seem much more sensitive to foreign policy news than bond prices.

[12] We exclude the ad hoc news from Section 2.5 here, because many of these events cannot naturally be categorized into "country of origin".

[13] This is somewhat different from Kim and Ochoa (2023), who find that foreign and domestic news are roughly equally important drivers of US ten-year yields. Compared to us, they use a smaller set of domestic US macro news and use overnight yield changes as a rough proxy for foreign news. Our results also differ from Boehm and Kroner (2023), who find that foreign macro news have essentially no effect on the US stock market. They also use a smaller set of news compared to us, but more importantly, they run regressions of returns on the surprise component of news (difference between actual release and survey expectations), whereas we regress squared returns on release dummies. Hence, our results are not directly comparable to theirs.

[14] To be sure, these results do not imply that euro area yields do not respond to domestic growth at all. Instead, it means that only few domestic growth news releases matter so that the impact of all news from this economic category turns out insignificant.

Table 2: Explained Share of Asset Price Variance by Origin and Category of News

(a) US assets

	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}
Domestic	17.6^{***}	20.8^{***}	19.4^{***}	4.6^{***}
Domestic Growth	7.5^{***}	8.7^{***}	7.8^{***}	1.4^{***}
Domestic Inflation	3.7^{***}	4.6^{***}	4.0^{***}	0.4^{***}
Domestic Fiscal	0.5^{***}	1.2^{***}	1.5^{***}	0.3^{**}
Domestic Money	5.9^{***}	6.3^{***}	6.1^{***}	2.5^{***}
Foreign	8.6^{**}	9.8^{***}	8.1^{***}	13.6^{***}
Foreign Growth	4.0^{***}	4.7^{***}	4.0^{**}	5.9^{***}
Foreign Inflation	1.8^{***}	2.0^{***}	1.0^{**}	1.7^{**}
Foreign Fiscal	0.4^{*}	0.3	0.1	0.5^{*}
Foreign Money	2.4	2.8^{**}	3.0^{**}	5.5^{***}

(b) EA assets

	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
Domestic	7.1^{***}	6.8^{***}	3.6^{**}	2.7^{***}
Domestic Growth	1.1	1.3	1.1	1.3
Domestic Inflation	0.6	0.7	-0.3	
Domestic Fiscal	0.2	0.1		
Domestic Money	5.2^{***}	4.6^{***}	2.7^{***}	1.4^{***}
Foreign	8.9^{***}	9.8^{***}	9.3^{***}	6.8^{***}
Foreign Growth	3.5^{*}	4.6^{**}	4.8^{***}	0.2^{*}
Foreign Inflation	0.9	1.9^{***}	1.4^{**}	1.9^{**}
Foreign Fiscal				
Foreign Money	4.5^{***}	3.4^{***}	3.1^{**}	4.7^{***}

Analogously to Figure 3, each entry decomposes R^2 values by the origin and category of news. p-values measure how often the R^2 is less or equal to zero across bootstrap samples, see Appendix C for details. All results are based on the set of news selected by LASSO. If no news are selected for a given origin and category, the corresponding entries in the table are empty.

3.5. Large vs. Small Market Movements

An important question in finance is the role of jumps in asset prices and the associated implications for portfolio construction, option pricing, risk management, and, more generally, how markets process information (e.g. Ait-Sahalia and Jacod, 2012; Johannes, 2004; Wachter and Zhu, 2022).[15]

Our results can speak to the literature on jumps and their relation to news. To this end, Figure 4 plots the frequency of news items per event window along the distribution of asset yield changes/returns, i.e. we count how often, on average, news events coincide with a return in the percentile of the distribution shown on the horizontal axis of Figure 4. As in the previous sections, we restrict this analysis to "important" news, i.e. those selected by LASSO in the original sample.[16] The results show a distinct U-shaped pattern and paint a clear picture: Extreme yield changes in the 0.1% and 99.9%-tile typically occur with about one macro news release on average in the euro area and more than one news release on average in the US. For jumps in stock prices, this number is lower but still sizeable with 0.75 and 0.4 news releases per event window in the US and euro area, respectively.

A natural interpretation of these results is that macro news releases are important drivers of bond price jumps and, to a lesser degree, jumps in stock prices, which suggests that jumps are closely tied to information processing in financial markets.

An important question in this context is the type of news that can be associated with jumps. Do jumps occur mostly around a certain economic type of news (e.g. monetary policy news)? Do jumps mostly occur around unscheduled, surprising ad hocs news releases or do jumps also occur around scheduled news releases, whose timing is known well in advance and can be factored into e.g. hedging decisions or liquidity provision by market makers?

To better understand these issues, Figure 5 shows the relative frequency of news events

[15] The role of jumps in relation to macro news has also been investigated in, e.g., Evans (2011), Lahaye et al. (2011), Rangel (2011).

[16] To give an example: A number of 1.4 for the US 5-year yield in the 0-0.1%-tile means that the largest 0.1% drops in US 5-year yields in our sample on average coincide with 1.4 news releases within the same event window.

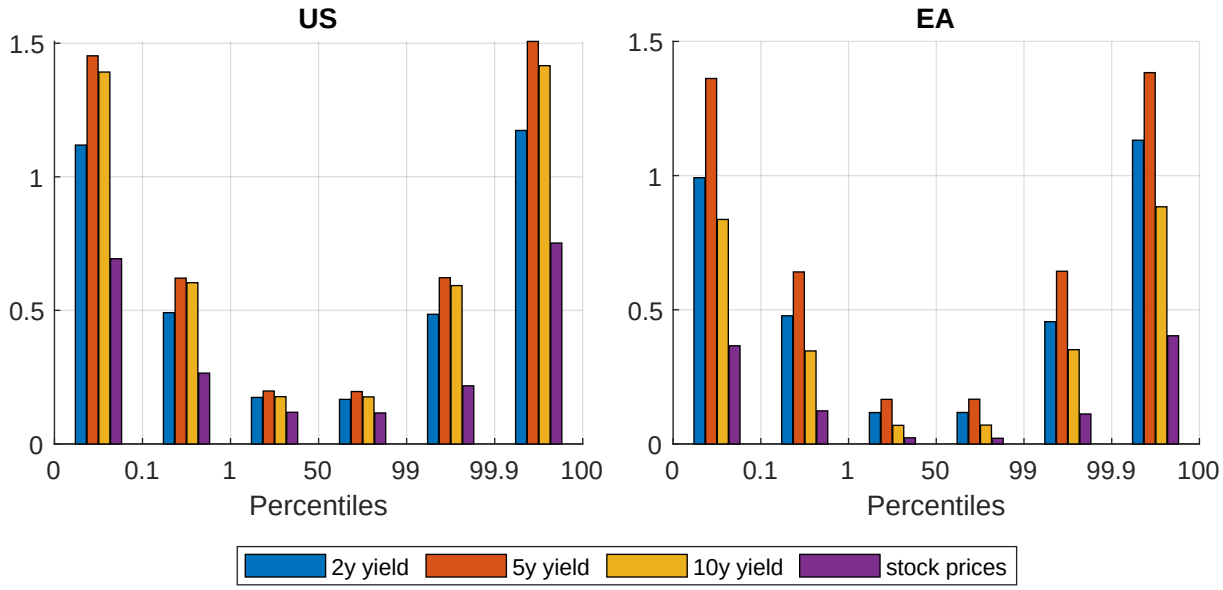

Figure 4: Average number of important news across the return distribution. For each asset and return percentile, this figure shows the average number of news events per window. In particular, we compute the average of $\sum_i^N \cdot D_{it}$ across all windows t in a given percentile, see Equation (1). Note that we restrict this analysis to news selected by LASSO in the original sample.

across categories. Since there is little asymmetry between positive and negative jumps, the figure looks at *absolute returns* of different size. Taking US 2-year yields as an example, the figure shows that for the bottom 50% of returns, only 1% of coinciding news were unscheduled ad hoc events. For the largest .1% of absolute yield changes, 8% of news were ad hoc events.

This decomposition highlights two important features of jumps and news. First, the relative importance of news appears to be different for "normal" returns and extreme returns (jumps). For example, inflation news releases account for a larger share of event windows in the tails of the distribution for US returns (e.g. 23% for 2-year yield changes and absolute returns in the 0.1 percentile) but seem less important in the center of the distribution (e.g. 13% for the bottom half of returns). Hence, whereas we do not find a large role for inflation news in driving asset price variation in general (see, e.g., Figure 3) the importance of inflation news increases sharply for jumps in US bond prices. The opposite is true for news in the category "money" which make up a large share in the center of the distribution (e.g. 36% for the bottom half of 2-year US yield changes) but are relative less dominant in the tails of the distribution (e.g. 25% for 2-year yield changes in the 0.1 percentile). As a second finding, Figure 5 shows that

"ad hoc news" play a much larger role for jumps in stock returns as compared to yield changes, both in the US and euro area. Especially for yield changes, scheduled macro news seem more important in driving jumps compared to ad hoc news.

These findings have clear implications for theoretical work in asset pricing. First, in terms of the economic type of news, inflation news seem more important for jumps in US yields than e.g. news about monetary policy or fiscal policy, which speaks to the type of shocks in theoretical models that can plausibly drive jumps in bonds.

Second, models with jumps in asset price typically assume random arrival times of jumps, which is not supported by our results, at least not for bonds. Specifically, jumps in yields do not occur randomly but are concentrated around pre-scheduled news releases as shown above. In this vein, Kim and Wright (2014) build a term structure model with jumps at deterministic times rather than random arrivals, which is well in line with the evidence documented above. For equities, models with jumps at random arrival times might be more realistic (e.g. Maheu and McCurdy, 2004; Evans, 2011), since jumps in stock markets often occur outside of macro news release windows more often than for government bonds (Figure 4) and because ad hoc news are relatively more important for stocks than for yields (Figure 5). However, even for equities we find that a large share of extreme returns co-occur with a scheduled news release, which is at odds with purely random arrival times.

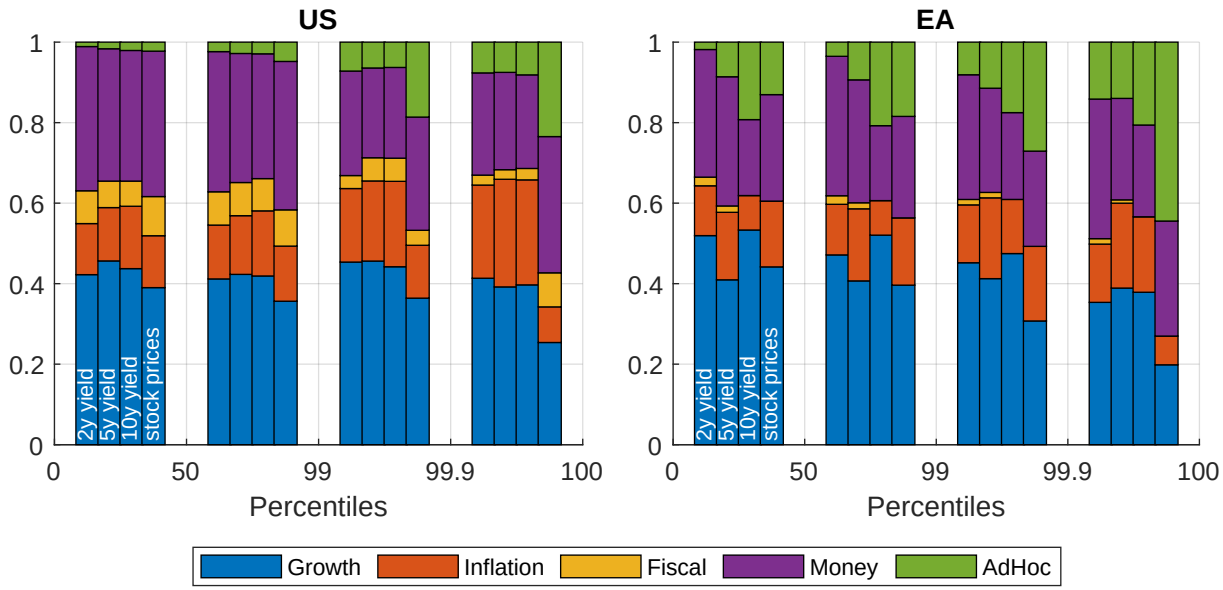

Figure 5: Share of news categories across the distribution using absolute returns. For each asset and absolute return percentile, this figure looks at all news releases within these windows and shows the relative share of different news categories. See Table B.8 for the mapping of news into categories. From left to right, each set of bars refers to 2-, 5-, 10-year yield changes and stock returns. Note that we restrict this analysis to news selected by LASSO in the original sample.

3.6. Do news fully explain returns in tight event windows?

A core assumption in the event study literature is that all asset price changes can be attributed to the respective news event around which they occur. In the case of central bank announcements, e.g., the debate is not *whether* but *why* announcements move markets.[17] In a recent paper, Gürkaynak et al. (2020) provide evidence supporting this assumption, not only for central bank announcements but also for macroeconomic data releases. They report R^2s of close to 100% for US bond yield changes around selected US macro news.[18]

Taken at face value, this evidence implies that our baseline approach in Equation (2), which controls for time-fixed effects and past volatility, might be overly restrictive. We should instead attribute the entire market movements to news, even if the news occurred early in the trading day or during crisis periods, when volatility is expected to be higher. A natural question thus is how the share of explained market movements would change if we adopted this less restrictive assumption? To answer this question, we compute an alternative R^2 measure according to Equation (3):

$$\Omega^{GKW}(k) = \frac{\sum_{i=1}^{k} (D_{it} \cdot y_t)^2}{\sum_{t=1}^{T} y_t^2} \tag{3}$$

where $\Omega^{GKW}(k)$ measures the share of total variance that occurs around the top k most important releases.[19] As before, our event windows usually start 15 minutes before and end 30 minutes after each event so that $\Omega^{GKW}(k)$ only picks up the variance in a tight window around

[17] Central bank announcement might move markets because they reveal news about the current policy rate target (Kuttner, 2001), about the future path of rates (Gürkaynak et al., 2005), or about asset purchases (Altavilla et al., 2019; Swanson, 2021, 2023b). Apart from these monetary news, announcements might also reveal news about the state of the economy (Nakamura and Steinsson, 2018; Jarociński and Karadi, 2020) or change market participant's risk aversion (Cieslak and Schrimpf, 2019; Kroencke et al., 2021).

[18] Gürkaynak et al. (2020) argue that the low R^2 typically found in event studies is due to a measurement problem, as the econometrician's measure of "news" is incomplete and only captures headline figures, usually as deviations from survey expectations. Most news releases contain information beyond headline figures, though, and once these unobserved news are accounted for (via a latent factor), virtually all of the immediate market response is explained by news.

[19] Equation (3) abstracts from simultaneous news, i.e. $D_{it} = 1$ for multiple news i. For such time periods t, to avoid double-counting, we attribute the market movements only to the news i with the highest rank k.

the news event. This way, we do not falsely attribute price changes to other events on the same day. However, even with tight event windows, the causality assumption is less convincing for less important types of news.

Hence, Figure 6 shows by how much the share of explained variance increases when we apply the less restrictive assumption on an expanding set of news. For the top ten news, e.g., the R^2s are very similar and only slightly higher when we ascribe the entire market reaction to news, instead of only the marginal increase in variance as in Equation (2). Increasing the set of news items leads to larger and larger discrepancies between the two approaches. For example, we observe large differences in R^2s of up to 20% for 10-year euro area yields when comparing R^2s for the 75 most important news (top 75).

The key take-away from this exercise for future empirical work is that the Gürkaynak et al. (2020) assumption and the more conservative approach employed in our paper yield almost identical results for a select group of highly important news releases, but not beyond. When working with larger sets of (less important) macro releases, ascribing all return variation to a news release – as is standard in event studies – may be less appropriate, even when using tight event windows.

3.7. Discussion of Main Results

Before moving on to a particular empirical application of our database, we now briefly discuss how to interpret our main findings. In particular, we discuss conditions under which our results are more likely to over- or underestimate the explanatory power of news.

Our approach is based on the standard idea in the event study literature that asset prices are driven by news in tight event windows around a release. Contrary to many other papers in this literature (see, e.g., the discussion of Gürkaynak et al. (2020) in the previous section), though, we do not mechanically assign *all* asset price variation in tight event windows to the news release but allow for heterogeneity in the importance of news via the regression in Equation (1). Empirically, we find that only 50-75 news items are relevant for asset prices. Moreover, since asset prices most likely would have moved to some extent anyways ("background noise"), we

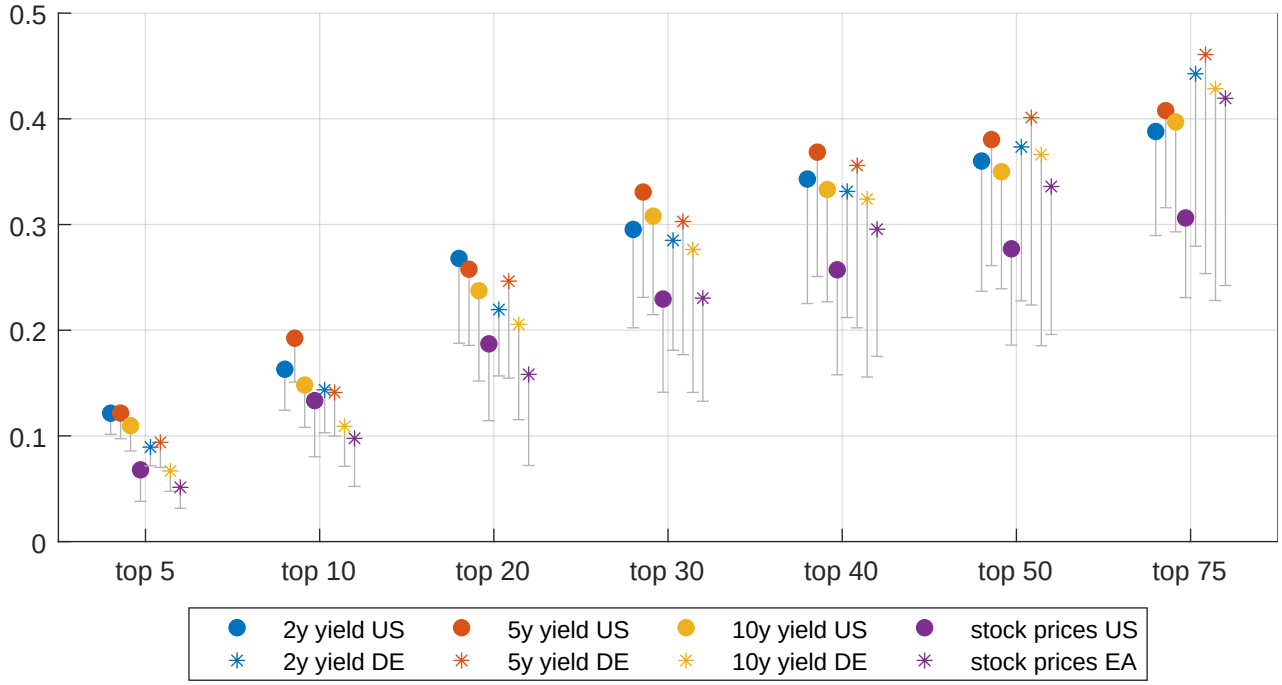

Figure 6: Explained variance shares when treating the entire market movement around news as explained. Each symbol refers to the cumulative variance of an asset around selected windows, divided by the total variance of the asset. This R^2 corresponds to Equation (3) and is motivated by the evidence in Gürkaynak et al. (2020). For reference, the grey lines show our baseline R^2 values based on Equation (2). The horizontal axis refers to the k most important news types for each asset, see Figure 2 for details.

control for time-of-day and calendar fixed effects as well as autocorrelation in return variance. Our results on R^2 in Figure 2 can thus be seen as conservative, which is corroborated by the analysis in Figure 6 above.

On the other hand, we might in some cases erroneously identify a "news" event based on the subsequent market reaction (post hoc ergo propter hoc fallacy).[20] To guard against this effect, we adopt a conservative approach and only include clearly relevant events in our database. However, some discretion in choosing which news to include is inevitable and the best we can do is be transparent about these choices. Hence, we make the news database available to other researchers. In any case, this issue is mostly relevant for unscheduled news, which do not account for the bulk of R^2. Hence, dropping some potentially controversial events from our database would only moderately affect our results.

[20]For example, Baker et al. (2021) find that next-day newspaper reports identify proximate causes for 88% of US stock market jumps (defined as daily absolute price changes $\geq$2.5%) in the post-war period.

Turning to the explanatory power of news for asset prices more generally, we may well underestimate the importance of news for a couple of reasons. First, despite our vast event database, we are still missing potentially important news. For example, we omit private information about macro news, e.g. in the form of early releases (Bernile et al., 2016; Michaelides et al., 2015; Hendershott et al., 2015) or unofficial communication of central bankers with the private sector (Cieslak et al., 2019). Second, our event database omits events for which the timing is unclear and might not fully capture the effect of news that diffuse only gradually to the public (Hong et al., 2000). Third, we do not include a vast array of corporate news, such as earnings releases, which would surely increase the R^2 especially for stock returns. We do not include this type of information since our goal is to focus solely on macro information that matters for the aggregate economy and not on idiosyncratic news about certain companies or industries. In this sense, we ignore the possibility that earnings announcements by large firms can affect aggregate market prices, as e.g. Gabaix (2011) and Ogneva and Xia (2021) argue.

Still, our results provide a useful benchmark for the literature on non-news driven volatility. To give a few examples, Edmans et al. (2022) show that investor sentiment that is unrelated to macro news has predictive power for stock and bond returns, albeit with low R^2s. Brandt and Kavajecz (2004) find that on days without major news, one quarter of the daily variation in US bond yields can be explained by orderflow imbalances, which they link to the aggregation of heterogeneous private information. Gabaix et al. (2006) argue that trades by large institutional investors cause market jumps, even in the absence of important fundamental news and even if they do not convey private information. Lastly, Gabaix and Koijen (2021) point to capital flows across different investor types as a major source of asset price variation. Our results should be relevant for these models since they provide bounds on how much return variation is left to explain by such effects after accounting for the direct effect of new macro information on asset prices.

3.8. Application: Predictability of Monetary Policy Surprises

A recent literature has documented that monetary policy "surprises", measured as high-frequency changes of asset prices around central bank announcements (e.g., Gürkaynak et al., 2005), are, in fact, partly predictable by public information. Miranda-Agrippino and Ricco (2021) for example show that principal components, extracted from a large set of macro-financial variables, predict subsequent FOMC surprises whereas Neuhierl and Weber (2021) show that asset returns exhibit momentum around monetary policy news.

Bauer and Swanson (2023) argue that such predictability is consistent with a channel in which the Fed responds to (public) news in a way that is imperfectly understood by market participants. In other words, even if a central bank and all market participants have access to the same information, imperfect knowledge about a central bank's reaction function can lead to predictability of monetary policy "surprises".[21] Our extensive data set allows us to investigate which type of news has predictive ability for monetary policy surprises to shed further light on this channel for the US Fed as well as the ECB.[22]

We do so by regressing monetary policy surprises, denoted mp_t and measured as the change in domestic 2-year yields in narrow windows around press releases and press conferences on central bank announcement days t, on 2-year yield changes in narrow windows around other news between day t and $t-1$, where $t-1$ denotes the day of the previous press release or press conference (*not* the previous calendar day). In essence, we ask what the market's reaction to macro news since the last central bank announcement, measured by 2-year yield changes in tight events around macro news, tells us about monetary policy surprises at the next meeting. Since the signs of the coefficients in such regressions are hard to interpret, we focus on and report F-tests, i.e. tests for the joint significance of slope coefficients. We run these regressions with all news selected by the LASSO procedure detailed above and, in addition, for four different subsets of news to better understand the nature of monetary policy surprise predictability. Specifically,

[21] In this regard, Cieslak (2018) and Schmeling et al. (2022) provide evidence that the Federal Reserve has frequently surprised market participants by responding more strongly to news than expected.

[22] Our focus here is not to provide a large-scale out-of-sample predictability analysis but to simply test what type of news are significantly related to subsequent monetary policy shocks.

we distinguish between domestic and foreign macro news, domestic and foreign central bank news events, as well as ad hoc (unscheduled) events.

Table 3: Predictive Regressions by News Category

(a) FOMC Surprises

	Domestic macro	Foreign macro	Domestic CB	Foreign CBs	Ad Hoc	LASSO
F	1.30	0.56	0.74	1.87^{***}	0.60	7.82^{***}
Adj. R^2	0.02	-0.03	-0.01	0.18	-0.02	0.22

(b) ECB Surprises

	Domestic macro	Foreign macro	Domestic CB	Foreign CBs	Ad Hoc	LASSO
F	2.67^{***}	1.15	2.64^{***}	1.80^{**}	2.78^{***}	15.57^{***}
Adj. R^2	0.08	0.01	0.09	0.11	0.07	0.13

Each column in each panel refers to a separate regression. The dependent variable is the change in 2-year yields in narrow windows around press releases and press conferences of the FOMC (panel a) or ECB (panel b). The regressors are 2-year yields changes around selected news. The first column uses yield changes around the ten most important (according to regression 1) domestic macro news as regressors. The second column uses changes around the ten most important foreign macro news. The third column uses changes around other domestic central bank announcements (such as speeches and minutes). The fourth column uses changes around foreign central bank announcements and the fifth column uses changes around the ad hoc events mentioned in Section 2.5. The last column uses LASSO with 5-fold cross validation to select relevant regressors from the set of all news.

Table 3 reports results for these regressions, where each column represents a regression of monetary policy shocks on the set of news indicated in the column heading. The last columns report results for a regression of monetary policy shocks on all news using LASSO to pick out the set of relevant news.

Our results qualitatively confirm prior evidence and show that both FOMC and ECB announcement "surprises" are partly predictable by past (market reactions to) news. Interestingly, both FOMC and ECB surprises are significantly predictable by 2-year yield changes around foreign central bank news. FOMC surprises are also predictable by foreign macro news, whereas ECB surprises are predictable by domestic macro and ad hoc (unscheduled) news events. The associated (adjusted) R^2s seem quite sizeable and range from 8% (ECB surprises and domestic macro news) to 18% (FOMC surprises and foreign central bank news). When regressing monetary policy shocks jointly on *all* news selected by LASSO, these adj. R^2s are 22% for FOMC surprises and 13% for ECB surprises.

Overall, our results thus corroborate recent work by Bauer and Swanson (2023) and Swanson (2023b). Complementing their results, we find that news prior to monetary policy meetings

are significantly related to subsequent monetary policy surprises, indicating that market participants have imperfect knowledge about the central bank's reaction function and lending credence to the existence of a "response to news channel".[23]

4. Conclusion

Using a large time-stamped event database together with continuous high-frequency asset price changes, we find that a large share of US and euro area asset price movements can be attributed to clearly identifiable news events. Specifically, our estimates suggest that 15-35% of bond yield changes and stock return variance in these two currency areas can be attributed to the release of macro news, which is much higher than previous estimates in the literature based on less comprehensive databases.

We thus find a much larger role for observable macro news in driving asset prices compared to the earlier literature. An optimistic interpretation of this finding is that asset prices do not seem disconnected from news about fundamentals and that the textbook model of asset prices as information aggregators is alive and well. However, a more pessimistic view is that a large share of return variation still cannot be linked to observable macro news, even when using a vast event database like ours. In any case, our time-stamped news database and the stylized facts documented in this paper should prove helpful for future research. First, our database allows researchers to precisely identify periods with and without (macro) news, which should be helpful for testing theories about how information is impounded into prices. Second, our results provide a benchmark for models in which asset prices move in the absence of macroeconomic news. Our estimates suggest that such models would have to match about two thirds of the total asset price variation by means of other mechanisms, e.g. noise trading or flows. Third, our results have implications for asset pricing models with jumps, since we show that, especially for bonds, the majority of news coinciding with jumps are scheduled news. This suggests that

[23] Our results are complementary, since Bauer and Swanson (2023) focus on a small set of important macro news for which they can measure the surprise component of the news by comparing survey estimates and headline numbers. We instead use the market reaction to news itself to measure surprises and hence can focus on a much larger set of news. Hence, results from our and their paper cannot be directly compared.

jumps do not have random arrival times, as often assumed in the literature, but that their timing is tied to release schedules, which are known in advance.

More generally, we hope that our database, which will be made publicly available, can help future research to separate between asset price movements emanating from macro news versus other drivers and to test theories about the transmission of news into asset prices and macro aggregates.

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Internet Appendix to accompany

What Moves Markets?

(not for publication)

This Internet Appendix provides additional information on the high-frequency asset price data used in the empirical analysis (Appendix A), the construction of the news database underlying the main part of our paper (Appendix B), and it contains additional tables and figures that complement the empirical analysis (Appendix D).

Appendix A. High-frequency Asset Prices

This Section describes the high-frequency asset price data used in our empirical analysis.

Sources. Intraday futures prices are from ThomsonReuters TickHistory (TRTH) for the US and from Eurex for the euro area. To convert bond price changes into yield changes, we divide log returns by minus the modified duration of the underlying cheapest-to-deliver bond, obtained from Bloomberg for each bond future at each point in time.

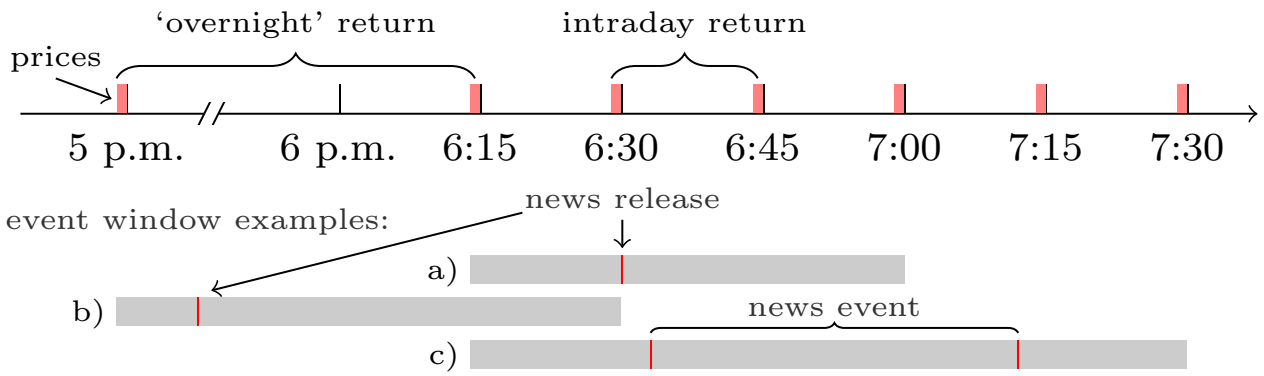
Returns and Event Windows. We compute yield changes and stock returns using the last available price in 15-minute intervals. Hence, given the 23 hours of continuous trading in US futures from 6 p.m. to 5 p.m., we have 93 return observations per day. The first return at 6:15 p.m. measures the price change from the close at 5 p.m. till just prior to 6:15 p.m., followed by 92 intraday returns (from 6:15 p.m. to 6:30 p.m. and so on). For a macro release at 8:30 a.m. sharp, for instance, our $[-15, +30)$ minute event window covers the price change from just prior to 8:15 until just prior to 9:00. Figure A.1 illustrates our approach.

Rollovers. We use the nearest-to-maturity contracts for all futures, since these contracts are typically the most liquid. For euro area futures, we roll over to the next-nearest contract on the day of expiration. For US futures, liquidity migrates earlier, usually at the beginning of the contract expiration month (particularly for Treasury futures without a fixed delivery day). Hence, for US futures we roll over to the next-nearest contract on the day this contract becomes more liquid (i.e. has higher trading volume and covers more trading time). For the overnight return, we use the new contract's last price on trading day $t-1$ and its first price on day t.

Filtering. Unlike the prices from Eurex, prices from TRTH do not necessarily reflect actual trades. The data contains indicative quotes which might be stale.[24] To filter out stale prices, we drop periods when a futures' price stays constant for one hour or longer. Since we use the maximum common sample for all assets in a given country, we effectively drop periods when any future's price is deemed stale.

[24] In particular, we use TRTH's *last* price and fill missing values with the *mid* price (mean of bid and ask quotes), if the number of ask or bid quotes is above the 30th sample percentile and the difference between the *mid* price and interpolated *last* price is not in the top quartile.

Figure A.1: Illustration of Returns and Event Windows



Red bars refer to the intraday prices we use, i.e. the last price prior to each time mark. Since trading in US futures starts at 6 p.m. US Eastern Time, the first intraday price we use refers to just prior to 6:15. Example a) shows how we define the event window for intraday news. For a news release at 6:30, our 45-minute event window ranges from 6:15-7:00. Example b) shows how we handle 'overnight' news. For news released during non-trading hours, our event window covers the first 30 minutes of the next 'trading day', i.e. for the US usually from 5:00 till 6:30 p.m. Example c) shows how we define event windows when we have precise timestamps for the start and end of the event, as is often the case for central bank press conferences and speeches for instance. For an event that lasts from 6:35-7:10 p.m., e.g., we use a 75-minute event window from 6:15-7:30 p.m. For European futures, overnight windows are considerably longer. The event window for news that occur during non-trading hours therefore usually ranges from 10 p.m. till 8:30 a.m. the next day, see Figure A.2.

Window Lengths. All asset price movements either refer to 15-minute intraday windows or to overnight windows. Table A.1 gives an overview. The length of overnight windows depends on non-trading hours. For the US, most overnight windows are exactly 1 hour and 15 minutes long, from 5 p.m. till 6:15 p.m. Eastern Time. For the EA, most overnight windows are 10 hours and 15 minutes long, from 10 p.m. to 8:15 a.m. Central European Time. Figure A.2 gives an overview of the trading hours our sample covers. Due to our above-mentioned filtering scheme and non-trading days (weekends and public holidays), some overnight windows are considerably longer. The longest window in our sample e.g. is almost six days long, from the close on December 23, 2003, to the opening on December 29.[25]

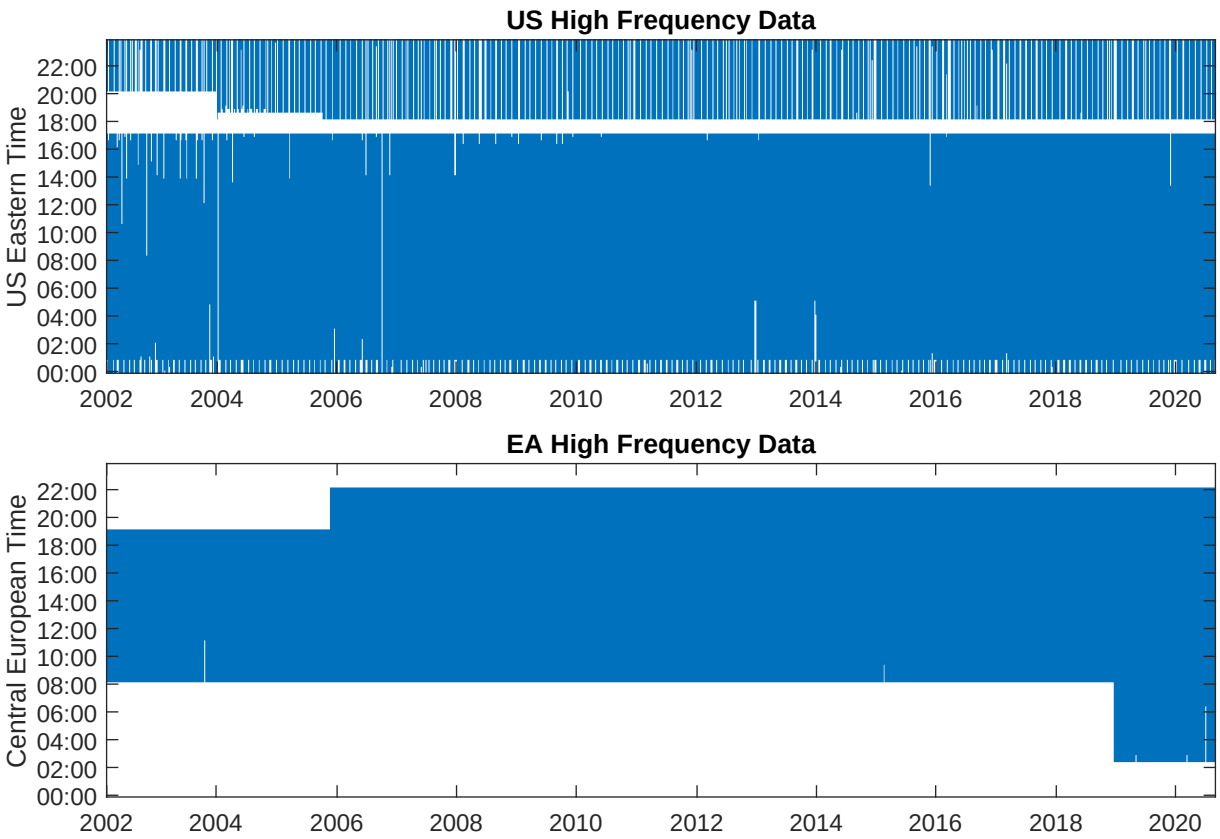
Table A.1: Length of Windows

	15min	$\leq$ 12h	$\leq$ 24h	$\leq$ 48h	$\leq$ 72h	$\leq$ 96h	$>$ 96h
US	386598	3620	10	47	834	127	5
EA	257398	2973	749	9	922	19	34

Number of return observations by country and duration. All returns refer to 15-minute intraday windows or to overnight windows of different lengths.

[25]Regarding US futures, we were able to fill some missing values in the TRTH dataset using data from https://www.tickdatamarket.com, but neither of the two datasets e.g. contained prices of 2-year and 5-year futures on January 21, 2003.

Figure A.2: Covered Trading Hours



The colored area shows the trading hours we cover each day of our sample. US futures were traded from 6 p.m. to 5 p.m. Eastern Time throughout. Missing values, particularly at the start of our sample, are due to our filtering of stale prices. European futures were traded from 9 a.m. to 7 p.m. till late 2005, from 9 a.m. to 10 p.m. till mid-2006, from 8 a.m. to 10 p.m. till late 2018, and from 2:00 a.m. to 10 p.m. thereafter.

Table A.2: Descriptive Statistics

	mean	min	max	std. dev.	variance	2nd mom.	skewness	kurtosis
US 2y yield	-0.0030	-32.2	22.7	0.6082	0.3699	0.3699	-0.409	97.0
US 5y yield	-0.0033	-28.3	24.7	0.6485	0.4205	0.4205	-0.422	86.3
US 10y yield	-0.0026	-37.0	17.2	0.5537	0.3065	0.3066	-1.029	111.8
US stock prices	0.0003	-4.8	4.6	0.1371	0.0188	0.0188	-0.117	71.7
EA 2y yield	-0.0032	-21.3	17.4	0.5493	0.3018	0.3018	0.055	63.3
EA 5y yield	-0.0042	-18.1	21.1	0.6034	0.3641	0.3641	0.138	41.6
EA 10y yield	-0.0040	-26.9	12.9	0.5686	0.3233	0.3233	-0.485	50.0
EA stock prices	0.0001	-12.0	5.8	0.2084	0.0434	0.0434	-1.288	100.7

Descriptive statistics of yield changes (in basis points) and stock returns (in percent). The "2nd mom." column contains the uncentered second moments, i.e. $\frac{1}{T}\sum_{t=1}^{T} y_t^2$.

Appendix B. News Database

This Section provides details on the construction of our news database. Appendix B.1 provides a list of all Bloomberg news items as well as details about sample coverage and timing. Appendix B.2 describes additional sources of news data and provides a classification of different news items into economic categories (i.e. "growth", "inflation", "fiscal", "money", "ad hoc").

Appendix B.1. News items and overview

Table B.3: Overview Macro News

Description	Nid	Nt	Nr	Day	Time	First	Last
AT Bank Manufacturing PMI	1	88	88	Thu	04:00	28.03.2014	27.08.2020
AT CPI	6	229	457	Wed	04:00	16.10.2002	19.08.2020
AT GDP	2	76	147	Fri	03:00	13.02.2007	28.08.2020
AT Industrial Production	2	231	443	Fri	03:00	02.05.2002	25.08.2020
AT PPI	2	231	460	Fri	03:00	20.06.2002	28.08.2020
AT Wholesale Price Index	6	225	445	Fri	03:30	07.10.2002	07.08.2020
BE Budget Balance	1	211	211	Fri	10:15	07.06.2002	12.08.2020
BE Business Confidence	1	232	232	Fri	09:00	22.03.2002	25.08.2020
BE CPI	2	221	440	Thu	05:30	28.03.2002	28.05.2020
BE Consumer Confidence	1	233	233	Fri	09:00	20.03.2002	21.08.2020
BE GDP	3	151	293	Wed	09:00	17.04.2002	31.08.2020
BE Trade Balance	1	197	198	Mon	09:00	13.03.2002	15.01.2020
BE Unemployment Rate	1	221	221	Fri	05:00	07.06.2002	30.07.2020
CH CPI	5	237	744	Thu	03:15	01.03.2002	03.08.2020
CH Consumer Confidence	2	69	69	Thu	01:45	06.05.2002	05.08.2019
CH Credit Suisse Survey	2	174	174	Wed	05:00	18.01.2007	26.08.2020
CH Foreign Currency Reserves	1	129	129	Fri	03:00	06.10.2010	07.08.2020
CH GDP	2	69	137	Thu	01:45	28.05.2004	27.08.2020
CH Industrial Output	3	78	141	Thu	03:15	26.03.2002	20.08.2020
CH KOF Leading Indicator	2	231	231	Fri	05:30	27.03.2002	28.08.2020
CH Money Supply M3	1	157	157	Mon	03:00	20.06.2008	21.08.2020
CH PMI Manufacturing	1	234	234	Mon	03:30	01.03.2002	03.08.2020
CH Producer, Import Prices	2	233	464	Thu	03:15	15.03.2002	14.08.2020
CH Real Estate Index Family Homes	1	52	52	Mon	03:00	21.04.2008	17.07.2020
CH Retail Sales	3	234	265	Mon	03:15	15.03.2002	31.08.2020
CH Sight Deposits	2	311	622	Mon	04:00	27.07.2015	31.08.2020
CH Trade Balance	1	190	190	Thu	02:15	21.03.2002	21.12.2017
CH Trade Data	3	154	351	Thu	02:00	20.07.2006	20.08.2020
CH UBS Consumption Indicator	1	152	152	Tue	02:00	28.06.2005	31.01.2018
CH Unemployment Rate	2	236	449	Fri	01:45	08.03.2002	10.08.2020
CN Actual FDI & CN Contract FDI Cumulative	2	94	132	Mon	22:15	11.06.2002	14.01.2010
CN CPI	1	233	233	Wed	21:30	12.03.2002	09.08.2020
CN Economic Indices	3	114	155	Tue	20:30	26.09.2005	05.05.2016
CN FDI	2	127	127	Thu	22:00	18.02.2005	13.08.2020
CN Foreign Reserves	1	124	124	Thu	04:00	16.10.2003	07.08.2020
CN GDP and Other Macro Aggregates	11	341	1195	Wed	22:00	14.03.2002	13.08.2020
CN HSBC Composite PMI & CN HSBC Services PMI	2	132	220	Tue	21:45	03.08.2010	04.08.2020
CN HSBC Manufacturing PMI	1	234	234	Sun	21:45	31.10.2006	31.08.2020
CN Industrial Profits	2	142	144	Thu	21:30	21.09.2005	26.08.2020
CN Manpower Survey	1	58	58	Mon	20:00	11.12.2006	08.06.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
CN Monetetary Aggregates	8	256	948	Fri	04:00	28.03.2002	11.08.2020
CN PMI	3	246	366	Sun	21:00	31.07.2005	30.08.2020
CN PPI & CN Purchasing Price Index	2	227	288	Wed	21:30	21.07.2002	09.08.2020
CN Swift Global Payments CNY	1	67	67	Wed	21:00	30.12.2015	19.08.2020
CN Trade Data	3	240	672	Thu	22:00	11.03.2002	06.08.2020
CN Trade Data (CNY)	3	79	218	Thu	22:00	07.02.2015	06.08.2020
CN Wholesale Price Index	1	51	51	Tue	03:00	13.07.2005	22.10.2009
DE CPI	5	225	1098	Thu	08:00	26.02.2003	31.08.2020
DE CPI Baden Wuerttemberg	4	228	455	Thu	05:00	22.03.2002	31.08.2020
DE CPI Bavaria	4	230	460	Fri	04:00	22.03.2002	31.08.2020
DE CPI Brandenburg	4	229	457	Thu	04:00	25.03.2002	31.07.2020
DE CPI Hesse	4	231	462	Fri	04:00	22.03.2002	31.08.2020
DE CPI North Rhine Westphalia	4	230	459	Thu	04:30	25.03.2002	31.08.2020
DE CPI Saxony	4	230	459	Thu	03:00	22.03.2002	31.08.2020
DE Expenditure Data	12	303	1357	Fri	02:00	12.03.2002	25.08.2020
DE Factory Orders	2	273	535	Thu	06:00	06.03.2002	06.08.2020
DE GDP	4	78	200	Thu	02:00	16.01.2003	30.07.2020
DE GfK Consumer Confidence	1	180	180	Thu	02:00	27.07.2006	28.08.2020
DE IFO Survey	5	233	695	Mon	04:00	26.03.2002	25.08.2020
DE Import Price Index	2	243	464	Fri	02:00	04.03.2002	28.08.2020
DE Industrial Production	2	268	530	Fri	06:00	28.03.2002	07.08.2020
DE Markit Construction PMI	1	87	87	Thu	03:30	04.04.2014	06.08.2020
DE PPI	2	232	464	Fri	02:00	25.03.2002	20.08.2020
DE Retail Sales	2	232	463	Fri	02:00	15.03.2002	31.07.2020
DE Unemployment Change & DE Unemployment Rate	2	260	466	Thu	03:45	06.03.2002	30.07.2020
DE Wholesale Price Index	6	232	464	Fri	02:00	15.03.2002	13.08.2020
DK CPI & DK CPI EU Harmonized	4	234	932	Mon	03:30	11.03.2002	10.08.2020
DK Change in Currency Reserves & DK Foreign Reserves	2	226	377	Tue	10:00	04.03.2002	04.08.2020
DK Consumer Confidence	1	229	229	Thu	03:30	22.03.2002	21.08.2020
DK Danish PMI Survey	1	191	191	Mon	05:00	03.10.2005	03.08.2020
DK GDP	4	159	298	Fri	03:30	27.03.2002	31.08.2020
DK Industrial Production and Orders	5	207	311	Fri	03:30	05.03.2004	07.08.2020
DK New Car Registration	2	55	55	Fri	03:30	13.12.2002	25.09.2007
DK PPI	2	87	174	Mon	03:00	15.04.2014	17.08.2020
DK Retail Sales	2	216	431	Mon	03:30	28.08.2002	26.08.2020
DK Trade & Current Account Balance	4	232	530	Mon	03:30	13.03.2002	10.08.2020
DK Unemployment Rate	2	229	347	Thu	03:30	07.03.2002	31.08.2020
DK Wholesale Price Index	4	142	282	Mon	03:30	15.03.2002	15.01.2014
EA Bank Lending Survey	1	70	70	Tue	04:00	15.05.2003	14.07.2020
EA CPI	3	252	303	Wed	05:00	18.03.2002	19.08.2020
EA CPI Core & EA CPI Estimate	2	231	306	Fri	05:00	02.04.2002	31.07.2020
EA Car Registrations	4	213	285	Tue	02:00	13.03.2002	16.07.2020
EA Construction Output	2	182	364	Wed	05:00	14.03.2005	20.08.2020
EA Consumer Confidence	1	137	137	Thu	10:00	18.02.2010	21.08.2020
EA Country-level Services PMI (DE, FR, IT)	15	740	2323	Thu	03:45	03.05.2004	21.08.2020
EA Current Account	1	196	196	Fri	04:00	26.03.2002	20.07.2018
EA EC Surveys	4	229	848	Thu	05:00	04.03.2002	28.08.2020
EA Employment	2	70	140	Fri	05:00	14.12.2006	14.08.2020
EA GDP	4	96	206	Thu	05:00	12.03.2002	31.07.2020
EA GDP Components	3	94	275	Wed	05:00	07.09.2004	09.06.2020
EA Industrial New Orders	2	99	198	Wed	05:00	26.01.2004	22.03.2012
EA Industrial Production	4	233	518	Wed	05:00	04.04.2002	12.08.2020
EA Labour Costs	2	101	127	Wed	05:00	22.03.2002	16.06.2020
EA M3 & EA M3 Money Supply	2	232	394	Thu	04:00	28.03.2002	27.08.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
EA PMI (EA, GR)	7	591	1180	Wed	04:00	03.05.2004	21.08.2020
EA PPI	4	233	520	Tue	05:00	04.03.2002	04.08.2020
EA Retail PMI (incl. country-level releases)	4	52	208	Thu	04:00	04.04.2014	05.07.2018
EA Retail Sales & EA Retail Trade	4	233	519	Wed	05:00	01.03.2002	05.08.2020
EA Sentix Investor Confidence	1	168	168	Mon	04:30	06.08.2007	10.08.2020
EA Survey of Professional Forecasters	1	23	23	Fri	04:00	23.01.2015	17.07.2020
EA Trade Balance	3	232	450	Fri	05:00	22.03.2002	14.08.2020
EA Unemployment Rate	2	234	262	Tue	05:00	05.03.2002	30.07.2020
EA ZEW Survey	3	233	655	Tue	05:00	19.03.2002	11.08.2020
ES Budget Balance	1	77	77	Tue	07:00	29.11.2011	23.12.2019
ES CPI & ES CPI Core & ES CPI EU Harmonised	6	441	1600	Fri	03:00	13.03.2002	31.08.2020
ES Consumer Confidence	1	51	51	Tue	04:00	03.04.2007	04.07.2011
ES Current Account Balance	1	204	204	Fri	04:00	15.03.2002	31.08.2020
ES GDP	2	65	130	Fri	03:00	11.11.2004	31.07.2020
ES Hotel Occupancy & ES Hotel Price Index	2	59	90	Fri	03:00	23.01.2003	23.10.2007
ES House Mortgage Approvals & ES Total Mortgage Lending	2	158	315	Wed	03:00	28.05.2008	28.08.2020
ES House transactions	1	160	160	Tue	03:00	28.04.2008	07.08.2020
ES Housing Permits	2	59	118	Thu	02:45	27.06.2008	31.10.2013
ES INE House Price Index	2	50	100	Thu	03:00	31.03.2009	09.06.2020
ES Industrial Output & ES Industrial Production	4	234	536	Fri	03:00	05.03.2002	07.08.2020
ES Labour Costs	1	74	74	Fri	03:00	22.03.2002	16.06.2020
ES Markit Composite PMI & ES Markit Services PMI	2	88	176	Wed	03:15	03.04.2014	05.08.2020
ES Markit Manufacturing PMI	1	89	89	Mon	03:15	01.04.2014	03.08.2020
ES PPI	2	221	441	Mon	03:00	25.02.2003	25.08.2020
ES Retail Sales	5	234	464	Thu	03:00	12.03.2002	28.08.2020
ES Trade Balance	1	173	173	Wed	04:00	18.04.2002	21.08.2020
ES Unemployment Net	1	216	216	Tue	03:00	06.03.2002	04.08.2020
ES Unemployment Rate	2	103	103	Fri	03:00	06.03.2002	28.07.2020
FI Business and Consumer Confidence	1	146	146	Mon	02:00	27.05.2009	27.08.2020
FI CPI	2	232	463	Fri	02:00	14.03.2002	14.08.2020
FI Consumer Confidence	2	232	232	Mon	02:00	01.03.2002	27.08.2020
FI Current Account Balance	1	228	228	Fri	02:00	15.03.2002	13.08.2020
FI Exports (EUR) & FI Imports (EUR) & FI Trade Balance	3	399	445	Fri	02:00	04.04.2002	31.08.2020
FI GDP	5	303	382	Fri	02:00	27.03.2002	28.08.2020
FI House Price Index & FI House Prices	3	102	193	Fri	02:00	29.10.2010	27.08.2020
FI Industrial Production	3	235	460	Fri	02:00	28.03.2002	10.08.2020
FI PPI	4	234	463	Mon	02:00	18.03.2002	24.08.2020
FI Retail Sales & FI Retail Sales Volume	3	371	371	Fri	02:00	14.12.2005	26.08.2020
FI Unemployment Rate	1	232	232	Tue	02:00	19.03.2002	25.08.2020
FR Banque de France business sentiment survey	1	176	176	Mon	02:30	16.10.2006	10.08.2020
FR Budget Balance	1	232	232	Fri	02:45	06.03.2002	04.08.2020
FR Business Survey Overall Demand	1	53	53	Tue	02:45	29.04.2008	23.07.2020
FR CPI and Wages	6	334	1491	Fri	02:45	12.03.2002	28.08.2020
FR Consumer Confidence	2	221	221	Tue	02:45	01.03.2002	26.08.2020
FR Consumer Spending	2	219	437	Fri	02:45	20.03.2002	28.08.2020
FR Current Account Balance	2	232	232	Fri	02:45	22.03.2002	07.08.2020
FR GDP	2	85	161	Fri	02:45	24.05.2002	31.07.2020
FR Housing Permits & FR Housing Starts	2	84	167	Tue	02:45	26.03.2002	28.05.2009
FR Industrial Production & FR Manufacturing Production	4	235	930	Fri	02:45	14.03.2002	07.08.2020
FR Jobseekers Net Change & FR Total Jobseekers	3	123	231	Wed	12:00	27.11.2008	27.07.2020
FR Manufacturing and Business Confidence	4	222	714	Thu	02:45	27.03.2002	27.08.2020
FR Non-Farm Payrolls & FR Wages	2	145	194	Fri	02:45	17.05.2002	20.03.2020
FR PPI	2	221	442	Fri	02:45	29.03.2002	28.08.2020
FR Trade Balance	1	232	232	Fri	02:45	15.03.2002	07.08.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
FR Unemployment Data	4	119	277	Thu	01:30	29.03.2002	13.08.2020
GR CPI & GR CPI EU Harmonized	2	243	457	Fri	05:00	08.03.2002	07.08.2020
GR Current Account Balance	1	218	218	Fri	04:00	13.11.2002	19.08.2020
GR GDP	3	117	187	Fri	05:00	13.03.2002	04.06.2020
GR Industrial Production	1	218	218	Fri	05:00	10.01.2003	07.08.2020
GR Retail Sales	1	227	227	Fri	05:00	10.06.2002	31.08.2020
GR Unemployment Rate	3	229	230	Thu	05:00	11.03.2002	06.08.2020
IE CPI & IE CPI EU Harmonized	4	231	882	Thu	06:00	13.05.2002	13.08.2020
IE Consumer Confidence	1	147	147	Tue	07:00	02.06.2009	23.08.2020
IE Current Account Balance & IE GDP	3	90	223	Thu	06:00	30.04.2002	20.07.2020
IE Industrial Production	3	231	461	Fri	06:00	22.03.2002	06.08.2020
IE Investec Composite PMI & IE Investec Services PMI	2	88	176	Wed	01:00	03.04.2014	05.08.2020
IE Investec Manufacturing PMI	1	89	89	Mon	01:00	01.04.2014	31.08.2020
IE Live Register Change & IE Live Register Level	2	231	462	Fri	06:00	01.03.2002	07.08.2020
IE New Private Car Licences & IE New Vehicle Licences	2	212	291	Fri	06:00	18.12.2003	10.08.2020
IE PPI	2	231	462	Thu	06:00	18.04.2002	21.08.2020
IE Property Prices	4	118	236	Wed	06:00	22.06.2011	18.08.2020
IE Retail Sales Volume	2	232	464	Fri	06:00	28.03.2002	28.08.2020
IE Trade Balance	1	228	228	Fri	06:00	25.07.2002	14.08.2020
IE Ulster Bank Construction PMI	1	88	88	Sun	20:00	13.04.2014	09.08.2020
IE Unemployment Rate	1	233	233	Wed	06:00	01.03.2002	05.08.2020
IT Budget Balance	2	214	340	Mon	13:00	04.03.2002	01.07.2020
IT Business Confidence & IT Economic Sentiment	2	232	336	Thu	03:30	26.03.2002	28.08.2020
IT CPI	4	367	1191	Fri	05:00	01.03.2002	31.08.2020
IT CPI FOI Index Ex Tobacco	1	99	99	Fri	04:00	12.04.2013	12.08.2020
IT Consumer Confidence	2	231	266	Tue	03:30	20.03.2002	28.08.2020
IT Current Account Balance	1	226	226	Fri	05:00	18.03.2002	19.08.2020
IT Deficit to GDP	2	75	75	Fri	04:00	01.03.2005	26.06.2020
IT GDP	3	84	152	Fri	04:00	08.08.2003	31.07.2020
IT General Government Debt	1	115	115	Fri	04:30	15.12.2011	14.08.2020
IT Hourly Wages	4	183	363	Fri	04:00	29.03.2002	29.07.2020
IT Industrial Orders & IT Industrial Sales	4	206	815	Fri	04:00	18.04.2003	27.08.2020
IT Industrial Production	3	233	699	Fri	04:00	14.03.2002	06.08.2020
IT Large Company Empl.	1	68	68	Fri	04:00	09.05.2003	30.12.2009
IT New Car Registrations	1	233	233	Mon	12:00	05.03.2002	03.08.2020
IT PPI	2	229	457	Fri	04:00	28.03.2002	28.08.2020
IT Retail Sales	2	218	436	Fri	04:00	24.04.2003	31.07.2020
IT Retailers' Confid. General & IT Services Survey	2	85	158	Wed	03:30	30.10.2002	29.12.2009
IT Trade Balance EU & IT Trade Balance Total	2	231	448	Fri	04:00	25.03.2002	07.08.2020
IT Trade Balance Non-Eu (Euros)	1	95	95	Thu	04:00	25.03.2002	27.01.2010
IT Unemployment Rate	1	139	139	Fri	04:00	08.01.2010	30.07.2020
IT Unemployment Rate Quarterly	1	68	68	Fri	04:00	28.09.2004	12.06.2020
JP All Industry Activity Index	1	211	211	Thu	00:30	22.01.2003	27.08.2020
JP BSI Large All Industry & JP BSI Large Manufacturing	2	70	140	Sun	19:45	03.03.2004	10.06.2020
JP Bank Lending and Monetary Aggregates	5	233	604	Sun	19:45	07.03.2002	10.08.2020
JP Bankruptcies	1	233	233	Mon	00:30	13.03.2002	11.08.2020
JP CPI	12	289	1539	Thu	19:30	28.03.2002	27.08.2020
JP Cabinet Office Indices	4	465	927	Fri	01:00	07.03.2002	26.08.2020
JP Capacity Utilization & JP Industrial Production	4	465	1157	Thu	00:30	14.03.2002	30.08.2020
JP Capital Spending and Company Earnings	4	73	206	Sun	19:45	03.09.2003	31.08.2020
JP Consumer Confidence	3	207	282	Tue	01:00	12.05.2004	31.08.2020
JP Convenience Store Sales	1	208	208	Mon	03:00	20.02.2004	20.08.2020
JP Current Account	5	233	768	Sun	19:45	13.03.2002	10.08.2020
JP Earnings Data	3	214	345	Mon	21:30	30.09.2003	06.08.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
JP Eco Watchters Survey	4	218	436	Mon	01:00	09.06.2003	11.08.2020
JP Export Price Index & JP Import Price Index & JP PPI	6	233	590	Tue	19:45	07.03.2002	12.08.2020
JP Foreign Investment	4	700	2750	Wed	19:45	09.01.2007	26.08.2020
JP GDP and Components	9	156	678	Sun	19:45	07.03.2002	16.08.2020
JP Household Spending & JP Overall Household Spending	3	233	262	Thu	19:30	08.03.2002	06.08.2020
JP Household Spending and Employment Data	4	235	532	Thu	19:30	28.03.2002	31.08.2020
JP Housing Loans	1	51	51	Wed	19:45	18.05.2008	12.08.2020
JP Housing Starts and Construction	3	235	669	Fri	01:00	29.03.2002	31.08.2020
JP Loans, Discounts Corp	1	157	157	Sun	19:45	13.05.2008	30.08.2020
JP M2 and M3	2	158	316	Mon	19:45	08.06.2008	11.08.2020
JP Machine Orders	2	233	448	Wed	19:45	11.03.2002	18.08.2020
JP Machine Tool Orders	1	457	457	Thu	02:00	11.03.2002	27.08.2020
JP Manpower Survey	1	58	58	Mon	20:00	11.12.2006	08.06.2020
JP Markit Services PMI & JP Markit/JMMA Composite PMI	2	116	230	Tue	20:30	05.01.2014	20.08.2020
JP Markit/JMMA Manufacturing PMI	1	263	263	Thu	20:30	29.11.2006	31.08.2020
JP Monetary Base	2	227	324	Mon	19:45	01.10.2002	03.08.2020
JP Nationwide Dept Sales	1	232	232	Fri	01:30	25.03.2002	21.08.2020
JP Official Reserve Assets	1	212	212	Thu	19:45	06.02.2003	06.08.2020
JP PPI Services	1	232	232	Mon	19:45	25.03.2002	25.08.2020
JP Retail Sales	3	230	666	Thu	19:45	27.03.2002	30.08.2020
JP Small Business Confidence	1	186	186	Tue	01:00	26.03.2002	27.09.2017
JP Supermarket Sales	1	189	189	Mon	01:00	26.09.2005	21.08.2020
JP Tankan Surveys, Capital Spending and Company Profits	9	80	497	Sun	19:45	31.03.2002	30.06.2020
JP Tertiary Industry Index	1	233	233	Thu	19:45	19.03.2002	14.08.2020
JP Tokyo Avg Office Vacancies	1	132	132	Wed	22:00	04.08.2010	05.08.2020
JP Tokyo Condominium Sales	1	232	232	Tue	00:00	13.03.2002	20.08.2020
JP Tokyo Dept Store Sales	1	233	233	Fri	01:30	15.03.2002	21.08.2020
JP Trade Balance	4	232	757	Tue	19:45	19.03.2002	18.08.2020
JP Vehicle Production	1	219	219	Fri	00:00	26.03.2002	31.08.2020
JP Vehicle Sales	1	234	234	Mon	01:00	01.03.2002	03.08.2020
NL CPI & NL CPI EU Harmonized	8	256	806	Thu	03:30	08.03.2002	06.08.2020
NL Consumer Confidence	3	231	296	Thu	03:30	25.03.2002	20.08.2020
NL Consumer Spending	1	226	226	Thu	03:30	04.04.2002	20.08.2020
NL GDP	2	146	287	Thu	03:30	15.05.2003	14.08.2020
NL House Price Index	2	112	220	Fri	02:00	21.02.2012	21.08.2020
NL Industrial Sales & NL Manufacturing Production	3	231	613	Fri	03:30	11.03.2002	07.08.2020
NL Producer Confidence	1	231	231	Tue	03:30	25.03.2002	28.08.2020
NL Retail Sales	2	230	230	Thu	03:30	13.03.2002	31.08.2020
NL Trade Balance	1	227	227	Fri	03:30	13.06.2002	14.08.2020
NL Unemployment Rate	4	230	250	Thu	03:30	19.03.2002	20.08.2020
NO CPI & NO CPI Underlying & NO PPI including Oil	6	236	1385	Mon	04:00	11.03.2002	10.08.2020
NO Consumer Confidence	1	51	51	Tue	00:30	02.12.2008	13.08.2020
NO Credit Indicator Growth	1	222	222	Mon	04:00	02.09.2002	31.08.2020
NO Deposit Rates & NO Norwegian Overnight Rate	2	143	171	Wed	08:00	22.01.2003	20.08.2020
NO GDP & NO GDP Mainland	4	100	221	Tue	04:00	14.06.2002	25.08.2020
NO Ind Prod Manufacturing & NO Industrial Production	6	231	872	Fri	04:00	08.03.2002	07.08.2020
NO Manufacturing PMI	1	163	163	Mon	03:00	02.11.2007	03.08.2020
NO Norges Bank Daily FX Purchases	1	94	94	Fri	04:00	30.08.2013	31.08.2020
NO Retail Sales	5	241	383	Fri	04:00	08.03.2002	27.08.2020
NO Trade Balance	4	232	368	Mon	04:00	15.03.2002	17.08.2020
NO Unemployment Rate	1	232	232	Fri	04:00	04.03.2002	28.08.2020
NO Unemployment Rate AKU	1	207	207	Wed	04:00	28.11.2003	26.08.2020
PL Average Gross Wages & PL Employment	4	200	736	Tue	08:00	17.11.2004	19.08.2020
PL Base Rate Announcement	1	197	197	Wed	07:30	21.01.2004	14.07.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
PL Budget Balance	3	221	471	Mon	09:00	18.03.2002	18.08.2020
PL CPI	2	290	580	Fri	08:00	15.03.2002	14.08.2020
PL Construction Output	1	81	81	Thu	08:00	17.10.2014	21.08.2020
PL Core CPI	4	208	416	Tue	08:00	26.08.2002	17.08.2020
PL Current Account	9	263	931	Fri	08:00	28.03.2002	13.08.2020
PL GDP	3	124	196	Fri	04:00	21.03.2002	31.08.2020
PL Monetary Aggregates	5	232	476	Fri	08:00	14.03.2002	24.08.2020
PL NBP Inflation Expectations	1	60	60	Fri	08:00	30.06.2011	30.06.2016
PL Official Reserves	1	140	140	Fri	08:00	07.10.2009	07.08.2020
PL PPI & PL Sold Industrial Output	4	234	927	Wed	08:00	18.03.2002	20.08.2020
PL Retail Sales & PL Retail Sales Real	3	226	523	Fri	04:00	20.09.2002	21.08.2020
PL Unemployment Rate & PL Unemployment Rate Quarterly	2	233	251	Tue	04:00	21.03.2002	25.08.2020
PT CPI & PT CPI EU Harmonized	8	272	1073	Wed	06:00	14.03.2002	31.08.2020
PT Construction Works Index	1	57	57	Tue	06:00	11.08.2008	11.07.2013
PT Consumer Confidence & PT Economic Climate Indicator	2	205	365	Thu	04:30	03.03.2004	28.08.2020
PT Current Account Balance	1	114	114	Thu	06:00	18.03.2002	20.08.2020
PT GDP	2	134	266	Fri	06:00	30.04.2002	31.08.2020
PT Industrial Production	2	224	444	Fri	06:00	06.11.2002	30.07.2020
PT Industrial Sales	2	126	250	Mon	06:00	08.11.2002	08.07.2013
PT Labour Costs	1	66	66	Fri	06:00	21.05.2002	13.08.2020
PT PPI	2	231	462	Tue	06:00	27.03.2002	19.08.2020
PT Retail Sales	2	222	442	Fri	06:00	05.11.2002	28.08.2020
PT Trade Balance	1	211	211	Fri	06:00	04.12.2003	07.08.2020
PT Unemployment Rate	1	77	77	Wed	06:00	21.05.2002	05.08.2020
SE Average House Prices	1	142	142	Thu	03:30	14.02.2008	05.12.2019
SE Budget Balance	1	230	230	Fri	03:30	06.03.2002	07.08.2020
SE CPI	9	233	1145	Thu	03:30	14.03.2002	12.08.2020
SE Current Account Balance	1	81	81	Fri	03:30	13.03.2002	08.06.2020
SE GDP	2	95	190	Fri	03:30	07.03.2002	28.08.2020
SE Household Consumption	2	87	174	Fri	03:30	07.04.2014	10.08.2020
SE Household Lending	1	165	165	Thu	03:30	25.10.2007	27.08.2020
SE Industry Capacity	1	53	53	Fri	03:30	14.05.2008	21.08.2020
SE PES Unemployment Rate	1	199	199	Wed	04:00	12.01.2005	11.08.2020
SE PMI Manufacturing	1	198	198	Mon	02:30	01.12.2004	03.08.2020
SE PMI Services & Composite	2	110	139	Wed	02:30	05.06.2012	05.08.2020
SE PPI	2	233	466	Thu	03:30	04.03.2002	25.08.2020
SE Production Indices	9	247	1110	Thu	03:30	19.03.2002	05.08.2020
SE Retail Sales	2	234	468	Fri	03:30	19.03.2002	27.08.2020
SE Service Production	2	84	168	Fri	03:30	06.12.2010	06.11.2017
SE Survey Confidence	6	235	602	Wed	03:00	04.03.2002	27.08.2020
SE Total No. of Employees	1	53	53	Thu	03:30	13.05.2008	20.08.2020
SE Trade Balance	1	232	232	Mon	03:30	25.03.2002	27.08.2020
SE Unemployment Rate & SE Unemployment Rate Trend	4	228	412	Thu	03:30	14.03.2002	20.08.2020
SE Wages Non-Manual Workers	1	144	144	Fri	03:30	30.05.2008	31.08.2020
UK BBA Loans for House Purchase	1	154	154	Tue	04:30	27.03.2007	27.01.2020
UK BRC Sales Like-For-Like	1	125	125	Mon	19:00	07.03.2011	10.08.2020
UK BRC Shop Price Index	1	126	126	Tue	19:00	08.03.2011	28.07.2020
UK CBI Sales	2	132	196	Thu	06:00	27.07.2010	25.08.2020
UK CBI Surveys	3	133	300	Thu	06:00	17.06.2010	21.08.2020
UK Car Prod.	2	61	122	Thu	04:30	23.04.2002	24.05.2007
UK Coincident and Leading Indicator	2	67	127	Wed	10:30	24.07.2002	11.03.2008
UK Construction Output	2	96	192	Fri	04:30	09.08.2013	12.08.2020
UK Expenditure Data	12	252	1026	Fri	04:30	27.03.2002	12.08.2020
UK GfK Consumer Confidence	1	236	236	Thu	19:00	27.03.2002	20.08.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
UK Halifax House Prices	4	212	421	Thu	03:00	07.03.2002	07.08.2019
UK Hometrack Housing Survey	2	72	140	Sun	19:00	29.09.2008	25.09.2014
UK House Price Index	1	60	60	Wed	04:30	19.07.2016	19.08.2020
UK Index of Services	2	178	308	Fri	04:30	20.10.2006	12.08.2020
UK Industrial Production & UK Manufacturing Production	4	233	932	Tue	04:30	12.03.2002	12.08.2020
UK Jobs Report	9	232	1335	Wed	04:30	20.03.2002	11.08.2020
UK Lloyds Business Barometer	2	123	123	Thu	19:00	27.03.2011	27.08.2020
UK Markit UK PMI Manufacturing	1	229	229	Mon	04:30	04.05.2004	21.08.2020
UK Markit/CIPS UK Construction PMI	1	197	197	Tue	04:30	05.05.2004	06.08.2020
UK Monetary Aggregates	17	508	2408	Mon	04:30	01.03.2002	21.08.2020
UK NIESR GDP Estimate	1	175	175	Tue	10:00	08.09.2003	11.06.2018
UK Nationwide Consumer Confidence	2	82	82	Tue	19:00	06.09.2005	15.06.2012
UK Nationwide House Prices	2	232	464	Thu	02:00	04.04.2002	31.07.2020
UK New Car Registrations	1	149	149	Thu	04:00	05.03.2009	05.08.2020
UK ONS House Price	1	150	150	Tue	04:30	08.12.2003	17.05.2016
UK Official Reserves Changes	1	230	230	Wed	04:30	05.03.2002	05.08.2020
UK PMI and Official Reserves	2	228	337	Wed	04:30	06.05.2004	21.08.2020
UK Price Indices	19	359	2862	Tue	04:30	11.03.2002	19.08.2020
UK RICS House Price Balance	1	210	210	Mon	19:00	16.02.2004	12.08.2020
UK Retail Sales Ex Auto & UK Retail Sales Incl. Auto	4	232	736	Thu	04:30	21.03.2002	21.08.2020
UK Rightmove House Prices	2	190	378	Sun	19:00	19.06.2005	16.08.2020
UK Total Business Investment	2	150	298	Thu	04:30	26.03.2002	12.08.2020
UK Trade Balance	4	233	644	Tue	04:30	11.03.2002	12.08.2020
US ADP Employment Change	1	181	181	Wed	08:15	02.08.2006	05.08.2020
US Budget Statement	1	233	233	Wed	14:00	20.03.2002	12.08.2020
US Building Permits & US Housing Starts	4	231	729	Tue	08:30	20.03.2002	18.08.2020
US Business Inventories	1	232	232	Fri	10:00	14.03.2002	14.08.2020
US CPI and Earnings Data	9	233	1459	Wed	08:30	21.03.2002	12.08.2020
US Car Sales	2	97	172	Tue	17:00	01.03.2002	02.06.2020
US Challenger Job Cuts	1	177	177	Thu	07:30	05.12.2006	06.08.2020
US Chicago Purchasing Manager	1	231	231	Fri	09:45	28.03.2002	28.08.2020
US Conference Board Indices	3	232	340	Tue	10:00	26.03.2002	25.08.2020
US Confidence Indicator and Mortgage Applications	2	903	928	Wed	07:00	14.01.2004	26.08.2020
US Consumer Credit	1	233	233	Fri	15:00	07.03.2002	07.08.2020
US Current Account Balance	1	78	78	Thu	08:30	14.03.2002	19.06.2020
US Durable Goods	6	464	1307	Thu	10:00	06.03.2002	26.08.2020
US EIA Weekly Petroleum Report	1	965	965	Wed	10:30	06.03.2002	26.08.2020
US Empire Manufacturing	1	224	224	Mon	08:30	15.11.2002	17.08.2020
US Employment Cost Index	1	77	77	Fri	08:30	25.04.2002	31.07.2020
US Employment Report	14	233	1911	Fri	08:30	08.03.2002	07.08.2020
US Existing Home Sales	2	232	413	Thu	10:00	25.03.2002	21.08.2020
US Export and Import Prices	5	231	610	Thu	08:30	14.03.2002	13.08.2020
US FHFA House Prices	2	159	209	Tue	09:00	25.03.2008	25.08.2020
US GDP, GDP Price Index, PCE	5	224	554	Thu	08:30	26.04.2002	27.08.2020
US Help Wanted Index	1	66	66	Thu	10:00	30.01.2003	26.06.2008
US IBD/TIPP Economic Optimism	1	126	126	Tue	10:00	11.07.2006	06.12.2016
US ICSC Chain Store Sales	2	60	60	Thu	10:30	12.04.2007	06.09.2012
US ISM Milwaukee	1	105	105	Fri	10:00	31.07.2007	29.04.2016
US ISM New York	1	59	59	Tue	09:45	02.02.2012	02.12.2016
US ISM Non-Manufacturing	1	233	233	Wed	10:00	05.03.2002	05.08.2020
US ISM Releases	5	254	824	Mon	10:00	01.03.2002	03.08.2020
US Inventories and Trade Balance	4	299	510	Fri	10:00	11.03.2002	28.08.2020
US JOLTS Job Openings	1	129	129	Tue	10:00	09.11.2010	10.08.2020
US Jobless Claims	2	1012	2002	Thu	08:30	07.03.2002	27.08.2020

Table B.3: Overview Macro News (continued)

Description	Nid	Nt	Nr	Day	Time	First	Last
US Leading Index	1	232	232	Thu	10:00	21.03.2002	20.08.2020
US Markit US Composite PMI & US Markit US Services PMI	2	177	353	Wed	09:45	26.03.2014	21.08.2020
US Markit US Manufacturing PMI	1	221	221	Mon	09:45	24.05.2012	21.08.2020
US Mortgage Foreclosures and Delinquencies	2	56	100	Thu	10:00	14.06.2007	17.08.2020
US NAHB Housing Market Index	1	219	219	Mon	10:00	15.04.2003	17.08.2020
US NFIB Small Business Optimism	1	141	141	Tue	07:30	10.11.2009	11.08.2020
US Net Long-term TIC Flows & US Total Net TIC Flows	2	200	375	Tue	09:00	18.10.2004	17.08.2020
US New Home Sales	2	230	410	Wed	10:00	27.03.2002	25.08.2020
US Nonfarm Productivity & US Unit Labor Costs	2	154	308	Thu	08:30	07.03.2002	14.08.2020
US PCE, Personal Income and Spending	7	234	1253	Fri	08:30	01.03.2002	28.08.2020
US PPI	8	233	1075	Tue	08:30	15.03.2002	11.08.2020
US Pending Home Sales	2	194	338	Thu	10:00	02.05.2005	27.08.2020
US Production and Capacity Utilization	3	232	575	Fri	09:15	15.03.2002	14.08.2020
US Retail Sales	4	232	721	Fri	08:30	13.03.2002	14.08.2020
US S&P Case-Shiller Index	6	175	724	Tue	09:00	26.12.2006	25.08.2020
US Survey Confidence	3	911	1397	Thu	09:45	27.01.2004	27.08.2020
US Trade Balance	1	233	233	Thu	08:30	19.03.2002	05.08.2020
US University of Michigan Surveys	5	465	1089	Fri	09:45	01.03.2002	28.08.2020
Total: 382	1,026	76,099	149,574				

The first column contains the country code and description of each news series. The data covers eleven euro area countries (AT Austria, BE Belgium, DE Germany, EA euro area aggregate, ES Spain, FR France, GR Greece, IE Ireland, IT Italy, NL Netherlands, PT Portugal), six other European countries (CH Switzerland, DK Denmark, NO Norway, PL Poland, SE Sweden, UK United Kingdom), two Asian countries (CN China, JP Japan) and the US. Nid refers to the number of underlying data series or transformations, Nt refers to the total number of unique release periods, and Nr refers to the total number of underlying data points. The remaining columns contain the most common release day, the most common release time (in US Eastern Time), and the first and last release in our sample.

Table B.4: Overview Bond Auction News

Description	N	Day	Time	First	Last
DE Auction Issuance Plan	18	Thu	04:00	19.12.2002	19.12.2019
DE Auction Result Bill	322	Mon	05:35	10.01.2005	24.08.2020
DE Auction Result Bond	104	Wed	05:35	26.01.2005	26.08.2020
DE Auction Result Note	583	Wed	05:35	05.01.2005	25.08.2020
ES Auction Result Bill	428	Tue	04:30	19.10.2005	25.08.2020
ES Auction Result Bond or Note	464	Thu	04:30	20.10.2005	06.08.2020
FR Auction Result Bill	1202	Mon	09:00	28.11.2004	31.08.2020
FR Auction Result Bond or Note	485	Thu	04:50	01.01.2004	20.08.2020
IT Auction Result Bill	408	Wed	05:00	12.09.2005	27.08.2020
IT Auction Result Bond or Note	597	Thu	05:00	13.09.2005	28.08.2020
US Auction Announcement Bill	3225	Thu	11:00	04.03.2002	27.08.2020
US Auction Announcement Bond	193	Thu	11:00	22.07.2004	13.08.2020
US Auction Announcement Note	1133	Thu	11:00	20.03.2002	20.08.2020
US Auction Result Bill	3558	Mon	11:35	05.03.2002	31.08.2020
US Auction Result Bond	193	Thu	13:05	27.07.2004	20.08.2020
US Auction Result Note	1142	Wed	13:05	27.03.2002	27.08.2020
Total: 16	14055				

N refers to the number of releases. The remaining columns contain the most common release day, the most common release time (in US Eastern Time), and the first and last release in our sample.

Table B.5: Overview Types of Central Bank Announcements

Central Bank	Press Release	Press Conference[1]	Speech[1]	Ad Hoc Press Release	Minutes	Other
Fed	Federal Open Market Committee (FOMC)		Chair[2]	✓	✓	Beige Book Releases[3], Discount Rate Minutes, Speech by other FOMC members
ECB	Governing Council (GC)		President[4]	✓	✓	Economic Bulletin[5], Speech by other GC members
BoE	Monetary Policy Committee		Governor	✓	✓[6]	Inflation Reports[6]
BoJ	Policy Board		Governor	✓	✓	Monthly Report[7], Summary of Opinion
SNB	Governing Board		Chairman[8]	×	×	Quarterly Bulletin[9]
Riksbank	Executive Board		×	×	✓	×
BoC	✓	×	×	×	×	×
RBA	✓	×	×	×	×	×

[1] When we have no exact timestamp for the end of press conferences or speeches, we set the window end to +60min after the event start, otherwise to +15min after the event end. For all other events, we use the usual $[-15, +30)$ minute window.
[2] Includes testimonies by the Federal Reserve Chair before Congress.
[3] Includes releases of the Monetary Policy Report and of the Prepared Testimony Statement, if those did not occur simultaneously with the testimony.
[4] Includes hearings by the ECB President at the European Parliament.
[5] Called "Monthly Bulletin" prior to 2015.
[6] Prior to May 2015, BoE Inflation Report events also cover the subsequent press conference. Since August 2015, BoE minutes and Inflation Reports are released simultaneously with scheduled MPC decisions; since November 2019, "Inflation Report" replaced by "Monetary Policy Report".
[7] Report of Recent Economic and Financial Developments (till 2015), Outlook Report (since 2016). The Monthly Report consists of two parts. Till June 2008, the "The Bank's View" summary was released prior to "The Background" document. From July 2008 till the end of 2015, both parts were released simultaneously. Since 2016 both documents are again released separately and "The Bank's View" is released simultaneously with the policy decision press re-lease.
[8] Includes annual General Meeting of Shareholders.
[9] Previously called "Monetary Policy Report".

Table B.6: Overview Central Bank News

Description	N	N*	Day	Time	First	Last
Fed: Ad Hoc Press Release	75	75	Fri	10:00	17.08.2007	11.08.2020
Fed: Beige Book	165	0	Wed	14:00	06.03.2002	15.07.2020
Fed: Discount Rate Minutes	147	0	Tue	14:00	29.03.2002	25.08.2020
Fed: Minutes	149	0	Wed	14:00	21.03.2002	19.08.2020
Fed: Press Conference	46	2	Wed	14:30	27.04.2011	29.07.2020
Fed: Press Release	155	8	Wed	14:15	19.03.2002	29.07.2020
Fed: Speech by Chair	400	290	Wed	10:00	07.03.2002	27.08.2020
Fed: Speech by FOMC member	930	930	Thu	13:00	04.03.2002	31.08.2020
ECB: (T)LTRO	354	0	Wed	05:15	27.03.2002	26.08.2020
ECB: (T)LTRO Repayment	123	0	Fri	06:00	25.01.2013	01.06.2020
ECB: Accounts	46	0	Thu	07:30	19.02.2015	20.08.2020
ECB: Ad Hoc Press Release	100	100	Thu	09:00	24.10.2002	26.06.2020
ECB: Asset Purchase Programmes	206	0	Mon	09:45	26.01.2015	25.05.2020
ECB: Economic Bulletin	199	0	Thu	04:00	14.03.2002	30.07.2020
ECB: MRO	963	0	Tue	05:15	05.03.2002	25.08.2020
ECB: Press Conference	195	1	Thu	08:30	07.03.2002	16.07.2020
ECB: Press Release	202	3	Thu	07:45	07.03.2002	16.07.2020
ECB: Securities Markets Programme	121	0	Mon	09:40	17.05.2010	03.09.2012
ECB: Speech by GC member	997	997	Fri	04:00	19.03.2002	27.08.2020
ECB: Speech by President	525	439	Mon	09:00	19.04.2002	08.06.2020
ECB: Weekly Financial Statement	968	0	Tue	09:00	01.03.2002	25.08.2020
ECB: other Refi Op	753	0	Wed	04:50	18.12.2002	28.08.2020
BoC: Press Release	148	0	Wed	09:00	05.03.2002	15.07.2020
BoE: Ad Hoc Press Release	22	22	Tue	07:00	11.03.2008	17.06.2014
BoE: Inflation Reports	53	0	Wed	05:30	15.05.2002	13.05.2015
BoE: Minutes	154	0	Wed	04:30	20.03.2002	13.03.2020
BoE: Press Conference	22	0	Thu	07:30	06.08.2015	06.08.2020
BoE: Press Release	207	4	Thu	07:00	07.03.2002	06.08.2020
BoE: Speech by Governor	44	44	Tue	04:47	20.09.2002	28.08.2020
BoJ: Ad Hoc Press Release	15	15	Mon	00:45	30.10.2002	05.07.2015
BoJ: Minutes	221	0	Tue	19:50	05.03.2002	19.07.2020
BoJ: Monthly Report	184	0	Wed	01:00	22.03.2002	16.07.2020
BoJ: Press Conference	84	3	Tue	02:30	17.07.2003	15.07.2020
BoJ: Press Release	246	10	Thu	22:50	19.03.2002	14.07.2020
BoJ: Speech by Governor	6	6	Thu	02:57	12.08.2010	22.02.2012
BoJ: Summary of Opinions	38	0	Sun	19:50	07.01.2016	26.07.2020
RBA: Press Release	205	0	Tue	00:30	05.03.2002	04.08.2020
Riksbank: Minutes	128	0	Wed	03:30	08.04.2002	10.07.2020
Riksbank: Press Conference	109	0	Thu	05:00	26.04.2002	01.07.2020
Riksbank: Press Release	125	5	Thu	03:30	19.03.2002	01.07.2020
SNB: Press Conference	42	2	Thu	04:00	14.06.2002	18.06.2020
SNB: Press Release	84	14	Thu	03:30	21.03.2002	18.06.2020
SNB: Quarterly Bulletin	55	0	Wed	09:00	09.01.2007	24.06.2020
SNB: Speech by Chair	10	4	Fri	04:00	17.03.2003	26.04.2019
Total: 44	10021					

N refers to the number of events, N^* to the number of unscheduled events, see Table B.4 for details.

Table B.7: Overview Ad hoc News

Description	N	Day	Time	First	Last
Covid-19	28	Fri	02:37	31.01.2020	20.07.2020
European Sovereign Debt Crisis	682	Wed	12:00	14.07.2009	07.06.2019
Global Financial Crisis	138	Fri	10:00	24.07.2007	27.12.2010
Iraq War	20	Mon	10:20	22.09.2002	07.04.2003
OPEC	27	Wed	01:45	24.09.2003	08.03.2020
Other Unscheduled Event	85	Thu	12:00	18.04.2002	05.05.2020
Sovereign Credit Ratings	129	Fri	02:01	02.05.2006	28.04.2020
Trump	110	Tue	13:26	04.12.2016	12.05.2020
Total: 8	1219				

N refers to the number of releases. The remaining columns contain the most common release day, the most common release time (in US Eastern Time), and the first and last release in our sample.

Appendix B.2. Other news sources and classification

Beyond Bloomberg, we collect macroeconomic news from various other sources.

US Treasury Auctions. For each auction, we extract the exact timestamps of the announcement and of the publication of the auction results from the Treasury website.[26]

German Bond Auctions. Data is from the website of the German debt management agency.[27] In 2012, the usual release time of auction results changed from shortly after 11:00 a.m. to shortly after 11:30 a.m.

Fed News. Most releases are from the Federal Reserve website.[28] Regarding speeches, we include all semi-annual testimonies of the Fed Chair at the US Congress. We infer the duration of each testimony from the accompanying transcript. The transcript of the first testimony e.g. states that "at 12:35 p.m., the hearing was adjourned".[29] Identifying other (non-regular) speeches by Fed officials is less straightforward. Our approach is as follows: we webscraped all speeches by FOMC officials from i) the Federal Reserve website[30] and ii) the Federal Reserve Bank of St. Louis' "FOMC Speak" database.[31] Dataset i) has a longer history, but contains no timestamps and covers fewer speeches compared to dataset ii), which only contains speeches since 2010 and contains timestamps only since late 2012. We merge these two sources into one consistent dataset of unique speeches. To obtain missing timestamps, we first check whether a speech has a PDF transcript linked to it. If so, we use the release time at the top of the PDF (if available). Particularly speeches by the FOMC Chair often contain such info, e.g. "For release on delivery 10:30 a.m. EST January 3, 2010".[32] If there is no timestamp, we manually identify the timestamp by using the Factiva database, searching for news on the day in question and with the speaker's last name in the headline. The remaining challenge is to purge speeches that do not reveal relevant information for financial markets, see Section Appendix B.3.

[26] https://www.treasurydirect.gov/instit/annceresult/press/preanre/preanre.htm
[27] https://www.deutsche-finanzagentur.de
[28] https://www.federalreserve.gov/newsevents/pressreleases.htm
[29] https://www.govinfo.gov/content/pkg/CHRG-107shrg80301/pdf/CHRG-107shrg80301.pdf
[30] https://www.federalreserve.gov/newsevents/speeches.htm
[31] https://www.stlouisfed.org/fomcspeak
[32] https://www.federalreserve.gov/newsevents/speech/files/bernanke20100103a.pdf

ECB News. We use the ECB website to obtain dates of various data releases, such as the Bank Lending Survey and the Survey of Professional Forecasters,[33] the ECB's weekly financial statements,[34] announcements regarding open market operations,[35], various ad hoc announcements,[36] and speeches by the ECB president and other members of the ECB Governing Council (which consists of the six members of the Executive Board and the governors of the national central banks).[37] We augment the speeches dataset from the ECB's website with events mentioned on Bloomberg, similar to Istrefi et al. (2022). As for speeches by FOMC officials, we try to keep only those speeches that revealed information relevant to financial markets, see Section Appendix B.3.

WPS. Data for "Weekly Petroleum Status Reports" are from the US Energy Information Administration (EIA) website.[38] In March 2003, the release time changed from 9:00 a.m. to 10:30 a.m.[39] Since September 2008, releases that do not occur on Wednesdays are released at 11:00 a.m. See Crego (2020) for details.

Appendix B.3. Filtering of central bank speeches

As explained in the previous section, we try to collect *all* speeches by the Fed Chair, by other FOMC members, by the ECB president and by other ECB GC members. However, many of these speeches concern topics such as regulation, fiscal policy, academic research, etc., i.e. they do not reveal information immediately relevant to financial markets. This issue is well explained by Swanson (2023a) who filters out irrelevant speeches by reading the market commentary in The Wall Street Journal or The New York Times following each speech (see Swanson and Jayawickrema, 2023, for details).

Since central bank speeches are not the main focus of our paper, we opt for an automatic approach: we filter speeches based on the number of news reports they were mentioned in. In

[33] https://www.ecb.europa.eu/stats/ecb_surveys/html/index.en.html
[34] https://www.ecb.europa.eu/press/pr/wfs/html/index.en.html
[35] https://www.ecb.europa.eu/mopo/implement/omo/html/top_history.en.html
[36] https://www.ecb.europa.eu/mopo/implement/omo/html/communication-history.en.html
[37] https://www.ecb.europa.eu/press/key/html/downloads.en.html
[38] https://www.eia.gov/petroleum/supply/weekly/schedule.php
[39] https://www.govinfo.gov/content/pkg/FR-2003-02-12/pdf/03-3480.pdf

particular, we build an intraday database of "headline news" from Bloomberg, Factiva, Twitter and Eikon as follows. From Bloomberg's Economic Calendar, we download all news from the category "Central Banks".[40] From Factiva, we download all news from three major newswires (Reuters News, Dow Jones Institutional News and MNI Market News) that have the Fed or ECB marked as a topic. From Twitter, we download all tweets from three major accounts distributing real-time financial news: @FxMacro, @LiveSquawk and @ForexLive. This dataset starts in early 2010. From Eikon, we download all news that are released by Reuters, that mention the Fed or ECB, and that are marked as important (search command "AA & Source:RTRS & Fed/ECB"). This dataset starts in early 2020.

With this headline news database at hand, we search for news that were released between 30 minutes prior till 90 minutes after the start of each speech and that contain the speaker's last name in the headline. We keep all speeches for which we find at least two, three, or four news (for speeches prior to 2010, between 2010-2019, and since 2020, respectively). Recall that we apply this filter only to unscheduled speeches. We keep all regular testimonies by the Fed Chair before the US Congress and by the ECB president in the European Parliament.

[40] Recall that macro data release times also come from Bloomberg's Economic Calendar, but from the category "Economic Releases".

Table B.8: Classification of News into Economic Categories

News Type	Growth	Inflation	Fiscal	Money	Ad Hoc
AT Wholesale Price Index		x			
BE Budget Balance			x		
BE Unemployment Rate	x				
CH CPI		x			
CH Producer, Import Prices		x			
CH Retail Sales	x				
CH Trade Balance	x				
CN Actual FDI & CN Contract FDI Cumulative	x				
CN CPI		x			
CN FDI	x				
CN Foreign Reserves				x	
CN GDP and Other Macro Aggregates	x				
CN HSBC Composite PMI & CN HSBC Services PMI	x				
CN HSBC Manufacturing PMI	x				
CN Industrial Profits	x				
CN Manpower Survey	x				
CN Monetetary Aggregates				x	
CN PMI	x				
CN Trade Data (CNY)	x				
DE Auction Result Bill			x		
DE CPI Hesse		x			
DE Factory Orders	x				
DE IFO Survey	x				
DE Import Price Index		x			
DE Industrial Production	x				
DE PPI		x			
DK Industrial Production and Orders	x				
DK Trade & Current Account Balance	x				
EA Car Registrations	x				
EA Employment	x				
EA GDP Components	x				
EA Retail Sales & EA Retail Trade	x				
EA Sentix Investor Confidence	x				
ES Consumer Confidence	x				
ES INE House Price Index		x			
ES Markit Composite PMI & ES Markit Services PMI	x				
ES Retail Sales	x				
ES Unemployment Net	x				
ES Unemployment Rate	x				
FI Business and Consumer Confidence	x				
FI CPI		x			
FI Consumer Confidence	x				
FI GDP	x				
FI House Price Index & FI House Prices		x			
FI Industrial Production	x				
FI PPI		x			

Table B.8: Classification of News into Economic Categories (continued)

News Type	Growth	Inflation	Fiscal	Money	Ad Hoc
FI Retail Sales & FI Retail Sales Volume	x				
FR Auction Result Bill			x		
FR Budget Balance			x		
FR CPI and Wages		x			
FR GDP	x				
FR Housing Permits & FR Housing Starts	x				
FR Industrial Production & FR Manufacturing Production	x				
FR Manufacturing and Business Confidence	x				
FR PPI		x			
FR Trade Balance	x				
GR CPI & GR CPI EU Harmonized		x			
GR Current Account Balance	x				
GR GDP	x				
IE Investec Manufacturing PMI	x				
IE Ulster Bank Construction PMI	x				
IT CPI		x			
IT Consumer Confidence	x				
IT Industrial Production	x				
IT Trade Balance Non-Eu (Euros)	x				
JP Bank Lending and Monetary Aggregates	x			x	
JP Bankruptcies	x				
JP CPI		x			
JP Cabinet Office Indices	x				
JP Capacity Utilization & JP Industrial Production	x				
JP Capital Spending and Company Earnings	x				
JP Consumer Confidence	x				
JP Convenience Store Sales	x				
JP Current Account	x				
JP Earnings Data	x	x			
JP Eco Watchters Survey	x				
JP Export Price Index & JP Import Price Index & JP PPI		x			
JP Foreign Investment	x				
JP GDP and Components	x				
JP Household Spending & JP Overall Household Spending	x				
JP Housing Loans	x				
JP Loans, Discounts Corp	x				
JP M2 and M3				x	
JP Machine Orders	x				
JP Machine Tool Orders	x				
JP Manpower Survey	x				
JP Markit Services PMI & JP Markit/JMMA Composite PMI	x				
JP Markit/JMMA Manufacturing PMI	x				
JP Monetary Base				x	
JP Official Reserve Assets				x	
JP PPI Services		x			
JP Retail Sales	x				

Table B.8: Classification of News into Economic Categories (continued)

News Type	Growth	Inflation	Fiscal	Money	Ad Hoc
JP Small Business Confidence	x				
JP Supermarket Sales	x				
JP Tankan Surveys, Capital Spending and Company Profits	x				
JP Tertiary Industry Index	x				
JP Tokyo Condominium Sales	x				
JP Vehicle Sales	x				
NL GDP	x				
NL Industrial Sales & NL Manufacturing Production	x				
NL Unemployment Rate	x				
NO Consumer Confidence	x				
NO GDP & NO GDP Mainland	x				
NO Ind Prod Manufacturing & NO Industrial Production	x				
NO Retail Sales	x				
NO Unemployment Rate	x				
PL Official Reserves				x	
PT Current Account Balance	x				
PT Industrial Production	x				
PT PPI		x			
SE Budget Balance			x		
SE Current Account Balance	x				
SE Household Consumption	x				
SE Trade Balance	x				
UK BRC Sales Like-For-Like	x				
UK BRC Shop Price Index		x			
UK Car Prod.	x				
UK Halifax House Prices		x			
UK Hometrack Housing Survey	x				
UK Industrial Production & UK Manufacturing Production	x				
UK Monetary Aggregates				x	
UK Official Reserves Changes				x	
UK Price Indices		x			
UK Rightmove House Prices		x			
US ADP Employment Change	x				
US Auction Result Bond			x		
US Auction Result Note			x		
US Building Permits & US Housing Starts	x				
US CPI and Earnings Data	x	x			
US Car Sales	x				
US Chicago Purchasing Manager	x				
US Conference Board Indices	x				
US Durable Goods	x				
US Empire Manufacturing	x				
US Employment Cost Index		x			
US Employment Report	x	x			
US Existing Home Sales	x	x			
US GDP, GDP Price Index, PCE	x	x			

Table B.8: Classification of News into Economic Categories (continued)

News Type	Growth	Inflation	Fiscal	Money	Ad Hoc
US ISM Non-Manufacturing	x				
US ISM Releases	x				
US Jobless Claims	x				
US Leading Index	x				
US New Home Sales	x	x			
US Nonfarm Productivity & US Unit Labor Costs	x	x			
US PPI		x			
US Production and Capacity Utilization	x				
US Retail Sales	x				
US Trade Balance	x				
US University of Michigan Surveys	x				
Fed: Ad Hoc Press Release				x	
Fed: Beige Book				x	
Fed: Discount Rate Minutes				x	
Fed: Minutes				x	
Fed: Press Conference				x	
Fed: Press Release				x	
Fed: Speech by Chair				x	
Fed: Speech by FOMC member				x	
ECB: Ad Hoc Press Release				x	
ECB: Asset Purchase Programmes				x	
ECB: MRO				x	
ECB: Press Conference				x	
ECB: Press Release				x	
ECB: Speech by GC member				x	
ECB: Speech by President				x	
ECB: Weekly Financial Statement				x	
BoE: Ad Hoc Press Release				x	
BoE: Press Release				x	
BoJ: Ad Hoc Press Release				x	
BoJ: Minutes				x	
BoJ: Monthly Report				x	
BoJ: Press Release				x	
BoJ: Speech by Governor				x	
BoJ: Summary of Opinions				x	
SNB: Press Release				x	
Riksbank: Press Release				x	
Ad Hoc: Iraq War					x
Ad Hoc: Global Financial Crisis					x
Ad Hoc: European Sovereign Debt Crisis					x
Ad Hoc: Covid-19					x
Ad Hoc: OPEC					x
Ad Hoc: Trump					x
Ad Hoc: Other Unscheduled Event					x

For brevity, the table only contains news that are selected by LASSO for at least one asset. The classification is used for the decompositions in Section 3.3.

Appendix C. Bootstrap Details

To perform inference, we re-run our main estimation in Equation (1) 1,000 times, resampling all observations with replacement. In each bootstrap sample j, we i) save the estimated β_i^j coefficients and ii) compute the share of explained variance $\Omega^j(k)$ based on Equation (2) for different sets of news k, namely the top 5, 10, 20, .., 50, 75 news or all news selected by LASSO. The ranking of news is based on their heteroskedasticity-robust t-statistics in that sample, i.e. the composition of the top 10 news e.g. might differ across samples.

In Figure 1, where we report the most important types of news, the t-statistics refer to $\beta_i / std(\beta_i^j)$, i.e. we divide the point estimate of each news in the original sample by the standard deviation of point estimates across bootstrap samples, see point i) above.

In Figure 2, the 95% confidence bands refer to $\pm\, 2 \cdot std(\Omega^j(k))$, i.e. two standard deviations of the estimated variance shares, see point ii) above.

In Table 1, where we test the null hypothesis that a given news does not increase the variance of an asset, the p-values refer to $prob(\beta_i \leq 0)$, i.e. the probability of observing a beta less than or equal to zero across bootstrap samples. A p-value of 1% e.g. means that the estimated coefficient of this news release is positive in 99% of bootstrap samples.

Similarly, in Table 2, we test the aggregate effect of a particular set of news releases. For this we classify news into non-overlapping categories C, e.g. $C(i) \in \{growth, inflation, ..\}$. That means the p-values measure how often the sum of a set of coefficients is equal to or less than zero across bootstrap samples, i.e. $prob\left(\sum_i (\beta_i \text{ if } C(i) = growth) \leq 0\right)$.

In Sections 3.3-3.4, where we decompose the share of explained variance into economic categories and countries, we keep the set of news fixed. In particular, we use all news selected by LASSO in the original sample. As in Equation (2), we sum up the weighted beta estimates for a set of news, e.g. growth news, to get an estimate of the variance these news explain. The 95% confidence bands are then again based on $\pm$ 2 standard deviations of this estimate across bootstrap samples.

Appendix D. Further Results and Robustness Checks

This Section provides further results and robustness checks. Appendix D.1 lists the biggest market movements and accompanying news in our database. Appendix D.2 provides evidence that our choice of the event window length is appropriate. Appendix D.3 elaborates on Section 3.6 of the main text, where we treat the entire market reaction to news as explained by news. Appendix D.4, lastly, provides detailed results for our main dummy regression in Equation (1).

Appendix D.1. Large Market Movements and News

To get a sense of our database and the link between news events and asset price movements, we provide a list of the largest US market movements during our sample period and see whether we can tie these price jumps to observable news in the spirit of Cutler et al. (1989). Table D.9 reports the results from this exercise and lists the five largest price changes, separately for unscheduled news events in panel (a), scheduled news releases in panel (b), and unrelated to any identifiable macro news event in panel (c).

As is evident from Table D.9, including unscheduled news events is important to properly account for the impact of news on asset prices as the top unscheduled news have a similar impact on prices as the top scheduled news events. The results also show that no single news category clearly dominates as there are news events related to quite different topics, such as monetary policy (FOMC statements), fiscal policy (the failure to pass the bank bail-out deal), the state of the economy (employment reports), wars, and the Covid-19 pandemic.

Finally, some price jumps do not occur on any identifiable macro news and seem to have other causes. A case in point is the market turmoil on January 21, 2008. This episode is widely attributed to the unwinding of large stock positions by Societe Generale, which its "rogue trader" Jerome Kerviel had built up over the previous months. The incident was made public only three days later, so the market turmoil seems to have been caused by flows – rather than news. In fact, our approach identifies this episode as the largest unexplained market movement in the sample. The second largest unexplained jump was the flash crash episode in May 2010 and two other such episodes coincided with positive earnings surprises by large US companies.

Table D.9: Largest US Asset Price Jumps

(a) Unscheduled ad hoc events

Date	Time	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	News Event
15.09.2008	ON	-32	-28	-19	-3.8	Lehman Brothers bankruptcy
16.03.2020	ON	-11	-22	-23	-3.7	Covid-19 lockdown in Spain, coordinated central bank actions, unscheduled FOMC statement (incl. 100 bp target rate cut and USD700 billion QE)
07.10.2002	ON	-9	-18	-12	-2.7	Iraq war, US pres. Bush: "use of force may become unavoidable'
25.06.2002	21:15	-16	-18	-15	-.2	Worldcom accounting scandal
29.09.2008	13:45	-17	-11	-6	-3.1	USD700bn bank bail-out deal fails in US House of Representatives

(b) Scheduled news releases

Date	Time	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	News Event
18.03.2009	14:30	-10	-28	-37	1.8	FOMC statement, QE1 announcement
07.05.2004	08:45	23	20	13	-.5	US employment report
02.04.2004	08:45	18	19	17	.6	US employment report
28.01.2004	14:30	22	18	12	-.7	FOMC statement omits promise to hold rates steady for a "considerable period"
03.09.2004	08:45	12	23	17	.1	US employment report

(c) No news

Date	Time	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	Non-Macro-News Explanation
22.01.2008	ON	-17	-14	-9	-4.8	unwinding of stock positions by Societe General?
06.05.2010	14:45	-9	-9	-10	-4.4	flash crash, see e.g. https://en.wikipedia.org/wiki/2010_flash_crash
06.03.2020	ON	-9	-8	-12	-2.3	
21.11.2002	ON	8	11	9	1.9	higher-than-expected Hewlett-Packard earnings? (see "H-P Earnings Give Markets a Boost")
17.10.2002	ON	7	9	7	2.1	higher-than-expected IBM earnings? ("U.S. Stocks: IBM Surges on Upbeat Results")

Dates and Times refer to US Eastern Time. Bond yield changes (y_{2y}^{US}, y_{5y}^{US}, y_{10y}^{US}) are in basis points, stock price changes (y_{s}^{US}) are in percent. For overnight events (Time=ON), market movements refer to the previous trading days' close till the stated day's opening price. The ordering is based on average normalized absolute returns.

Appendix D.2. Tighter or Wider Event Windows

Our baseline result in Section 3.2 for the share of variance explained by news is based on 45-minute event windows. In particular, we use $[-15, +30)$ minute windows for macroeconomic data releases and $[-15, +60)$ minute windows for central bank press conferences, speeches, and ad hoc events (except when we have timestamps for the exact event duration). This section shows how our results change when we use tighter or wider event windows. For each news event, we either shorten the event window by 15 minutes or extend it by 15, 30, or 45 minutes. For each of these choices, we re-run our main regression in Equation (1), select important news according to LASSO, and compute the share of variance these news explain according to Equation (2). Table D.10 contains the results.

Window Length	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
-15min	27.8	31.3	28.7	21.5	19.2	20.7	16.5	13.6
	(10.5)	(9.1)	(11.9)	(8.1)	(8.8)	(12.8)	(5.0)	(0.9)
baseline	28.8	32.9	30.3	23.7	20.4	21.8	18.2	15.9
	(13.4)	(12.8)	(17.7)	(11.9)	(9.6)	(14.2)	(7.4)	(2.2)
+15min	30.3	34.9	29.2	22.8	19.9	20.1	17.7	15.2
	(19.5)	(18.5)	(15.0)	(13.4)	(12.7)	(12.1)	(6.8)	(2.4)
+30min	29.8	32.6	29.7	22.5	19.7	22.6	18.6	16.5
	(20.7)	(16.2)	(20.0)	(14.5)	(12.5)	(18.2)	(10.9)	(3.2)
+45min	32.2	36.8	31.4	24.2	20.6	21.7	17.7	15.1
	(29.2)	(27.6)	(20.0)	(18.2)	(14.4)	(17.7)	(7.9)	(2.9)

Table D.10: Explained variance shares using shorter or longer event windows. All results refer to the variance share explained by all news that are selected by LASSO, see Equation (2) and Figure 2. For reference, the values in parentheses indicate the percent of observations covered by the underlying event windows.

Using tighter event windows barely reduces R^2 values. For 2-year US yields, for instance, the R^2 drops by one percentage point, while the share of returns covered by event windows drops by roughly three percentage points. That means the ratio of explained variance to the number of underlying event windows increases. Nonetheless, we think using such tight event windows is overly restrictive, as it leaves little margin for error in the timing of events. Similarly, using wider event windows often increases the R^2 slightly, but not always. For US stocks, e.g., the R^2 decreases, because less news are deemed relevant by LASSO.

We conclude that our benchmark choice for the length of event windows seems appropriated and that the R^2 values documented in Section 3.2 are reasonably robust to alternative choices.

Appendix D.3. Details on Section 3.6

In Section 3.6, we show how our baseline results change when we assume that all market movements around selected news are fully explained by news. This assumption seems reasonable given that Gürkaynak et al. (2020) report R^2s of close to 100% for US bond yield changes around selected US macro news. But is it valid to extend the assumption to a wider set of assets and news?

To shed light on this question, it is useful to check the importance of the news releases studied by Gürkaynak et al. (2020) according to our dummy regression in Equation (1).[41] Out of the 10 news studied by GKW, four are ranked in the top 10, and all but one are ranked in the top 30. The least important news according to this ranking are FOMC press conferences.

We draw two conclusions from this. First, reassuringly, our dummy regression approach successfully identifies "important" news, because they significantly move asset prices. Secondly, the news studied by Gürkaynak et al. (2020) are no extreme outliers in terms of market impact. This means that our database contains lots of other important news items. Hence, it seems reasonable to impose the strong causality assumption, namely that 100% of the market movements in tight event windows around important news releases are caused by these news, to a wider set of news.

Table D.11 reports detailed R^2s based on Equation (3). Taking US 5-year yields as an example, the first row shows that the five most important types of news alone account for over 12% of total variance while covering only 1.6% of returns. For the top 20 news the R^2 rises to around 24%, and the top 50 news account for roughly 35% of the variance in 5-year yields. For both US and EA assets, the explanatory power of news is highest for short- and medium term

[41] Gürkaynak et al. (2020) study 14 different news series, but since some of these series are always released jointly (like CPI and core CPI), they correspond to 10 distinct types of news in our setting (according to our naming convention from Table B.3, the 10 releases are CPI and Earnings Data, Durable Goods, Employment Cost Index, US Employment Report, US GDP, Jobless Claims, PPI, Retail Sales, Fed: Press Release, Fed: Press Conference).

yields and lowest for stock returns. The second-to-last row in Table D.11 reports results based on LASSO. In particular, we impose the strong causality assumption on all intraday windows around news deemed "important" by LASSO. Results differ strongly across assets. Few news systematically affect stock returns, hence the R^2 values are lowest for US stocks (with 25%) and EA stocks (16%). On the other hand, R^2 values are as high as 44% for US 5-year and 38% for EA 5-year yields. To put this into perspective, the last row in Table D.11 ("all news") shows results when we impose the causality assumption on *all* 450 news types from our database, even if their release has no significant impact on asset prices as per regression (1). In this setting, the share of explained variance rises to about 50-70%, which can be regarded as an upper bound on the importance of macro news.

Selected News	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
top 5	12.1	12.2	11.0	6.8	8.9	9.4	6.7	5.1
	(1.6)	(1.8)	(1.8)	(0.9)	(1.9)	(2.2)	(1.5)	(1.3)
top 10	16.3	19.2	14.8	13.3	14.4	14.1	10.9	9.8
	(2.5)	(2.6)	(2.7)	(3.2)	(3.9)	(3.9)	(3.3)	(3.9)
top 20	26.8	25.8	23.7	18.7	22.0	24.6	20.6	15.8
	(5.2)	(5.0)	(5.8)	(4.7)	(6.5)	(8.2)	(7.3)	(7.4)
top 30	29.5	33.1	30.8	23.0	28.5	30.3	27.6	23.0
	(7.3)	(7.0)	(6.9)	(7.3)	(11.4)	(12.5)	(12.4)	(8.9)
top 40	34.3	36.9	33.3	25.7	33.1	35.6	32.4	29.6
	(10.3)	(10.2)	(8.9)	(9.4)	(13.5)	(15.5)	(16.8)	(12.3)
top 50	36.0	38.0	35.0	27.7	37.3	40.1	36.6	33.6
	(11.6)	(11.3)	(10.2)	(11.3)	(16.8)	(18.4)	(18.3)	(15.8)
top 75	38.8	40.8	39.7	30.6	44.3	46.1	42.9	41.9
	(14.3)	(14.4)	(14.4)	(14.8)	(21.7)	(23.4)	(22.0)	(22.3)
LASSO	39.7	44.0	40.5	24.7	33.6	37.8	24.3	16.4
	(14.9)	(16.6)	(15.0)	(10.5)	(9.6)	(13.4)	(6.4)	(2.2)
all news	59.0	61.7	61.0	51.3	71.3	72.1	71.3	68.2
	(41.5)	(41.5)	(41.5)	(41.5)	(50.5)	(50.5)	(50.5)	(50.5)

Table D.11: Explained variance shares based on Equation (3). Each entry refers to the cumulative variance of an asset around selected windows, divided by the total variance of the asset. The first rows refer to all windows around the k most important news types for each asset, determined by the t-statistic from regression (1). The second-to-last row refers to all windows around news that are selected by LASSO. The last row refers to all windows around any news. For reference, the values in parentheses indicate the percent of observations covered by the underlying event windows.

Appendix D.4. Further Dummy Regression Results

This section contains further results from the dummy regression in Equation (1). Table D.12 reports t-statistics for all assets and all news. Figure D.3 lists the next 50 most important scheduled news after the top 25 news shown in Figure 1. Figure D.4 shows the importance of the included fixed-effects and lagged volatility measures and Figure D.5 shows that they reproduce the volatility pattern throughout the day quite well.

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
AT Bank Manufacturing PMI	-1.6	-1.9	-1.8	-1.5	1.2	0.2	-0.9	-1.0
AT CPI	**1.8**	1.0	0.5	0.1	-1.8	-0.8	0.6	-1.3
AT GDP	-1.2	-1.2	-0.8	-0.5	-0.4	-1.5	-1.3	-1.2
AT Industrial Production	-1.2	-0.4	0.5	-0.4	1.2	0.2	0.2	0.3
AT PPI	-0.4	0.2	-0.5	0.6	0.3	1.0	1.4	0.6
AT Wholesale Price Index	1.3	1.5	1.3	1.1	0.5	1.2	0.7	-0.1
BE Budget Balance	0.1	1.1	0.9	0.6	-0.1	0.4	0.6	-0.0
BE Business Confidence	-3.4	-3.2	-2.6	-0.7	-1.7	-0.5	0.6	-1.8
BE CPI	0.0	0.5	0.1	-1.1	1.6	1.6	**2.0**	-0.2
BE Consumer Confidence	-1.0	-0.2	0.3	-3.7	0.1	-0.2	1.1	-1.3
BE GDP	-0.8	-1.1	-0.9	-2.0	0.1	-0.1	0.6	-0.1
BE Trade Balance	0.3	-0.4	-0.5	0.0	1.2	0.8	0.8	**3.0**
BE Unemployment Rate	0.1	0.8	0.7	0.5	-1.2	-0.1	0.4	0.1
CH CPI	0.5	1.5	1.3	0.9	1.3	1.5	1.1	0.6
CH Consumer Confidence	-3.1	-1.2	-0.7	-0.2	-1.0	-0.7	-0.2	-0.3
CH Credit Suisse Survey	-1.8	-1.2	-0.9	-0.5	-0.7	-0.7	-0.9	-0.4
CH Foreign Currency Reserves	-0.7	-1.8	-0.4	-0.8	-0.8	-1.7	-0.4	0.0
CH GDP	-1.1	-1.4	-0.5	-0.8	-0.5	-1.6	-1.4	0.0
CH Industrial Output	-0.0	-0.9	-1.4	-0.4	0.1	-0.1	-0.2	0.7
CH KOF Leading Indicator	1.0	1.1	1.1	-0.3	0.4	-0.0	0.6	0.6
CH Money Supply M3	1.2	**2.1**	**2.1**	1.3	0.9	1.3	1.3	**2.0**
CH PMI Manufacturing	-1.4	1.1	1.0	0.6	0.6	-1.1	-1.1	-0.0
CH Producer, Import Prices	1.4	1.5	1.6	1.4	**2.1**	**2.2**	1.5	1.6
CH Real Estate Index Family Homes	-2.2	-1.9	-1.0	-0.8	-0.7	-1.9	-0.4	0.5
CH Retail Sales	0.3	0.3	-0.1	1.5	1.3	**1.7**	1.4	0.5
CH Sight Deposits	-1.0	0.6	0.1	1.2	-0.6	-1.1	-0.8	0.9
CH Trade Balance	1.3	1.3	1.1	-0.4	0.8	0.7	0.2	-0.5
CH Trade Data	-1.6	-1.6	-1.2	0.1	-1.9	-1.1	-0.3	-0.6
CH UBS Consumption Indicator	-1.5	-1.3	-0.8	0.6	0.6	0.7	-0.5	-1.2
CH Unemployment Rate	-0.2	0.2	-0.1	0.3	0.7	0.4	-0.4	0.1
CN Actual FDI & CN Contract FDI Cumulative	1.3	1.2	0.6	1.3	1.0	-0.8	-1.5	1.0
CN CPI	0.1	-0.7	-0.9	0.2	-0.5	-1.1	-0.9	0.1
CN Economic Indices	-2.2	-2.2	-1.9	-0.2	0.2	1.1	0.8	-0.0
CN FDI	-0.6	-1.0	-0.3	-0.2	0.6	0.8	0.9	0.8
CN Foreign Reserves	-1.6	-0.8	-2.1	-0.3	-0.9	-0.9	-0.4	-0.2
CN GDP and Other Macro Aggregates	1.2	1.5	1.3	1.2	**1.9**	**2.2**	1.6	1.3

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
CN HSBC Composite PMI & CN HSBC Services PMI	-0.7	0.2	0.6	0.6	-1.9	-2.3	-1.5	0.1
CN HSBC Manufacturing PMI	0.0	-0.8	-1.2	-0.1	-1.6	-0.7	1.1	-0.1
CN Industrial Profits	-0.7	0.0	0.3	-1.8	-2.0	1.0	1.3	-0.2
CN Manpower Survey	0.4	0.5	-0.2	0.5	-0.3	-1.4	-1.3	-1.5
CN Monetetary Aggregates	-2.9	-2.2	-2.0	-0.3	-2.8	-2.0	-2.4	-1.4
CN PMI	-1.5	-2.5	-3.4	-1.2	-0.7	-0.7	0.5	-1.7
CN PPI & CN Purchasing Price Index	-0.7	0.1	0.6	0.1	-0.2	0.1	0.2	-0.3
CN Swift Global Payments CNY	0.3	0.8	1.2	0.6	-2.4	-1.3	-0.7	-0.9
CN Trade Data	0.3	-0.2	0.1	-0.2	0.7	0.9	1.3	0.2
CN Trade Data (CNY)	-0.5	-0.7	0.2	-0.8	-1.3	-1.8	-1.6	-0.5
CN Wholesale Price Index	-0.7	-3.0	-2.7	-0.9	-1.1	-1.8	-2.1	-2.6
DE Auction Issuance Plan	-2.3	-0.2	-0.6	0.5	-2.3	-1.5	-1.5	-0.2
DE Auction Result Bill	1.1	1.0	0.4	1.0	0.4	-0.0	0.3	0.3
DE Auction Result Bond	**2.2**	**1.8**	**2.4**	-0.5	**1.7**	**1.8**	1.6	-0.1
DE Auction Result Note	-0.2	-1.1	-0.0	-1.0	**2.1**	**2.5**	**2.5**	-1.0
DE CPI	-0.3	0.3	0.1	0.4	0.9	0.1	-0.3	-1.6
DE CPI Baden Wuerttemberg	0.8	0.9	0.5	1.1	0.5	0.2	-0.3	**1.8**
DE CPI Bavaria	-0.7	0.2	0.6	1.0	-1.4	-1.2	0.3	-0.2
DE CPI Brandenburg	-0.7	-0.9	-0.5	-0.6	-0.7	-0.4	0.5	0.9
DE CPI Hesse	0.8	1.4	1.2	1.5	0.7	1.4	1.6	-1.0
DE CPI North Rhine Westphalia	-0.2	0.4	0.5	0.4	1.1	0.4	0.5	**1.7**
DE CPI Saxony	-0.8	-0.4	-0.2	0.6	0.8	**1.7**	**1.8**	1.2
DE Expenditure Data	-0.0	-0.2	-0.5	0.7	0.2	-0.2	-0.1	-0.7
DE Factory Orders	**2.6**	1.6	**1.9**	**2.0**	-1.1	0.6	1.3	1.1
DE GDP	0.4	0.6	0.4	-0.2	-1.1	-0.7	-0.2	-0.2
DE GfK Consumer Confidence	-1.1	0.1	0.1	-1.0	-1.6	-1.7	-1.4	-0.7
DE IFO Survey	1.0	**2.1**	**2.0**	0.2	**4.1**	**4.6**	**4.6**	1.2
DE Import Price Index	1.1	1.3	1.1	0.8	-0.4	-0.3	-0.9	-0.2
DE Industrial Production	**2.1**	**1.8**	1.0	1.3	-1.0	-0.8	-0.4	0.7
DE Markit Construction PMI	-0.2	-1.8	-1.7	-1.7	-0.5	-1.0	0.2	-1.4
DE PPI	1.2	**1.8**	**2.1**	1.1	**1.7**	**1.9**	1.6	0.2
DE Retail Sales	0.5	-1.0	-0.9	-0.5	-0.1	0.4	0.5	0.5
DE Unemployment Change & DE Unemployment Rate	-0.3	-0.6	0.0	-0.5	0.3	-0.8	-0.7	-0.5
DE Wholesale Price Index	0.1	0.9	0.7	0.2	-0.1	0.5	0.3	-0.7
DK CPI & DK CPI EU Harmonized	-0.3	1.4	0.8	1.0	-1.3	-1.5	-0.1	0.7
DK Change in Currency Reserves & DK Foreign Reserves	-2.6	-2.9	-1.9	-0.5	0.8	0.3	1.3	0.1
DK Consumer Confidence	-0.9	-0.2	-0.2	-0.6	0.4	-0.5	-0.1	0.6
DK Danish PMI Survey	-0.8	-1.3	-1.4	-0.9	0.2	0.8	-0.2	0.7
DK GDP	-0.5	-1.6	-1.2	-2.1	-1.2	-0.2	-0.0	-0.7
DK Industrial Production and Orders	-2.4	-1.9	-0.7	-1.0	0.6	0.8	0.5	1.1
DK New Car Registration	-0.7	-0.4	-0.3	-1.6	-1.5	-2.2	-0.3	0.4
DK PPI	-0.0	-0.7	0.1	-0.5	0.2	-0.4	0.3	0.7
DK Retail Sales	0.6	-0.5	-0.9	-0.8	0.2	0.9	0.7	-0.3
DK Trade & Current Account Balance	**2.0**	1.1	0.7	**1.7**	-0.7	-0.3	0.6	0.4
DK Unemployment Rate	0.9	0.5	0.5	0.9	-1.8	-1.3	-0.4	-1.2
DK Wholesale Price Index	-0.1	-0.2	0.2	-2.8	-0.1	-0.0	-0.2	-1.5
EA Bank Lending Survey	-1.4	-1.1	-1.2	-0.5	1.3	0.2	-0.4	-0.1

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
EA CPI	-0.0	0.8	0.8	-0.5	-0.2	-1.2	-1.8	-0.8
EA CPI Core & EA CPI Estimate	-0.2	-0.7	-0.4	-0.4	0.1	0.6	-0.1	-1.8
EA Car Registrations	**2.6**	**1.9**	**2.3**	1.3	-2.6	-1.3	-1.5	-1.4
EA Construction Output	-1.0	0.3	-0.8	0.8	1.4	1.5	0.3	0.2
EA Consumer Confidence	-2.3	-1.8	-1.2	-0.5	-2.0	-1.4	-1.3	-0.7
EA Country-level Services PMI (DE, FR, IT)	**2.0**	0.6	1.1	-0.2	0.8	**3.0**	**3.9**	-1.1
EA Current Account	1.0	1.3	0.5	-0.3	-1.0	-1.3	-1.5	-0.3
EA EC Surveys	0.4	-0.5	-0.4	0.1	-0.6	-0.6	-0.4	-0.8
EA Employment	-2.8	0.4	-0.9	0.8	-0.6	-0.5	-0.4	-1.9
EA GDP	-2.2	-0.9	-1.1	-0.8	-0.3	-0.1	0.7	-0.0
EA GDP Components	-0.1	0.9	-0.4	1.2	0.2	-0.3	0.0	1.2
EA Industrial New Orders	-2.2	-1.0	-0.8	-1.0	0.8	0.5	0.5	0.1
EA Industrial Production	0.5	0.3	-0.3	1.1	-0.9	0.3	-0.1	-0.5
EA Labour Costs	0.9	0.4	-0.1	0.7	0.2	0.6	0.2	0.1
EA M3 & EA M3 Money Supply	1.2	0.7	0.6	0.5	-0.5	-0.8	0.1	-0.3
EA PMI (EA, GR)	-1.2	-0.9	-1.1	0.2	0.4	-1.8	-2.7	0.1
EA PPI	-0.1	1.0	0.6	0.6	0.5	0.8	0.4	0.4
EA Retail PMI (incl. country-level releases)	**2.3**	**2.7**	**2.7**	0.7	1.5	0.9	0.6	1.5
EA Retail Sales & EA Retail Trade	0.5	**1.7**	**1.9**	1.3	-1.5	-0.9	-0.7	-2.2
EA Sentix Investor Confidence	1.0	0.3	-1.0	1.0	1.1	1.1	0.5	0.3
EA Survey of Professional Forecasters	**1.7**	**2.9**	**2.2**	1.1	-1.9	-1.8	-1.6	-1.2
EA Trade Balance	1.1	0.3	0.5	1.0	-1.1	-1.0	-0.8	1.4
EA Unemployment Rate	0.6	-0.6	-0.2	-0.6	-0.8	-1.4	-1.6	-1.5
EA ZEW Survey	-1.0	-1.8	-0.1	-0.1	**3.3**	**3.8**	**4.4**	0.7
ES Auction Result Bill	0.2	0.6	-0.9	0.4	-3.3	-2.9	-3.1	-3.2
ES Auction Result Bond or Note	0.5	-1.3	-2.2	1.0	**2.4**	**1.8**	0.2	-0.9
ES Budget Balance	-2.2	-2.0	-2.7	-0.3	**2.3**	-2.0	-2.2	0.4
ES CPI & ES CPI Core & ES CPI EU Harmonised	0.6	0.9	0.8	-0.8	-0.3	-0.6	-1.1	-0.9
ES Consumer Confidence	-1.8	-0.2	-1.3	-2.2	0.7	0.9	0.9	-1.9
ES Current Account Balance	-2.8	-1.3	-1.8	-0.4	-1.7	-0.1	0.6	0.6
ES GDP	-0.7	-0.9	-1.0	-0.6	-1.1	-0.0	0.2	-2.0
ES Hotel Occupancy & ES Hotel Price Index	0.0	0.9	0.9	0.3	-0.9	0.8	1.0	-0.4
ES House Mortgage Approvals & ES Total Mortgage Lending	-0.8	-0.1	-0.2	-0.6	0.1	0.0	0.1	-1.0
ES House transactions	-0.0	-0.2	-0.4	-1.2	-0.5	-0.7	-0.8	0.3
ES Housing Permits	1.0	1.4	1.1	-0.9	0.7	1.1	1.0	-1.2
ES INE House Price Index	-1.6	0.4	-1.2	0.9	-1.1	-1.5	-1.1	-1.6
ES Industrial Output & ES Industrial Production	1.1	-1.1	-0.3	0.7	0.1	0.4	-0.2	-2.0
ES Labour Costs	-0.0	1.4	**1.8**	-0.6	1.5	1.5	1.2	0.1
ES Markit Composite PMI & ES Markit Services PMI	1.0	1.3	1.2	1.6	0.8	-1.5	-0.3	1.0
ES Markit Manufacturing PMI	**2.1**	0.1	0.3	-0.9	1.3	0.3	0.6	1.3
ES PPI	1.2	1.2	0.4	0.7	-1.8	-0.5	-0.4	-0.9
ES Retail Sales	**1.7**	1.6	**1.8**	0.8	-0.0	0.3	0.5	1.0
ES Trade Balance	0.2	0.6	0.6	-0.3	-0.6	-0.7	0.2	-1.3
ES Unemployment Net	**1.8**	1.3	1.0	-0.8	0.5	1.1	0.3	0.1
ES Unemployment Rate	1.3	1.1	1.2	0.5	-2.1	-0.3	-0.5	0.7
FI Business and Consumer Confidence	-0.2	0.3	-0.5	-0.4	-1.5	-0.3	0.9	-0.4
FI CPI	0.6	1.6	1.4	-0.1	0.5	0.3	0.0	-1.3

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
FI Consumer Confidence	0.2	-0.4	0.3	0.2	1.1	0.7	-0.8	0.4
FI Current Account Balance	-2.8	-0.0	-0.1	0.3	-1.6	-1.1	-0.1	0.3
FI Exports (EUR) & FI Imports (EUR) & FI Trade Balance	-0.0	0.7	0.8	0.6	0.7	0.6	**1.8**	1.2
FI GDP	1.2	0.4	0.6	1.0	0.5	0.7	-0.3	-0.5
FI House Price Index & FI House Prices	0.8	0.1	-0.1	1.0	-3.0	-2.7	-1.7	-2.4
FI Industrial Production	1.4	**1.9**	**2.1**	1.6	0.5	0.5	0.8	0.9
FI PPI	0.9	**1.7**	1.3	1.5	-1.2	-0.8	-0.9	-0.9
FI Retail Sales & FI Retail Sales Volume	-0.7	-1.3	-0.1	-0.1	0.6	0.2	-0.1	-0.9
FI Unemployment Rate	0.5	0.6	0.6	0.8	0.5	0.1	-0.2	-0.7
FR Auction Result Bill	-1.4	-1.2	-2.1	0.9	-1.2	-2.2	-2.7	-2.2
FR Auction Result Bond or Note	-0.1	0.9	1.2	-0.9	0.9	**2.5**	**2.8**	0.2
FR Banque de France business sentiment survey	0.5	0.6	0.3	0.7	-0.7	-0.2	0.4	0.2
FR Budget Balance	0.2	0.5	0.3	1.1	1.1	0.9	1.0	0.9
FR Business Survey Overall Demand	-1.4	-0.8	-0.9	0.2	-1.1	-0.8	-0.3	-0.5
FR CPI and Wages	0.4	1.6	**1.8**	1.0	0.7	1.2	0.6	0.8
FR Consumer Confidence	0.3	1.2	1.1	**2.0**	-1.4	-1.4	0.2	-0.4
FR Consumer Spending	1.0	0.2	-0.2	1.4	0.5	0.0	0.4	1.0
FR Current Account Balance	-0.1	-0.9	0.2	1.1	-2.0	-0.9	-0.4	-0.6
FR GDP	1.6	1.1	0.9	-1.6	-1.3	-1.8	-1.3	-1.3
FR Housing Permits & FR Housing Starts	1.3	**2.3**	**2.4**	1.2	0.6	-0.4	-0.3	0.6
FR Industrial Production & FR Manufacturing Production	0.2	1.0	-0.5	1.5	**1.7**	**2.2**	**1.9**	0.0
FR Jobseekers Net Change & FR Total Jobseekers	-0.4	0.5	1.1	0.2	-0.0	0.4	-0.7	-2.8
FR Manufacturing and Business Confidence	**2.0**	**2.2**	**2.1**	0.8	1.3	1.5	1.2	-0.8
FR Non-Farm Payrolls & FR Wages	-0.2	0.7	0.8	-0.2	0.9	0.6	0.6	-0.1
FR PPI	-0.0	0.9	0.9	-1.0	0.6	0.7	1.0	-0.5
FR Trade Balance	**1.7**	**2.4**	**2.9**	-0.2	1.4	1.2	0.2	0.2
FR Unemployment Data	-0.1	-0.5	-1.0	1.5	-0.1	0.2	1.0	0.4
GR CPI & GR CPI EU Harmonized	1.0	0.2	-0.3	1.2	-0.7	-1.4	-0.5	-0.6
GR Current Account Balance	-0.4	-2.2	-2.4	0.3	**1.8**	1.4	0.7	-1.5
GR GDP	1.0	0.8	1.0	-0.0	0.8	1.4	1.1	-0.9
GR Industrial Production	0.2	1.5	1.2	0.7	0.4	0.9	1.2	-1.6
GR Retail Sales	0.9	1.0	1.0	1.3	0.6	1.4	1.5	0.5
GR Unemployment Rate	-0.0	-0.2	0.2	-2.0	0.2	-0.0	0.3	-0.5
IE CPI & IE CPI EU Harmonized	0.8	0.2	-0.0	0.9	-0.2	0.4	0.8	-0.5
IE Consumer Confidence	-1.5	-2.3	-2.6	-2.1	-2.9	-2.4	-2.0	-2.6
IE Current Account Balance & IE GDP	-2.9	-1.3	-2.4	-1.7	-2.9	-2.3	-3.1	-0.9
IE Industrial Production	-0.6	-2.4	-2.3	-1.2	-2.2	-2.9	-4.9	-1.1
IE Investec Composite PMI & IE Investec Services PMI	-1.6	0.2	0.6	1.0	-1.5	-0.6	-0.3	-1.3
IE Investec Manufacturing PMI	1.0	0.2	0.3	0.7	-1.1	-0.6	0.4	1.0
IE Live Register Change & IE Live Register Level	0.4	0.7	0.3	-0.7	0.8	0.2	-0.7	-1.9
IE New Private Car Licences & IE New Vehicle Licences	-2.4	0.2	-0.4	0.8	0.1	-0.5	-1.7	-2.4
IE PPI	1.6	1.6	1.6	0.6	-0.9	-2.5	-0.7	-1.8
IE Property Prices	**2.3**	1.1	0.6	-0.3	**2.0**	0.2	-0.8	0.6
IE Retail Sales Volume	-0.8	0.6	0.7	-1.5	-0.4	0.3	1.0	1.3
IE Trade Balance	1.6	1.1	1.4	1.2	0.1	-0.2	-1.6	-2.9
IE Ulster Bank Construction PMI	-3.1	-2.8	-3.4	-0.1	-4.6	-5.1	-2.9	-1.4
IE Unemployment Rate	-0.5	0.1	-0.0	-2.3	0.2	1.1	1.6	1.0

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
IT Auction Result Bill	-1.5	-0.1	-0.2	0.1	0.1	-0.3	-0.1	-0.9
IT Auction Result Bond or Note	-1.9	-0.7	-0.9	-2.3	1.1	-1.0	-1.0	-2.8
IT Budget Balance	-2.2	1.0	0.9	0.2	0.5	0.6	0.7	0.8
IT Business Confidence & IT Economic Sentiment	-0.1	0.5	0.3	-0.0	-0.3	-0.1	0.1	-0.4
IT CPI	-1.9	-1.0	-1.3	-1.8	**2.1**	**2.3**	**1.7**	1.3
IT CPI FOI Index Ex Tobacco	**3.7**	**3.1**	**2.5**	-0.4	**2.3**	0.0	-1.0	0.5
IT Consumer Confidence	1.3	1.0	0.9	1.0	0.4	0.3	0.4	0.7
IT Current Account Balance	1.1	1.2	1.0	0.7	0.2	0.2	-0.2	-0.1
IT Deficit to GDP	-0.8	-0.6	-0.1	-2.7	0.8	0.9	0.7	-0.5
IT GDP	-0.6	0.0	-0.3	-1.9	-0.8	-1.2	-1.0	-1.1
IT General Government Debt	1.3	1.6	1.6	0.7	1.6	0.0	-0.4	1.1
IT Hourly Wages	0.6	0.5	0.7	-0.1	0.4	0.3	0.3	0.2
IT Industrial Orders & IT Industrial Sales	-0.9	-1.3	-0.6	-2.0	-0.4	0.7	0.4	-2.6
IT Industrial Production	0.6	1.5	1.6	1.4	**1.9**	**2.2**	**2.2**	**1.7**
IT Large Company Empl.	-3.6	-3.3	-1.9	-3.1	0.3	0.2	1.2	0.5
IT New Car Registrations	0.8	-0.0	-0.1	-2.4	-0.3	-0.3	-0.6	0.4
IT PPI	-0.4	-0.9	-1.5	-3.3	1.3	1.2	0.9	1.4
IT Retail Sales	0.5	0.5	0.8	0.5	0.9	0.8	-0.1	-0.1
IT Retailers' Confid. General & IT Services Survey	0.3	0.6	0.9	1.2	-1.3	-0.6	-1.6	-1.3
IT Trade Balance EU & IT Trade Balance Total	0.5	-0.3	-0.3	-1.8	0.4	0.2	-0.0	0.9
IT Trade Balance Non-Eu (Euros)	0.6	0.4	0.5	0.5	1.2	1.2	0.8	0.8
IT Unemployment Rate	**2.2**	0.2	-0.1	-1.3	0.5	0.6	1.4	1.0
IT Unemployment Rate Quarterly	-1.4	-2.0	-0.9	-3.1	0.7	0.2	-0.5	-2.3
JP All Industry Activity Index	0.4	-0.0	-0.0	-1.5	-2.2	-1.9	-2.6	-1.4
JP BSI Large All Industry & JP BSI Large Manufacturing	-2.1	-1.2	0.0	-0.1	-0.2	-0.5	0.2	0.8
JP Bank Lending and Monetary Aggregates	1.1	1.1	0.7	0.6	1.5	1.2	0.4	1.0
JP Bankruptcies	1.2	1.2	1.4	**2.1**	**1.7**	**1.8**	0.4	1.0
JP CPI	0.1	0.6	1.1	0.7	-1.0	-1.3	-1.5	-0.8
JP Cabinet Office Indices	**2.2**	**2.5**	**2.5**	**2.4**	1.1	1.0	0.7	-1.0
JP Capacity Utilization & JP Industrial Production	0.3	0.1	0.0	-1.0	0.1	0.9	1.0	-0.2
JP Capital Spending and Company Earnings	0.4	-0.1	-0.9	-1.7	-1.5	-2.4	-2.2	-1.9
JP Consumer Confidence	-1.1	-1.3	-1.0	0.4	-1.4	-0.1	0.3	-0.9
JP Convenience Store Sales	0.7	0.6	0.3	1.0	-1.1	-1.9	-1.6	-0.0
JP Current Account	-1.3	-1.2	-1.0	-0.8	-1.7	-1.3	-1.3	-1.6
JP Earnings Data	-0.8	-0.4	0.4	-1.2	-2.6	-2.3	-1.7	-2.2
JP Eco Watchters Survey	0.8	0.8	1.0	0.8	-0.8	-0.3	-0.8	-1.9
JP Export Price Index & JP Import Price Index & JP PPI	0.1	-0.6	-1.2	-0.0	0.2	-0.3	-0.9	-0.1
JP Foreign Investment	-1.1	-1.6	-1.2	0.0	-1.9	-3.5	-2.2	-1.8
JP GDP and Components	-1.3	-0.2	-0.8	-0.3	-2.9	-2.1	-0.5	0.1
JP Household Spending & JP Overall Household Spending	0.8	0.8	1.3	1.3	0.6	1.5	0.8	-0.8
JP Household Spending and Employment Data	-0.2	-0.4	-1.3	-0.8	-1.5	-1.4	-1.2	-1.5
JP Housing Loans	-1.9	-2.2	-2.2	-2.6	-2.7	-2.7	-1.9	-2.2
JP Housing Starts and Construction	0.4	-0.5	-0.7	-2.6	-0.1	0.2	-0.2	-1.3
JP Loans, Discounts Corp	-0.6	-0.2	0.7	0.7	-1.5	-0.2	0.4	-1.2
JP M2 and M3	0.9	0.9	1.1	1.5	0.4	0.9	0.8	1.0
JP Machine Orders	0.0	0.8	1.0	0.1	0.3	0.1	0.2	0.6
JP Machine Tool Orders	0.4	1.2	1.2	0.8	1.1	1.1	1.0	-1.7

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
JP Manpower Survey	-0.6	0.7	0.9	1.4	-0.3	0.0	0.8	1.1
JP Markit Services PMI & JP Markit/JMMA Composite PMI	-0.2	0.7	1.0	-0.2	-3.3	-3.4	-2.6	-1.9
JP Markit/JMMA Manufacturing PMI	-1.8	-2.8	-2.8	-3.2	-3.1	-1.4	0.0	0.1
JP Monetary Base	-0.6	0.7	0.9	-1.9	0.0	0.4	-0.2	-3.2
JP Nationwide Dept Sales	-0.4	-0.3	-0.4	-1.1	0.4	0.0	-0.5	-2.1
JP Official Reserve Assets	0.4	-0.7	0.2	-0.5	-2.7	-2.7	-2.3	-1.8
JP PPI Services	-1.0	-1.0	-2.1	-2.4	-0.1	0.5	0.8	1.1
JP Retail Sales	0.7	0.9	0.7	0.2	1.0	1.1	1.1	1.3
JP Small Business Confidence	1.0	1.1	1.2	1.1	0.3	0.1	-0.8	-1.5
JP Supermarket Sales	0.4	-0.5	-1.5	0.4	0.4	0.5	0.8	0.2
JP Tankan Surveys, Capital Spending and Company Profits	-1.3	-1.8	-1.3	-1.3	-0.9	-0.7	-1.7	-1.8
JP Tertiary Industry Index	1.4	1.4	1.1	**1.8**	-0.6	-0.8	0.3	0.1
JP Tokyo Avg Office Vacancies	-0.6	-0.7	-0.1	-1.7	-1.5	-0.7	-0.3	-0.8
JP Tokyo Condominium Sales	0.3	-0.3	-1.0	0.9	-1.4	-1.9	-2.4	-1.4
JP Tokyo Dept Store Sales	0.1	0.1	-0.0	0.7	-1.0	-0.6	-0.0	1.4
JP Trade Balance	0.6	0.5	-0.1	-1.9	-0.4	-1.4	-1.7	-1.8
JP Vehicle Production	-0.2	-0.6	-1.3	-1.7	0.5	0.3	-0.4	0.9
JP Vehicle Sales	-0.1	1.4	0.8	0.2	-0.4	-0.0	-1.0	**1.7**
NL CPI & NL CPI EU Harmonized	0.7	-0.3	-0.5	0.1	-0.4	-2.0	-0.9	-0.4
NL Consumer Confidence	-1.3	-0.7	-0.5	-0.7	-1.9	-0.4	0.7	0.3
NL Consumer Spending	1.2	0.9	1.2	0.4	0.2	-0.7	-0.4	-0.5
NL GDP	0.1	0.1	-0.0	-2.8	0.6	0.9	1.0	0.9
NL House Price Index	-0.6	-0.5	-0.6	-0.9	-2.3	-2.1	-2.1	-2.4
NL Industrial Sales & NL Manufacturing Production	0.7	1.0	0.7	0.2	-1.2	-0.7	-0.3	0.2
NL Producer Confidence	-1.0	-0.1	-0.6	-0.2	-1.2	-2.1	-1.8	-0.6
NL Retail Sales	-0.3	-1.0	-0.8	-2.8	-2.8	-3.1	-1.8	-2.4
NL Trade Balance	0.2	-0.7	-0.5	**1.7**	-0.3	-0.6	-1.0	-0.8
NL Unemployment Rate	1.5	1.4	1.3	1.2	-1.5	-1.6	-1.6	0.1
NO CPI & NO CPI Underlying & NO PPI including Oil	-0.8	-1.0	-1.6	-0.4	-0.1	-0.7	-1.1	-1.6
NO Consumer Confidence	-0.5	-0.5	-0.5	-2.4	0.5	0.8	0.7	-0.1
NO Credit Indicator Growth	-3.6	-0.1	0.2	0.3	-2.2	-1.3	-0.7	-1.1
NO Deposit Rates & NO Norwegian Overnight Rate	-2.0	-1.1	-1.2	-0.9	-2.9	-2.0	-2.3	-0.4
NO GDP & NO GDP Mainland	1.2	1.4	1.6	0.8	0.1	0.3	0.4	-1.3
NO Ind Prod Manufacturing & NO Industrial Production	**1.8**	1.4	1.5	**1.7**	-0.0	-0.4	-1.2	-0.8
NO Manufacturing PMI	-0.0	0.6	1.1	0.6	-1.4	0.8	**1.7**	0.4
NO Norges Bank Daily FX Purchases	1.3	0.4	0.1	0.3	**3.0**	1.4	0.4	-0.0
NO Retail Sales	1.5	1.3	1.3	1.2	-2.1	-0.9	-1.1	-1.4
NO Trade Balance	-1.9	0.4	0.5	0.6	-2.0	-2.3	-2.8	-0.7
NO Unemployment Rate	**1.6**	**1.7**	**2.0**	1.5	-2.6	-3.2	-2.6	-1.5
NO Unemployment Rate AKU	-1.7	-1.6	-1.8	-0.9	-2.0	-2.4	-2.2	-1.3
PL Average Gross Wages & PL Employment	-2.5	-1.5	-3.3	0.1	-0.7	0.5	0.5	0.5
PL Base Rate Announcement	-3.7	-3.6	-4.0	-0.0	-1.2	-2.1	-1.6	-1.5
PL Budget Balance	0.5	-0.1	0.2	-0.0	-1.8	-1.3	-0.2	-1.3
PL CPI	-1.6	-3.3	-3.4	-1.6	-2.6	-3.0	-2.7	-2.1
PL Construction Output	0.2	-0.8	-0.6	-0.2	-1.5	-1.7	-1.6	-0.4
PL Core CPI	-5.4	-4.3	-3.9	-1.7	0.2	-0.6	-0.7	0.3
PL Current Account	0.9	0.6	0.1	-1.2	-0.1	-0.7	-1.5	-1.5

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
PL GDP	1.1	-0.4	0.1	-0.5	0.0	-0.0	-0.6	-0.4
PL Monetary Aggregates	-0.9	-0.3	-0.2	**1.8**	0.6	0.5	-0.4	0.9
PL NBP Inflation Expectations	-3.6	-2.0	-0.9	0.6	-2.0	0.0	1.0	1.3
PL Official Reserves	-5.7	-5.5	-3.6	-1.9	-4.2	-2.6	-3.5	-2.6
PL PPI & PL Sold Industrial Output	0.1	0.4	0.2	0.6	0.7	0.4	0.7	-2.0
PL Retail Sales & PL Retail Sales Real	-2.9	-1.0	-1.0	-0.7	0.4	0.8	0.4	0.9
PL Unemployment Rate & PL Unemployment Rate Quarterly	-0.0	-0.3	-0.3	-1.1	-1.7	-1.7	-1.6	-2.9
PT CPI & PT CPI EU Harmonized	-1.5	1.0	1.2	-0.2	-0.4	-0.2	-1.4	-1.6
PT Construction Works Index	-1.1	-0.8	-1.9	-2.1	0.5	-2.5	-1.5	-2.5
PT Consumer Confidence & PT Economic Climate Indicator	-1.0	-2.0	-2.1	-1.5	0.4	1.2	1.1	-0.8
PT Current Account Balance	1.0	0.4	0.4	0.8	**1.8**	**2.5**	**2.3**	0.6
PT GDP	0.3	0.5	0.0	0.4	0.7	1.4	1.2	0.3
PT Industrial Production	0.8	1.1	**1.7**	**1.8**	-1.2	-1.2	0.1	0.4
PT Industrial Sales	-0.5	-0.5	-1.0	-3.3	0.6	-0.2	-0.1	-0.0
PT Labour Costs	-1.0	0.2	-0.1	1.0	0.2	-2.6	-2.5	-0.6
PT PPI	0.9	0.8	0.3	0.8	-2.6	-2.3	-2.2	0.6
PT Retail Sales	0.8	0.6	0.5	0.4	1.2	0.9	0.3	-0.9
PT Trade Balance	0.2	-1.5	-0.8	-1.0	0.1	0.3	0.6	-1.1
PT Unemployment Rate	0.4	-0.0	-0.3	-0.4	0.7	-1.3	-1.4	-2.3
SE Average House Prices	-0.8	0.4	0.1	-0.5	-1.7	-1.8	-1.6	-1.1
SE Budget Balance	0.8	-0.5	0.0	0.2	0.8	0.9	1.3	-0.1
SE CPI	**1.7**	1.3	1.5	0.4	1.6	1.5	0.5	-1.1
SE Current Account Balance	-0.9	1.0	0.6	1.2	0.1	-0.1	-0.3	-1.3
SE GDP	-0.1	-0.5	-0.1	-1.2	-1.3	-1.8	-1.1	-0.4
SE Household Consumption	-0.9	1.0	1.1	0.8	0.6	-0.5	-0.2	-1.3
SE Household Lending	-1.5	-0.6	0.2	0.7	-1.0	-0.0	-0.6	-1.6
SE Industry Capacity	-0.6	-0.2	-0.2	0.6	-0.2	-1.0	-1.0	-1.1
SE PES Unemployment Rate	-0.2	-1.0	-0.7	-1.2	-3.4	-2.4	-0.0	-1.5
SE PMI Manufacturing	0.5	-0.8	-0.5	-1.3	**3.2**	**2.5**	1.2	0.2
SE PMI Services & Composite	1.2	1.1	0.9	1.0	**4.6**	**3.6**	**3.3**	**4.0**
SE PPI	1.1	0.9	0.3	-0.8	-0.4	0.0	-0.4	-1.0
SE Production Indices	-1.2	-0.2	-0.2	-0.6	-1.2	-1.2	-1.7	-0.1
SE Retail Sales	-1.1	-1.6	-2.1	-0.7	0.7	0.6	0.1	0.2
SE Service Production	0.7	0.8	0.6	-0.1	1.4	1.5	0.6	-0.4
SE Survey Confidence	-0.6	-0.5	0.3	-0.5	0.4	0.1	0.1	0.3
SE Total No. of Employees	0.7	0.3	-0.4	-0.1	**1.6**	1.5	0.9	-0.2
SE Trade Balance	**2.0**	**2.2**	**1.8**	1.0	1.3	-0.1	-0.1	1.1
SE Unemployment Rate & SE Unemployment Rate Trend	-0.4	-1.4	-0.6	-0.3	-1.5	-1.9	-0.5	-0.9
SE Wages Non-Manual Workers	-0.6	-1.1	-1.5	-1.2	0.7	0.7	0.8	0.4
UK BBA Loans for House Purchase	**2.2**	**1.9**	0.9	0.9	-2.5	-2.5	-2.7	-1.2
UK BRC Sales Like-For-Like	-2.2	-0.0	-0.5	1.3	-1.5	-1.8	-0.2	0.7
UK BRC Shop Price Index	-1.0	-1.3	-0.5	0.9	-3.8	-1.9	-0.6	-2.1
UK CBI Sales	0.3	-0.5	-1.3	0.1	0.8	-1.1	0.1	0.7
UK CBI Surveys	-1.5	-0.9	-0.8	-1.2	-0.1	-1.2	-0.9	-0.3
UK Car Prod.	1.6	0.6	-0.3	1.3	-0.4	-0.0	0.2	1.0
UK Coincident and Leading Indicator	-0.9	-0.1	0.7	1.1	-0.8	0.9	0.8	**2.3**
UK Construction Output	-1.2	-1.6	-1.3	-0.7	0.2	-1.3	-1.3	-1.8

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
UK Expenditure Data	-0.6	-0.2	0.7	-1.8	-0.6	0.3	0.1	-0.9
UK GfK Consumer Confidence	-0.2	0.2	0.5	0.8	-2.3	-1.8	-1.7	-0.9
UK Halifax House Prices	0.7	1.6	1.2	1.2	1.1	1.3	1.0	0.5
UK Hometrack Housing Survey	-3.4	-3.3	-2.9	0.4	-0.2	0.2	-0.8	-0.2
UK House Price Index	-1.0	0.3	1.6	0.0	0.2	-0.2	-1.1	1.3
UK Index of Services	0.3	-0.5	-0.8	0.7	0.7	**2.1**	**2.2**	0.0
UK Industrial Production & UK Manufacturing Production	0.7	1.4	1.3	0.8	-0.8	-0.6	-0.7	0.4
UK Jobs Report	**2.3**	0.7	0.6	-0.3	-0.3	-1.7	-1.2	-1.4
UK Lloyds Business Barometer	-1.8	-1.6	-1.4	-0.3	-1.8	-1.8	-1.5	-0.9
UK Markit UK PMI Manufacturing	0.5	-0.1	0.1	-1.0	-0.4	0.9	**1.8**	1.3
UK Markit/CIPS UK Construction PMI	-0.0	0.2	0.2	-1.9	0.1	0.0	-1.1	-1.2
UK Monetary Aggregates	**1.7**	**2.0**	**1.8**	1.6	-0.5	-0.1	-0.7	0.3
UK NIESR GDP Estimate	0.8	0.5	0.2	-0.9	0.7	0.2	-1.5	0.2
UK Nationwide Consumer Confidence	-2.7	-0.7	-0.9	0.2	0.2	0.6	0.4	0.7
UK Nationwide House Prices	0.7	**1.7**	**1.9**	1.2	0.2	-0.2	-1.2	-0.2
UK New Car Registrations	-0.5	-1.6	-1.7	-1.1	-1.2	-1.6	-0.9	-2.0
UK ONS House Price	-1.0	0.1	0.9	-0.6	0.6	0.9	0.5	0.4
UK Official Reserves Changes	1.6	**1.7**	**1.7**	0.6	**2.1**	**2.2**	**2.4**	**1.9**
UK PMI and Official Reserves	-1.6	-1.7	-1.7	-0.4	-2.4	-3.0	-2.5	-2.2
UK Price Indices	1.2	0.4	-0.6	0.4	-0.5	-0.2	-0.5	-0.3
UK RICS House Price Balance	0.0	-0.3	0.4	-1.1	-0.6	-0.6	-1.0	-1.9
UK Retail Sales Ex Auto & UK Retail Sales Incl. Auto	0.6	0.5	0.5	-1.2	-0.1	-0.6	-1.1	-0.7
UK Rightmove House Prices	-0.0	0.7	0.7	-0.0	-1.3	-1.1	-0.1	0.6
UK Total Business Investment	-0.6	0.3	-0.1	-0.6	-1.2	-2.0	-1.9	-0.8
UK Trade Balance	1.6	-0.2	-0.2	-0.8	0.4	0.4	-0.5	1.2
US ADP Employment Change	**2.7**	**2.9**	**2.7**	0.9	-1.1	0.7	**2.0**	-0.1
US Auction Announcement Bill	0.3	0.6	0.6	0.8	**2.1**	**2.7**	**2.8**	**1.8**
US Auction Announcement Bond	-2.5	-3.2	-3.1	-1.4	-1.2	-0.5	0.1	-1.1
US Auction Announcement Note	0.5	0.8	0.7	-0.7	0.6	-0.5	-0.0	-1.0
US Auction Result Bill	0.9	0.9	0.6	1.0	**1.7**	1.5	0.3	1.3
US Auction Result Bond	**2.6**	**4.5**	**5.6**	1.5	0.8	**2.3**	**3.6**	1.3
US Auction Result Note	**6.1**	**8.8**	**10.1**	**1.7**	**2.5**	**2.9**	**2.5**	**1.7**
US Budget Statement	-2.3	-2.3	-1.6	-0.7	0.4	-0.1	-1.6	-1.0
US Building Permits & US Housing Starts	1.6	**1.8**	**1.7**	0.6	0.4	1.3	**1.8**	-1.3
US Business Inventories	-0.6	-0.2	0.4	-1.5	0.3	0.8	1.0	-0.7
US CPI and Earnings Data	**4.1**	**4.8**	**4.7**	**1.8**	1.2	**3.0**	**4.8**	1.5
US Car Sales	1.1	1.2	1.1	-0.4	1.6	1.6	**1.9**	**1.9**
US Challenger Job Cuts	-0.3	-0.1	-0.7	-1.9	-0.7	-0.2	-1.9	-0.8
US Chicago Purchasing Manager	**2.8**	**4.1**	**4.6**	**1.8**	1.4	**3.9**	**3.4**	**1.8**
US Conference Board Indices	**3.6**	**3.7**	**3.7**	**3.7**	**1.7**	**3.1**	**3.2**	**3.8**
US Confidence Indicator and Mortgage Applications	-3.2	-2.3	-2.0	1.3	-1.0	-2.2	-1.4	0.0
US Consumer Credit	0.3	0.6	0.9	-2.0	-2.3	-0.9	0.1	-0.4
US Current Account Balance	0.2	0.1	0.3	-1.0	-1.4	-1.4	-0.6	-1.6
US Durable Goods	**4.5**	**5.1**	**5.3**	1.5	1.3	**2.2**	**2.1**	1.5
US EIA Weekly Petroleum Report	-1.8	-2.5	-3.2	-1.9	-0.7	-1.0	-1.6	-2.9
US Empire Manufacturing	-0.6	1.1	1.6	-0.3	0.6	0.9	1.0	-0.7
US Employment Cost Index	**2.6**	**2.5**	**2.6**	**2.0**	**2.2**	**2.4**	**2.5**	1.1

Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
US Employment Report	**7.2**	**9.3**	**9.0**	**6.5**	**5.4**	**5.4**	**9.7**	**7.2**
US Existing Home Sales	**1.9**	**2.3**	**2.5**	**2.1**	**1.8**	**1.9**	**1.8**	**2.4**
US Export and Import Prices	0.1	1.0	1.2	-0.4	-0.7	0.7	0.9	-0.6
US FHFA House Prices	-1.0	0.3	0.9	-0.3	-0.3	-1.2	1.0	-0.2
US GDP, GDP Price Index, PCE	**2.6**	**3.5**	**3.7**	**2.3**	-0.4	**2.5**	**2.7**	**2.4**
US Help Wanted Index	0.7	0.8	-0.1	0.9	1.2	1.6	**1.7**	0.9
US IBD/TIPP Economic Optimism	-0.4	0.2	-0.2	1.3	-2.7	-2.2	0.4	0.7
US ICSC Chain Store Sales	0.2	0.1	0.7	-0.4	-2.3	-0.9	-0.0	-0.4
US ISM Milwaukee	-0.0	-0.8	-0.7	-0.9	1.0	1.0	0.7	0.2
US ISM New York	-1.6	-1.8	-2.7	-1.6	-0.7	-1.0	-1.7	-1.0
US ISM Non-Manufacturing	**2.5**	**3.2**	**3.6**	**2.4**	**1.9**	**2.3**	**2.7**	**2.8**
US ISM Releases	**5.1**	**6.2**	**7.1**	**3.9**	**3.7**	**5.6**	**6.9**	**3.6**
US Inventories and Trade Balance	-0.3	-1.3	-1.9	**1.7**	-2.7	-2.2	-0.7	1.5
US JOLTS Job Openings	-1.3	-1.8	-1.8	0.1	0.3	-0.2	-0.9	-0.1
US Jobless Claims	**2.3**	**2.7**	**3.4**	1.0	**5.1**	**5.6**	**3.5**	1.1
US Leading Index	-0.2	1.3	**1.9**	**2.2**	1.6	**2.5**	**3.1**	**2.3**
US Markit US Composite PMI & US Markit US Services PMI	0.9	1.1	0.6	-0.2	-0.9	-1.2	0.5	-0.4
US Markit US Manufacturing PMI	-1.6	-1.3	-1.6	-2.4	-3.1	-2.1	-2.5	0.0
US Mortgage Foreclosures and Delinquencies	-1.1	0.2	0.6	-0.5	-1.3	-1.2	-0.8	-0.4
US NAHB Housing Market Index	0.1	0.5	0.2	-0.4	-0.9	0.1	0.6	-0.1
US NFIB Small Business Optimism	-0.6	1.0	0.7	1.0	0.3	0.1	-0.4	-0.3
US Net Long-term TIC Flows & US Total Net TIC Flows	-1.4	-1.3	-0.5	0.1	-4.5	-4.8	-2.8	-2.2
US New Home Sales	**2.1**	**2.8**	**3.0**	1.6	1.3	**2.3**	**2.8**	**2.1**
US Nonfarm Productivity & US Unit Labor Costs	1.6	**1.8**	**2.6**	-1.6	1.3	1.1	0.6	-0.4
US PCE, Personal Income and Spending	-1.7	-0.5	0.5	-2.3	-1.9	-1.5	-0.7	-2.1
US PPI	**1.9**	**3.0**	**3.6**	0.5	**2.1**	**2.0**	**2.7**	1.6
US Pending Home Sales	0.0	-0.9	-1.5	0.7	0.8	0.9	0.6	-0.4
US Production and Capacity Utilization	**2.0**	**2.6**	**2.4**	0.4	1.3	**1.8**	**2.4**	-0.2
US Retail Sales	**3.8**	**4.7**	**5.2**	**1.7**	0.9	**3.0**	**4.3**	**2.6**
US S&P Case-Shiller Index	-0.1	-0.4	-0.7	-1.9	-0.7	-1.2	-1.4	-2.4
US Survey Confidence	-0.7	-2.9	-2.4	**1.7**	-2.2	-2.2	-1.7	-2.9
US Trade Balance	-1.2	-0.9	-1.8	1.0	-2.4	-3.0	-3.6	-1.0
US University of Michigan Surveys	**3.0**	**2.7**	**2.9**	**2.2**	**1.9**	**2.1**	**2.4**	**2.0**
Fed: Ad Hoc Press Release	1.4	1.6	**1.7**	**2.6**	1.3	1.3	1.0	**2.1**
Fed: Beige Book	**2.2**	**1.8**	1.5	0.5	1.4	1.2	1.6	**1.8**
Fed: Discount Rate Minutes	0.1	0.7	0.7	1.0	0.7	0.9	1.3	1.1
Fed: Minutes	**4.9**	**5.0**	**5.4**	**3.9**	**2.2**	**3.0**	**4.1**	**2.1**
Fed: Press Conference	-0.4	0.6	0.6	0.6	-1.0	-0.3	0.5	1.0
Fed: Press Release	**5.4**	**5.0**	**2.9**	**3.4**	**4.1**	**4.6**	**4.1**	**2.1**
Fed: Speech by Chair	**3.1**	**3.9**	**3.3**	**1.8**	**2.1**	**2.4**	**2.7**	1.4
Fed: Speech by FOMC member	**2.6**	**2.2**	**2.0**	-1.3	0.7	0.7	1.1	0.3
ECB: (T)LTRO	-1.0	-0.9	-0.8	-0.3	0.5	0.4	0.7	-1.0
ECB: (T)LTRO Repayment	**1.9**	0.6	-0.4	0.4	**2.3**	1.6	1.4	**2.7**
ECB: Accounts	-2.2	-1.4	-1.2	0.1	**2.9**	1.5	1.4	-0.8
ECB: Ad Hoc Press Release	1.0	1.4	1.5	0.9	**1.9**	**2.1**	1.6	**1.8**
ECB: Asset Purchase Programmes	-4.8	-0.8	-2.3	1.5	-0.6	-4.0	-3.5	-1.9
ECB: Economic Bulletin	0.8	0.6	0.3	0.7	-1.5	-1.2	-1.5	-1.8

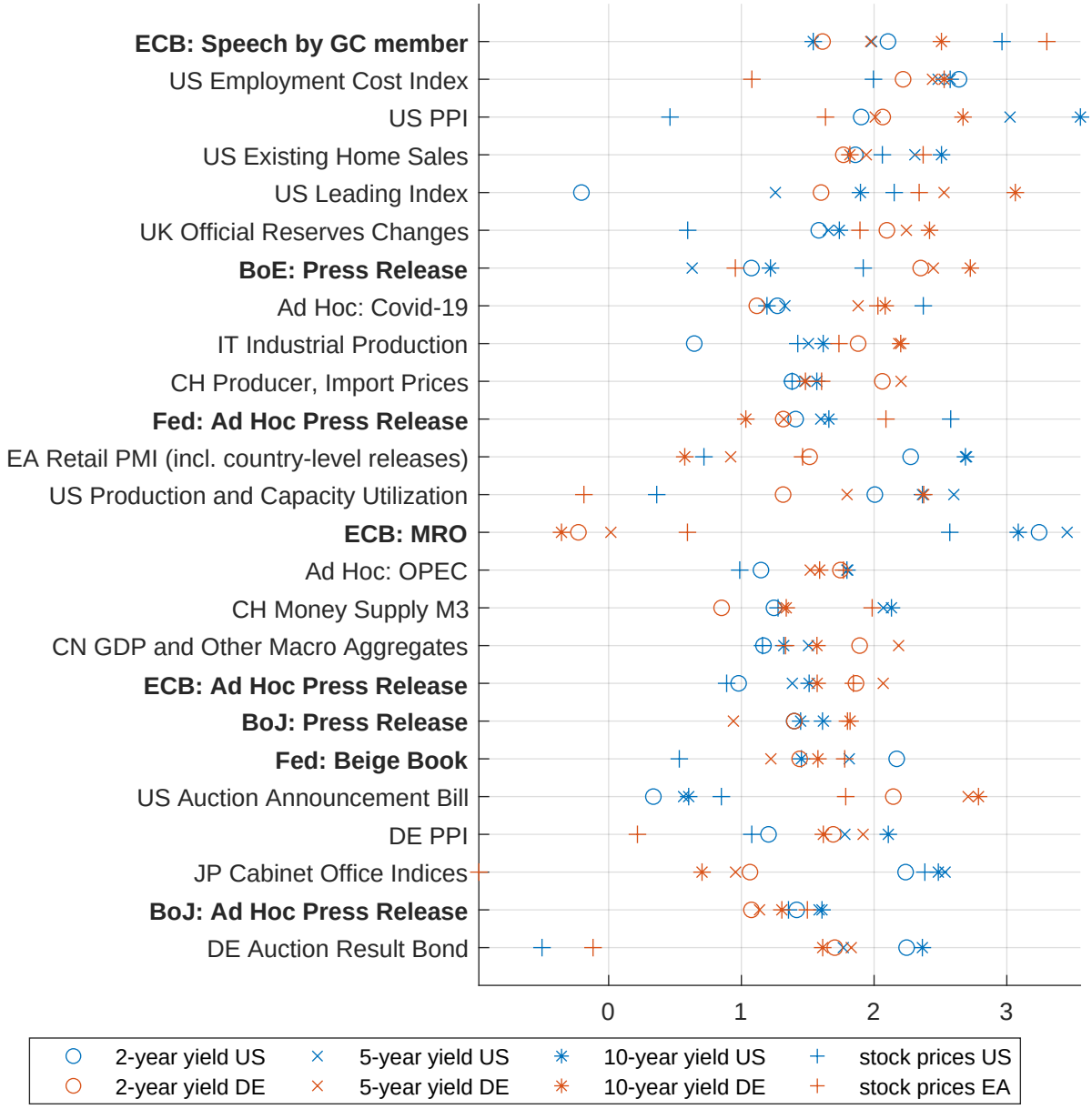
Table D.12: T-Statistics of Scheduled Releases from Dummy Regression (continued)

News Type	y_{2y}^{US}	y_{5y}^{US}	y_{10y}^{US}	y_{s}^{US}	y_{2y}^{EA}	y_{5y}^{EA}	y_{10y}^{EA}	y_{s}^{EA}
ECB: MRO	**3.2**	**3.5**	**3.1**	**2.6**	-0.2	0.0	-0.4	0.6
ECB: Press Conference	-1.2	0.0	0.9	1.2	**6.4**	**9.2**	**9.2**	**3.6**
ECB: Press Release	0.5	1.3	**1.9**	**2.0**	**3.6**	**4.1**	**3.2**	**3.1**
ECB: Securities Markets Programme	-2.7	-1.1	-1.1	0.5	-2.2	-3.2	-2.2	-0.9
ECB: Speech by GC member	**2.1**	**2.0**	1.5	**3.0**	1.6	**2.0**	**2.5**	**3.3**
ECB: Speech by President	0.9	1.2	**1.7**	**1.8**	**4.2**	**4.1**	**4.5**	**2.1**
ECB: Weekly Financial Statement	-1.5	-1.7	-2.1	-1.1	-0.3	0.9	-1.0	-4.0
ECB: other Refi Op	0.8	-0.8	-0.9	-3.8	1.1	0.4	0.8	-3.3
BoE: Ad Hoc Press Release	-0.5	-0.8	-1.5	-0.7	-0.2	-0.4	-1.6	-0.9
BoE: Inflation Reports	0.9	-0.9	-0.6	-0.9	-0.2	1.2	**2.0**	-0.1
BoE: Minutes	0.5	0.9	1.0	-0.3	0.3	1.1	**1.8**	1.2
BoE: Press Conference	-3.7	-2.2	-2.3	-1.6	-2.4	-2.5	-1.8	-1.4
BoE: Press Release	1.1	0.6	1.2	**1.9**	**2.4**	**2.4**	**2.7**	1.0
BoE: Speech by Governor	0.6	0.2	-0.7	-0.1	-0.7	0.0	0.1	1.0
BoJ: Ad Hoc Press Release	1.4	1.6	1.6	1.4	1.1	1.1	1.3	1.5
BoJ: Minutes	-0.3	-2.4	-2.1	-1.0	-0.9	-1.0	-1.3	-0.3
BoJ: Monthly Report	-0.1	-0.2	-0.6	-0.4	1.2	1.3	1.1	-0.3
BoJ: Press Conference	0.1	1.0	1.1	-1.1	0.2	0.1	-1.2	-0.3
BoJ: Press Release	1.4	1.6	1.4	1.6	1.4	0.9	**1.8**	**1.8**
BoJ: Speech by Governor	-0.6	-1.5	-0.4	0.9	1.3	0.1	-0.1	1.3
BoJ: Summary of Opinions	-2.4	-1.9	-1.7	-2.1	0.7	0.9	1.0	0.9
SNB: Press Conference	1.2	1.5	**1.8**	-0.3	0.5	1.4	1.2	-0.4
SNB: Press Release	-1.4	0.6	0.9	1.0	**1.9**	**2.0**	**2.0**	1.0
SNB: Quarterly Bulletin	-1.7	-0.7	-0.9	0.9	-2.0	-2.9	-3.1	-1.4
SNB: Speech by Chair	1.4	0.6	0.7	1.2	0.9	1.0	1.0	**1.9**
Riksbank: Minutes	0.8	1.0	1.1	-2.1	-0.3	-0.4	-0.9	0.0
Riksbank: Press Conference	-1.1	-1.9	-2.3	0.4	-0.2	-0.6	-0.8	-0.8
Riksbank: Press Release	0.6	1.4	1.4	1.6	**1.6**	1.5	0.9	1.2
BoC: Press Release	1.2	1.0	1.0	0.7	0.1	-0.3	0.7	-0.4
RBA: Press Release	0.4	0.2	1.1	-0.6	0.6	0.7	0.4	-0.2
Ad Hoc: Iraq War	**2.2**	**2.1**	**2.3**	**2.4**	**2.8**	**2.7**	**2.6**	**3.1**
Ad Hoc: Global Financial Crisis	**3.1**	**2.6**	**2.9**	**4.2**	**3.2**	**3.3**	**2.9**	**4.5**
Ad Hoc: European Sovereign Debt Crisis	-1.6	-0.5	0.4	-1.7	0.4	**3.0**	**3.4**	**2.2**
Ad Hoc: Covid-19	1.3	1.3	1.2	**2.4**	1.1	**1.9**	**2.1**	**2.0**
Ad Hoc: Sovereign Credit Ratings	-1.8	-0.2	0.0	0.3	0.8	1.2	1.0	0.8
Ad Hoc: OPEC	1.1	**1.8**	**1.8**	1.0	**1.7**	1.5	1.6	**1.8**
Ad Hoc: Trump	1.0	1.6	1.5	**1.7**	-1.3	0.2	0.8	0.1
Ad Hoc: Other Unscheduled Event	**2.9**	**3.2**	**3.5**	**3.7**	**2.8**	**3.3**	**2.0**	**1.9**

T-statistics of scheduled news releases, see dummy regression in Equation (1). Significant effects at the 10% level are in bold. News types with significant effects on at least one asset are also in bold.

Figure D.3: Important Scheduled News

(a) Rank 26-50

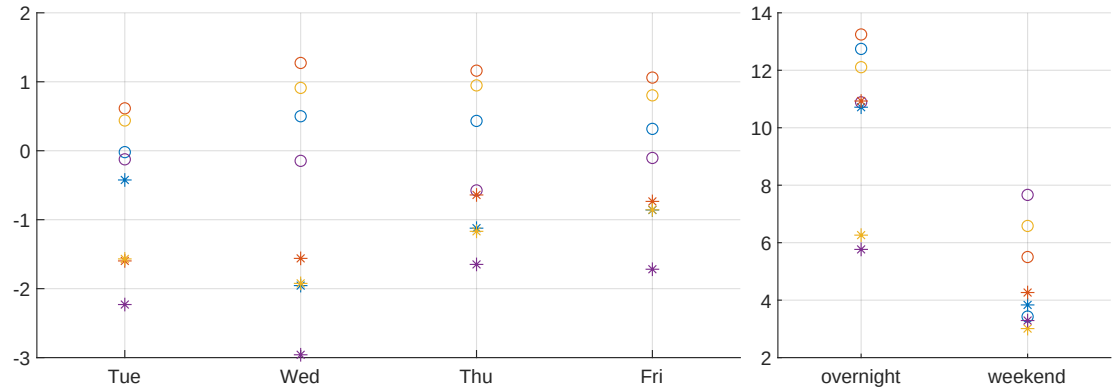


(b) Rank 51-75

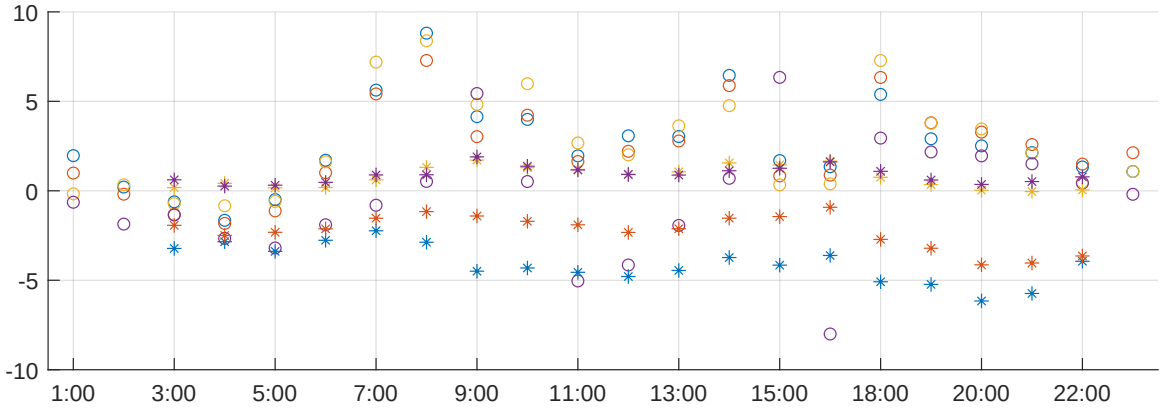
Each symbol-color combination refers to a t-statistic of β_i from a separate regression, one for each of the eight assets we study, see Equation (1). Each row label refers to a different news release. Monetary policy announcements are in bold font. Figure 1 shows results for the 25 most important news.

Figure D.4: Fixed-Effects from Regression (1)

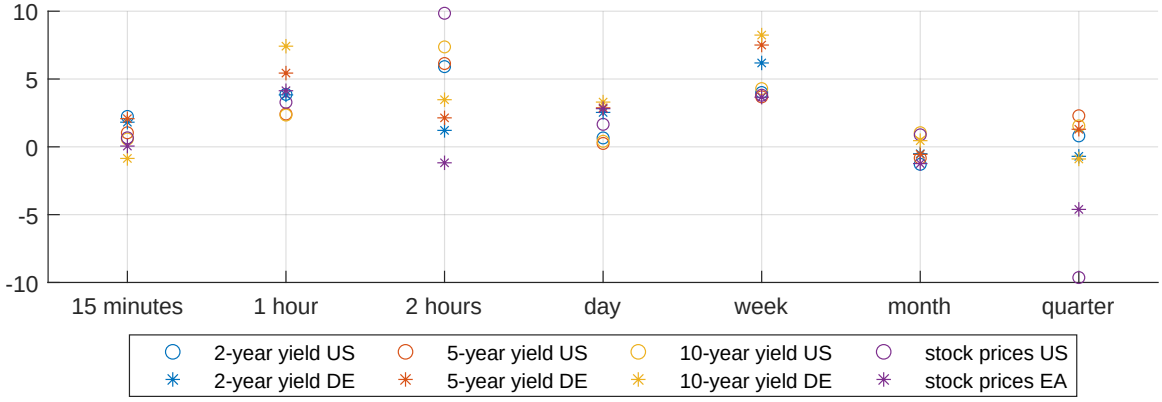
(a) day of the week and overnight



(b) hour within day



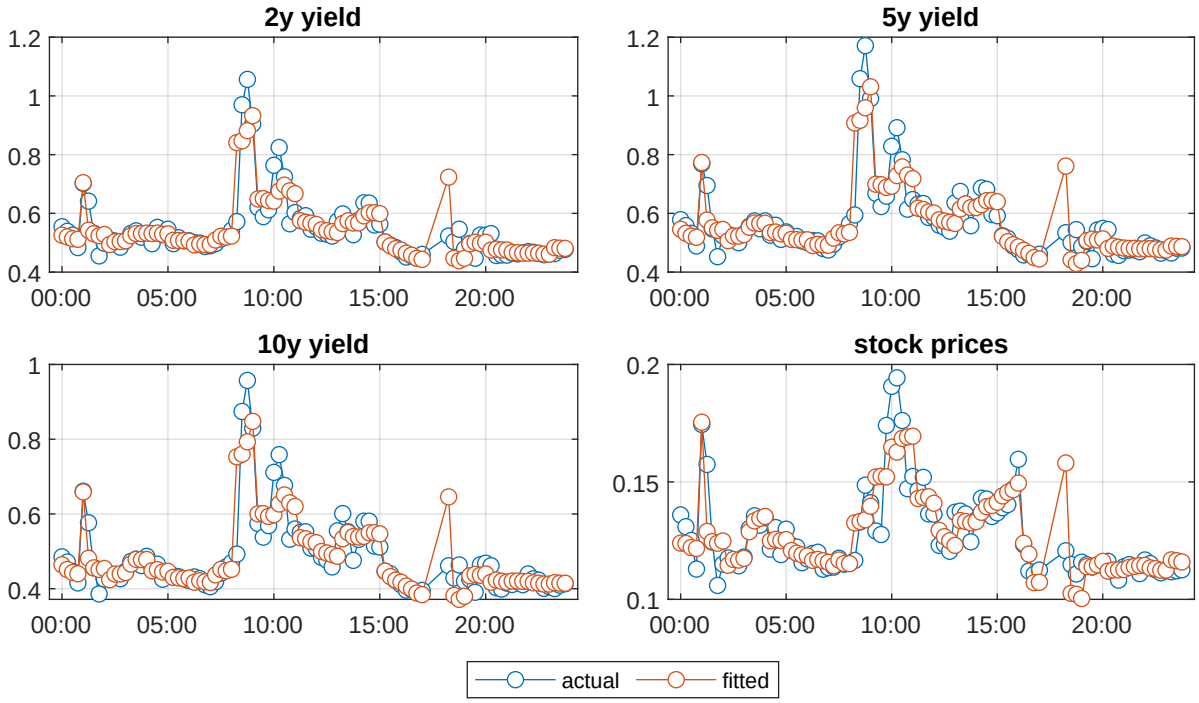
(c) past volatility



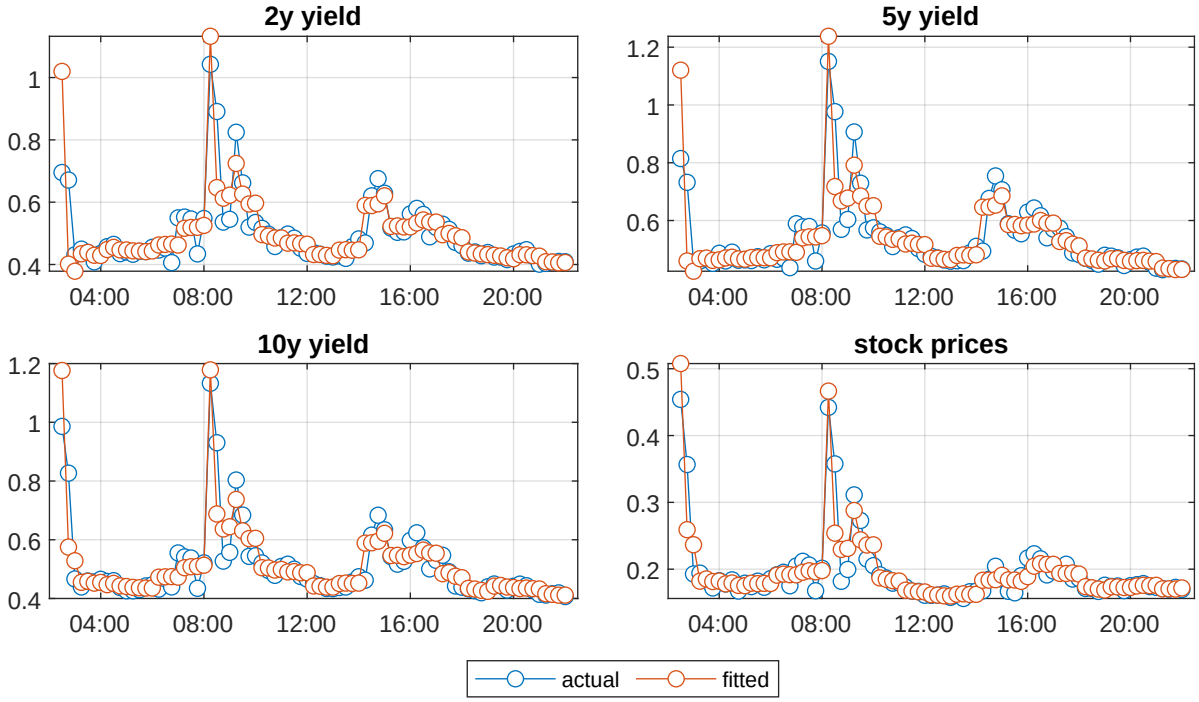
T-statistics of fixed-effects included in Equation (1). The "overnight dummy" in panel (a) captures any time span greater than 15 minutes, the "weekend dummy" captures any time span greater than 24 hours, i.e. not only weekends but also other non-trading days. The hour dummies in panel (b) refer to local time and capture price movements over the subsequent hour, i.e. the 3 p.m. dummy covers 3 p.m .to 4 p.m. and so forth. Panel (c) refers to the realized power measures included in Equation (1), i.e. the sum of y_t^2 over the previous 15 minutes, 1 hour, 2 hours, day, week, month and quarter.

Figure D.5: Actual and Fitted Intraday Volatility Patterns

(a) US



(b) EA



This figure shows the volatility pattern of each asset price throughout the day (cf. Figure 3 in Andersen et al., 2003). The solid line is the intraday pattern of the square root of the absolute residual $\sqrt{|\epsilon_t|}$, where ϵ_t is the residual from Equation (1) excluding calendar-based fixed-effects and lagged volatility measures, i.e. from the following regression: $y_t^2 = \alpha + \sum_i^N \beta_i \cdot D_{it} + \epsilon_t$. The dashed line refers to the fitted intraday pattern using the calendar-based fixed-effects and lagged volatility measures from Equation (1), i.e. the fitted values from the following regression: $\sqrt{|\epsilon_t|} = \alpha + \lambda \cdot FE + \gamma \cdot vol$. Yield changes are in basis points, stock returns in percent. All values refer to averages across days. The horizontal axis refers to US Eastern Time for US assets and to Central European Time for EA assets.