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Central bank information effects and transatlantic spillovers

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Abstract

The news about the economy contained in a central bank announcement can affect public expectations. This paper shows, using both event studies and vector autoregressions, that such central bank information effects are an important channel of the transatlantic spillover of monetary policy. They account for a part of the co-movement of German and US government bond yields around Fed policy announcements, and for most of this co-movement around ECB policy announcements, explaining the puzzling responses of US variables.

JEL Classification: E52, F31, F42

Keywords: International Policy Transmission, Monetary Policy Shocks, High-Frequency Identification, Structural VAR

Non-technical summary

The yields on the US and German government bonds often co-move on the days when the Fed or the ECB announce their policy decisions. This is one symptom of the transatlantic spillovers of domestic monetary policies. Because of these spillovers, it is feared, when one central bank raises rates and tightens financial conditions in its jurisdiction, they tighten on the other side of the Atlantic as well. But this paper shows that a part of the spillovers observed after Fed announcements and the bulk of those observed after ECB announcements are of entirely different nature. On average in the last 20 years, when both German and US government bond yields increase in the wake of an ECB announcement, this is typically followed by higher stock prices and lower corporate bond spreads, i.e. overall easier, not tighter, financial conditions on both sides of the Atlantic. This pattern is present both in daily and in monthly data.

Recent literature on "central bank information effects" offers an explanation of this finding. As long as there is uncertainty about the state of the economy, the information effect will emerge, meaning that people analyzing a central bank policy announcement will update their beliefs not only about monetary policy, but also about the economy. Consequently, a surprise interest rate hike makes investors pessimistic when it is perceived as hawkish monetary policy, but optimistic when it is interpreted as a proportional reaction to good economic news (i.e., when the information effect is triggered).

The strong transatlantic spillover of the ECB information effect documented in this paper is interesting for at least three reasons. First, this finding implies that transatlantic monetary policy spillovers are more complex than previously believed. In particular, observing a co-movement of German and US government bond yields is not sufficient to conclude about the economic nature of the transatlantic spillover, one needs to look at other financial data too. Second, this paper documents a case where the central bank information effect is quite clear in the data and economically significant. So far, economists agree that this effect is a theoretical possibility but continue to debate its economic significance in other datasets and samples studied before. Third, the transatlantic spillover of the information effects suggest a combination of correlated economic fundamentals in Europe and the US, and financial spillovers through integrated financial markets, possibly including an effect of central bank announcements on investor sentiment.

1 Introduction

The yields on the US and German government bonds often co-move on the days when the Fed or the ECB announce their policy decisions. This is one manifestation of the transatlantic spillovers of monetary policies through integrated financial markets. A large literature documents that when the Fed hikes its interest rate, financial conditions tighten and the economic activity declines also outside of the US borders (Rey, 2013; Miranda-Agrippino and Rey, 2020, and many others). But, as repeatedly pointed out by the Fed officials, the Fed is not the only central bank whose actions affect global financial markets (e.g. Powell, 2018; Clarida, 2021). US and European government bond yields co-move also around ECB policy announcements (e.g. Curcuru et al., 2018). However, the empirical evidence on the effects of ECB policies on the US is often counter-intuitive and the published literature on it is scarce.

This paper dissects an empirical puzzle that has plagued this research. It shows that an ECB interest rate hike that spills over across the Atlantic is followed by an easing, not a tightening, of the US financial conditions and an expansion of economic activity. This paper argues that the evidence is consistent with a weak transatlantic spillover of the ECB monetary policies and a strong transatlantic spillover of the ECB information effects. The latter mean that investors facing a positive interest rate surprise infer that the ECB is more bullish about the economy than they expected and this makes them more bullish as well (Romer and Romer, 2000; Nakamura and Steinsson, 2018). In fact, as this paper shows, when the US financial variables respond to ECB interest rate hikes, their response is similar to their response to unexpectedly positive euro area macroeconomic data releases.

I first document that the transatlantic spillovers of ECB interest rate surprises are conditional on the co-movement of European interest rates and stock prices. Not all ECB interest rate surprises generate a persistent effect on the US Treasury yields. It is only those that are associated with a positive co-movement of European interest rates and stock prices. Hence, these transatlantic spillovers cannot be driven by ECB monetary policy shocks, which would have driven these two variables in the opposite directions. I construct proxies for ECB monetary policy and information shocks based on the high-frequency co-movement of interest rates and stock prices in the wake of policy announcements, following Jarociński and Karadi (2020). It is the ECB information shocks that move the Treasury yields.

Next, I study the responses of other US variables to ECB shocks using daily event study regressions and monthly vector autoregressions (VARs). The ECB information shocks significantly affect a range of US financial variables, including stock prices, corporate bond spreads and the dollar exchange rate, also against currencies other than the euro, and are eventually followed by stronger US real activity and higher prices.

For a comparison, I estimate the transatlantic spillovers of selected European macroeconomic news surprises, defined as the differences between the actual data releases and their earlier expectations from Bloomberg surveys of professional forecasters. I find that the US financial markets respond to an ECB information shock similarly as they do to an unexpectedly high reading of the European industrial confidence or an unexpectedly low European unemployment rate.

I show that the responses of the US stock prices are not driven solely by internationally operating companies. Predominantly US-exposed companies respond almost as much as foreign-exposed companies. Instead, the stocks that respond the most to ECB information shocks are those that are particularly sensitive to general investor sentiment: financial stocks and small stocks (Baker and Wurgler, 2006).

Finally, using the same methodology and variables I study the effects of Fed shocks on the euro area. I find similar transatlantic spillovers of the Fed information shocks in the monthly VAR. However, in the case of the Fed the spillovers of monetary policy shocks dominate, consistently with the consensus in the literature.

These results reconcile two facts. On the one hand, research finds that the transatlantic financial spillovers work both ways, also from Europe to the US. The already mentioned paper by Curcuru et al. (2018) documents a positive co-movement of US Treasury yields and German bunds on the days of ECB policy announcements. For another example, Ehrmann et al. (2011) find significant spillovers of European shocks to the US across several asset classes. On the other hand, there is a dearth of published evidence on the effects of ECB policy on the US risky asset prices and financial conditions, while some papers note in passing that these effects appear puzzling (Rogers et al., 2014; Brusa et al., 2020). Instead, the literature on the international spillovers of ECB monetary policies focuses on the non-eurozone European countries (e.g. Bluwstein and Canova, 2016; Moder, 2019; Feldkircher et al., 2020; Ellen et al., 2020; Corsetti et al., 2021), on specific subsets of monetary policy interventions (Georgiadis and Gräb, 2016), or both.

This paper shows that it is exactly those ECB surprises that generate information effects at home, according to the Jarociński and Karadi (2020) decomposition, that are responsible for the bulk of the transatlantic spillovers. Hence, the response of US financial variables to these ECB surprises is not puzzling. It is similar to the effect of other European macroeconomic news. These responses are consistent with a combination of correlated economic fundamentals in Europe and the US, and financial spillovers through integrated financial markets, possibly including an effect of ECB announcements on investor sentiment.

It is also intuitive that the ECB monetary policy shocks have little effect on the US. In the integrated global financial markets the role of the dollar as investing and funding currency dwarfs that of the euro (Rey, 2016), so the Fed can easily offset any tightening of the US financial conditions caused by the ECB. The VAR evidence in this paper shows that the US Treasury yields fall in response to contractionary ECB monetary policy shocks, suggesting that markets expect such an offsetting policy. This paper studies also the responses of the federal funds target rate to ECB monetary policy shocks but this evidence is less conclusive.

The aforementioned large literature that documents strong international spillovers of the Fed's monetary policy includes also Kim (2001); Maćkowiak (2007); Georgiadis (2016); Ha (2016); Dedola et al. (2017); Gerko and Rey (2017); Degasperi et al. (2021) and many others. The literature on central bank information effects goes back to Romer and Romer (2000). Melosi (2017); Nakamura and Steinsson (2018) build theoretical models featuring these effects and Campbell et al. (2012); Miranda-Agrippino and Ricco (2019); Cieślak and Schrimpf (2019); Jarociński and Karadi (2020); Andrade and Ferroni (2021), among others, provide empirical evidence. Kroencke et al. (2021) document a related phenomenon of the "FOMC risk shift." This paper's empirical methodology is based on Jarociński and Karadi (2020).

This paper belongs to the growing recent literature on the contribution of central bank information effects to international spillovers. Cesa-Bianchi and Sokol (2021) document the spillover of the Fed information shocks to Europe. In Stavrakeva and Tang (2019) and Gürkaynak et al. (2021) central bank information effects help explain the behavior of the exchange rate. Bekaert et al. (2020) find strong non- monetary policy-driven risk and uncertainty spillovers across countries, emanating not just from the US but also from the euro area (and Japan). Franz (2020) studies a panel of exchange rates and shows that speculative currencies appreciate after positive ECB information shocks. Furthermore, controlling for central bank information effects is important for precisely isolating the spillovers of monetary policy shocks in Ca' Zorzi et al. (2020); Miranda-Agrippino and Rey (2020); Corsetti et al. (2021); Miranda-Agrippino and Nenova (2021).

The rest of the paper is organized as follows. Section 2 explains the identification of shocks. Section 3 documents the conditional transatlantic spillovers of the ECB interest rate surprises to US Treasury yields. Section 4 reports the responses of other US variables. Section 5 focuses on the responses of the Fed policy rates. Section 6 compares the spillovers of ECB surprises with those of other European macroeconomic news. Section 7 reports the transatlantic spillovers of Fed shocks. Section 8 concludes.

2 Central bank interest rate surprises and their two components

Monetary policy reacts to the state of the economy, reflecting a variety of global and domestic shocks. In order to isolate the international spillovers of central bank policies from the international spillovers of other shocks, this paper focuses on central bank interest rate *surprises*. These are defined as the high-frequency reactions of market interest rates to central bank announcements. Furthermore, I decompose the interest rate surprises into two distinct components.

2.1 Central bank surprises

When a central bank begins to announce its policy, markets have already priced in its systematic response to the state of the economy. Therefore, the surprise is exogenous to this response and, hence, useful for isolating the causal effects of the central bank communication and action. The use of surprises for identification goes back at least to Kuttner (2001). I take the ECB surprises from the dataset of Altavilla et al. (2019) and the Fed surprises from the updated dataset of Gürkaynak et al. (2005). Since the focus of this paper is on the transatlantic spillovers, I drop all the simultaneous policy announcements by the Fed and the ECB.

The Euro Area Monetary Policy Event-Study Database (EA-MPD) of Altavilla et al. (2019) includes all the monetary policy announcements that follow ECB Governing Council meetings. I use the surprises in the "Monetary Event" window: a half-hour window around the press release, extended until 15 minutes after the end of the press conference whenever there is one. The EA-MPD vintage used in this paper contains 264 announcements from 7 January 1999 to 6 June 2019. I drop three coordinated, same-day policy announcements by the Fed and the ECB: on 13 and 17 September 2001 and on 8 October 2008. This leaves 261 ECB announcements.[1]

The Fed surprises come from the updated Gürkaynak et al. (2005) (GSS) database. For comparability with the ECB I start the sample in 1999 and the database version used in this paper ends in May 2019. I drop three coordinated, same-day policy announcements by the Fed and the ECB: on 17 September 2001, 11 March 2008 and 8 October 2008 (the second one is not present in the EA-MPD). This leaves 170 announcements

For each dataset I compute the summary **interest rate surprises**, i^{Total} and **stock price surprises**, s. The interest rate surprise is the first principal component of the surprises in interest rate derivatives with maturities up to 1 year. For the Fed I use the first principal component of the surprises in the current month and 3-month fed funds futures and 2-, 3-, and 4- quarters ahead 3-month eurodollar futures.[2] I rescale it so its variance equals that of the 4-quarters ahead eurodollar futures. For the ECB I use the first

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[1] I check the robustness of the results with the Jarociński and Karadi (2020) database. This database includes on top of the EA-MPD announcements also 34 additional policy-related announcements that did not directly follow the ECB Governing Council meetings (and hence are not in the EA-MPD). 24 of these announcements are about USD swaps with the Fed and 10 are about nonstandard policies, such as unusual refinancing operations or changes in the collateral rules for the refinancing operations. Furthermore, there are minor differences in the timing of the windows and the computation of the representative market price at the end points of the window. Nevertheless, all the findings are very similar when the ECB surprises are taken from this alternative database.

[2] Among others, Gürkaynak et al. (2005) and Nakamura and Steinsson (2018) work with the principal components of the same instruments.

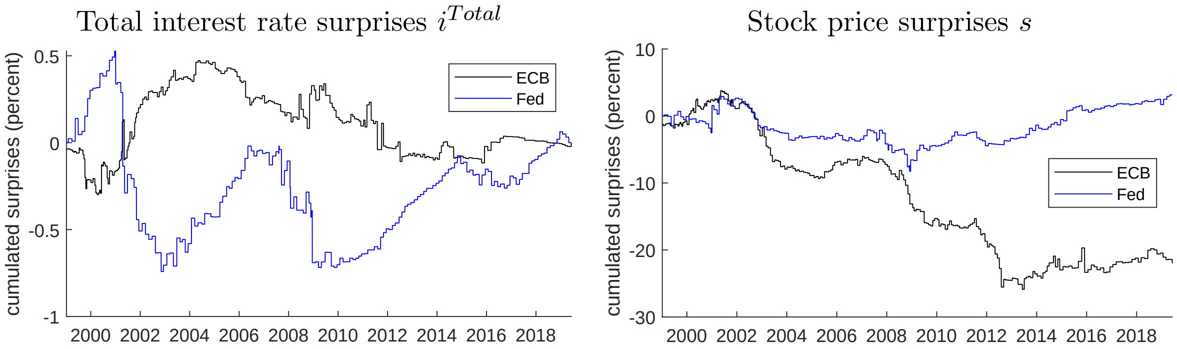
principal component of the surprises in the Overnight Index Swaps (OIS) with maturities 1-, 3- and 6-months and 1-year. I rescale it so its variance equals that of the 1-year OIS swap. Consequently, the ECB interest rate surprises have the standard deviation of 4.18 basis points and the Fed interest rate surprises are slightly larger at 6.81 basis points. For the Fed stock price surprises I use the S&P500 index and for the ECB stock price surprises I use the Euro Stoxx 50 index.

Table 1: Cross-correlations of Fed and ECB surprises

	Total interest rate surprise, i^{Total}		Stock price surprise, s		N. of pairs
correlation between the Fed surprise and the most recent ECB surprise	-0.14	(0.08)	0.11	(0.18)	163
correlation between the Fed surprise and the subsequent ECB surprise	-0.09	(0.25)	0.12	(0.13)	163

Note. P-values in parentheses. There are only 163 pairs of consecutive Fed and ECB surprises because sometimes there are two Fed surprises in a row without an ECB suprise in between.

Figure 1: Cumulated surprises



Total interest rate surprises i^{Total}

Stock price surprises s

The consecutive ECB and Fed surprises are not correlated, as shown in Table 1.[3] This is important, because this guarantees that we don't mistake the effects of domestic policy shocks for transatlantic spillovers. Figure 1 plots the cumulated surprises of both central banks, interest rate surprises in the left panel and stock price surprises in the right panel. This figure shows that also at lower frequencies there is no systematic correlation between the Fed and ECB surprises.

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[3] The first correlation of -0.14 is significant at the 10% level but this correlation changes to 0.02 if one omits the large negative Fed surprise on April 18, 2001, which was preceded by a large positive ECB interest rate surprise on April 11.

2.2 Decomposing interest rate surprises into monetary policy and information shocks

Next, I follow Jarociński and Karadi (2020) and decompose the total interest rate surprises based on their correlation with the stock price surprises, as

$$i^{Total} = i^{MP} + i^{CBI}. \tag{1}$$

where i^{MP} is negatively correlated with s and i^{CBI} is positively correlated with s.

According to a textbook asset pricing model, monetary policy shocks generate a negative correlation between the interest rate and stock price surprises. For example, an expansionary monetary policy shock reduces the discount rate and increases the expected future dividends, so the stock price, which reflects the present discounted value of future dividends, increases. This justifies thinking of i^{MP} as a proxy for a Monetary Policy (MP) shock.

Since the i^{CBI} component is positively correlated with s, it follows that it is not a monetary policy shock. Jarociński and Karadi (2020) propose to treat it as a proxy for the Central Bank Information (CBI) effect. If the state of the economy is imperfectly observable, agents facing a positive interest rate surprise infer that the central bank is more bullish about the economy than they expected and this makes them more bullish as well.[4] The precise origins of these surprises continue to be debated, but the bottom line is that the impact of a positive i^{CBI} (unlike i^{MP}) is similar to the impact of *positive* economic news.[5]

Following Jarociński and Karadi (2020) I perform the decomposition using two alternative approaches, "poor man's sign restrictions" and "rotational sign restrictions". In the "poor man's" approach I simply classify each central bank announcement as conveying

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[4] See e.g. Romer and Romer (2000); Melosi (2017); Nakamura and Steinsson (2018). Morris and Shin (2002) show that the central bank does not need to have a superior knowledge about the economy in order to affect public beliefs about the economy.

[5] Recently Bauer and Swanson (2020) propose an alternative "Fed response to economic news" effect to explain the positive correlation between interest rate surprises and subsequent revisions of survey expectations. However, their model still predicts a negative correlation between interest rate surprises and *stock price surprises* and they argue that this negative correlation dominates anyway. To the extent that some variants of the "Fed response to economic news" can generate a positive correlation between interest rate surprises and stock price surprises, one can interpret the i^{CBI} as a proxy for this effect too.

either i^{MP} or i^{CBI}.

$$i^{MP} = \begin{cases} i^{Total} & \text{if} \quad i^{Total} \times s \leq 0 \\ 0 & \text{otherwise} \end{cases}, \qquad i^{CBI} = \begin{cases} 0 & \text{if} \quad i^{Total} \times s \leq 0 \\ i^{Total} & \text{otherwise.} \end{cases} \tag{2}$$

In the data, the poor man's monetary policy shocks account for 68% of the variance of the ECB's total interest rate surprises and for 88% of the variance of the Fed's total interest rate surprises. That is, we have $\mathrm{var}(i^{MP})/\mathrm{var}(i^{Total}) = 0.68$ for the ECB and 0.88 for the Fed.[6]

In the "rotational sign restrictions" approach each central bank announcement may simultaneously convey a monetary policy shock and an information effect. The decomposition satisfies

$$M = UC, \quad \text{with} \quad U'U = \text{diagonal matrix} \quad \text{and} \quad C = \begin{pmatrix} 1 & c_{MP} < 0 \\ 1 & c_{CBI} > 0 \end{pmatrix}, \tag{3}$$

where $M = (i^{Total}, s)$ is a $T \times 2$ matrix with i^{Total} in the first column and s in the second column, $U = \left(i^{MP}, i^{CBI}\right)$ is a $T \times 2$ matrix with i^{MP} in the first column and i^{CBI} in the second column, T is the number of central bank announcements, i^{MP} and i^{CBI} are mutually orthogonal, and matrix C captures how i^{MP} and i^{CBI} translate into financial market surprises. The 1's in the first column of C reflect equation (1). The second column of C contains the elasticities of stock prices to i^{MP} and i^{CBI}, $c_{MP} < 0$ and $c_{CBI} > 0$.

The decomposition in (3) is not unique. In particular, one can vary the shares of variance of i^{Total} explained by i^{MP} and i^{CBI} in quite a wide range. To pin the decomposition down I impose that, as in the "poor man's" case, $\mathrm{var}(i^{MP})/\mathrm{var}(i^{Total}) = 0.68$ for the ECB and 0.88 for the Fed. Previous papers have chosen different approaches to this non-uniqueness. Jarociński and Karadi (2020) include the surprises in their Bayesian VAR and specify an agnostic Bayesian prior covering the space of all admissible rotations of U (Rubio-Ramirez et al., 2010). Andrade and Ferroni (2021), in a related decomposition, use the average admissible rotation angle. For another example, Kroencke et al. (2021) define the FOMC risk shift shock (similar to the Central Bank Information effect)

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[6] The information effects i^{CBI} account for the remaining variance of i^{Total}, since $\mathrm{var}(i^{Total}) = \mathrm{var}(i^{MP}) + \mathrm{var}(i^{CBI})$.

that explains the stock price surprises but none of the interest rates surprises, i.e. impose $\mathrm{var}(i^{MP})/\,\mathrm{var}(i^{Total}) = 0$. The Appendix shows how to compute the decomposition matching the desired angle or, equivalently, variance shares, in one step, without Monte Carlo simulation or optimization.[7,8]

3 Conditional transatlantic spillover of ECB interest rate surprises

This section documents a new stylized fact about the transatlantic spillovers of ECB interest rate surprises: they are conditional on the direction of the response of the European stock prices. The ECB interest rate surprises spill over strongly to the US Treasury yields when on impact European interest rates and stock prices co-move positively. By contrast, there is no detectable transatlantic spillover when on impact European interest rates and stock prices co-move negatively, i.e. after an ECB monetary policy shock.

To examine the transatlantic spillovers I run the following event study regressions (local projections):

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP} + \beta_h^{CBI}\, i_t^{CBI} + u_t. \tag{5}$$

t runs over the dates of ECB monetary policy announcements (261 dates in the EA-MPD, from 7 January 1999 to 6 June 2019). y denotes a financial variable of interest, in the baseline case this is the 1-year US Treasury yield. h is the horizon, in business days. I run the regressions for $h = 1, 2, 3, 4, 5, 10, 15, ...$ I include i_t^{MP} and i_t^{CBI} simultaneously as explanatory variables but they are mutually orthogonal so their estimated coefficients would be the same if estimated one by one. β_h^{MP} and β_h^{CBI} are the coefficients of interest,

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[7] The Appendix shows that the variance share of the monetary policy shocks can be anywhere in the following range:

$$\frac{\mathrm{var}(i^{MP})}{\mathrm{var}(i^{Total})} \in \begin{cases} (\rho^2, 1) & \text{if } \rho < 0, \\ (0, 1-\rho^2) & \text{if } \rho \geq 0, \end{cases} \tag{4}$$

where ρ is the correlation between i^{Total} and s. It also shows how to obtain the decomposition for any desired variance share within the attainable range. The numbers 0.68 and 0.88 are within the attainable ranges for the ECB and Fed datasets respectively.

[8] The findings reported in this paper remain similar when one uses the median rotation in the spirit of Andrade and Ferroni (2021).

showing by how many basis points y changes over h days per one basis point of i_t^{MP} and i_t^{CBI}.[9]

Table 2 reveals a striking contrast between the transatlantic spillovers of the two components of the ECB interest rate surprises. The interest rate surprises that on impact move the European stock prices in the same direction (i^{CBI}) have a significant effect on the US Treasury yields. For the rotation-based decomposition the effect of a 1 basis point i^{CBI} on the US 1-year Treasury yield ranges from 0.33 after one day to 0.53 basis points after three days. For the poor man decomposition the effect ranges from 0.52 after one day to 0.68 after three days. These are substantial, economically significant spillovers. They are also statistically significant at the 10% level or higher for the first five days. By contrast, the effects of i^{MP} are very small and statistically insignificant for both decompositions and for all horizons. Table 2 reports also the p-values obtained when testing the null hypothesis that $\beta_h^{MP} = \beta_h^{CBI}$, showing that for many horizons we can reject this null hypothesis.

These results shed new light on the transatlantic spillovers of ECB interest rate surprises. We know from meticulous examination of high-frequency futures prices by Curcuru et al. (2018) that US and German yields are highly correlated in a narrow time-window around ECB announcements. This is seen as evidence that the ECB monetary policies spill over to the US. This important evidence has featured in high-level policy statements about international monetary policy spillovers (Powell, 2018; Clarida, 2021). However, the results in Table 2 imply that the transatlantic spillovers are persistent enough to show up in daily data only when the European interest rates and stock prices co-move positively. This means that ECB monetary policy shocks cannot be the driver of these more persistent spillovers, as monetary policy would drive the interest rates and stock prices in the opposite directions.

To add more context to these numbers, Table 2 reports also the responses of 1-year German bund yields. Unlike, the US Treasuries, German bund yields are strongly affected by all ECB surprises, both i^{MP} and i^{CBI}. In the longer run the effect of i^{CBI} is stronger

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[9] Throughout the paper I use the Eicker-Huber-White heteroskedasticity-robust standard deviations. In most of the sample ECB announcements are separated by about a month and Fed announcements by about seven weeks, so the horizons rarely overlap, thus obviating the need to use autocorrelation-robust standard deviations.

Table 2: The effect of ECB monetary policy and information shocks on financial variables $y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP} + \beta_h^{CBI}\, i_t^{CBI} + u_t$.

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$
1-year Treasury yield							
β_h^{MP} (rotation)	0.01	0.10	0.07	-0.07	-0.03	-0.24	-0.26
	(0.17)	(0.18)	(0.22)	(0.20)	(0.24)	(0.32)	(0.27)
β_h^{CBI} (rotation)	0.33*	0.45*	0.53**	0.49**	0.46*	0.48	0.23
	(0.18)	(0.24)	(0.25)	(0.21)	(0.26)	(0.39)	(0.43)
F-test	0.05	0.10	0.06	0.02	0.05	0.09	0.31
R-sq	0.01	0.02	0.02	0.02	0.01	0.01	0.00
N.obs.	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.08	0.03	0.00	-0.11	-0.02	-0.26	-0.32
	(0.18)	(0.20)	(0.24)	(0.22)	(0.29)	(0.35)	(0.29)
β_h^{CBI} (poor man)	0.52***	0.59**	0.68***	0.56***	0.44*	0.53	0.36
	(0.16)	(0.26)	(0.23)	(0.18)	(0.26)	(0.43)	(0.44)
F-test	0.01	0.09	0.04	0.02	0.24	0.15	0.19
R-sq	0.03	0.03	0.03	0.02	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261
1-year Bund yield							
β_h^{MP} (rotation)	0.90***	0.86***	0.88***	0.72***	0.69**	0.51	0.42
	(0.18)	(0.19)	(0.23)	(0.24)	(0.29)	(0.38)	(0.38)
β_h^{CBI} (rotation)	1.28***	1.33***	1.35***	1.43***	1.56***	1.60***	1.92***
	(0.19)	(0.23)	(0.29)	(0.33)	(0.35)	(0.39)	(0.46)
F-test	0.04	0.03	0.08	0.03	0.01	0.01	0.00
R-sq	0.38	0.28	0.25	0.20	0.19	0.11	0.10
N.obs.	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.93***	0.88***	0.86***	0.72***	0.65**	0.53	0.48
	(0.21)	(0.22)	(0.25)	(0.27)	(0.30)	(0.42)	(0.41)
β_h^{CBI} (poor man)	1.22***	1.28***	1.38***	1.44***	1.64***	1.55***	1.79***
	(0.20)	(0.26)	(0.35)	(0.38)	(0.43)	(0.46)	(0.51)
F-test	0.32	0.24	0.24	0.12	0.06	0.10	0.04
R-sq	0.38	0.27	0.25	0.20	0.20	0.10	0.09
N.obs.	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. F-test: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

and more persistent (similarly as in the VAR results of Jarociński and Karadi, 2020), but the impact effect of i^{MP} is substantial and highly significant too. The Appendix (Table C.1) reports also the responses of Treasury and German bund yields to the total ECB interest rate surprise i^{Total}. The transatlantic spillover of the total interest rate surprise to the US Treasury yields is on average not significant. The domestic response of German bunds is, however, positive and highly significant. So all ECB interest rate surprises affect the domestic interest rates, but only the i^{CBI} spill over across the Atlantic.

4 The response of other US variables

This section reports the effect of ECB interest rate surprises of both kinds on other US variables. It shows that a positive i^{CBI} surprise is good news for the US economy, since it is followed by higher stock prices, lower corporate bond spreads, a weaker dollar, and eventually stronger real activity and prices. I first study these effect over short horizons using event study regressions. Then I turn to the effect over longer horizons, of several months. For this I embed the ECB surprises in a monthly VAR.

4.1 Event study regressions

I run regressions (5) for other financial variables. Figure 2 reports graphically the estimated coefficients for the rotation-based decomposition. The coefficients of i^{CBI} with their one standard deviation bands are plotted in red and those of i^{MP} in blue. The Appendix shows that the coefficients for the "poor man's" decomposition are similar.

The first plot presents the effects of ECB shocks on 1-year Treasury yields, already familiar from Table 2. The second plot reports a similar finding for the 10-year Treasury yields: the i^{CBI} surprises do spill over to these yields, and the i^{MP} surprises do not.

The second row shows that a positive i^{CBI} increases US stock prices and reduces corporate bond spreads, while i^{MP} has no significant effect. A one basis point i^{CBI} raises the S&P500 by about 20 basis points on the first day and up to 30 later on, explaining from 7% to 9% of the S&P500 change in the first week after the ECB announcement.[10] The high yield corporate bond option adjusted spread is almost 4 basis points lower after 5 business days.

The puzzle that positive ECB interest rate surprises have positive effects on international stock prices has been noted e.g. in Brusa et al. (2020). Figure 2 sheds new light on

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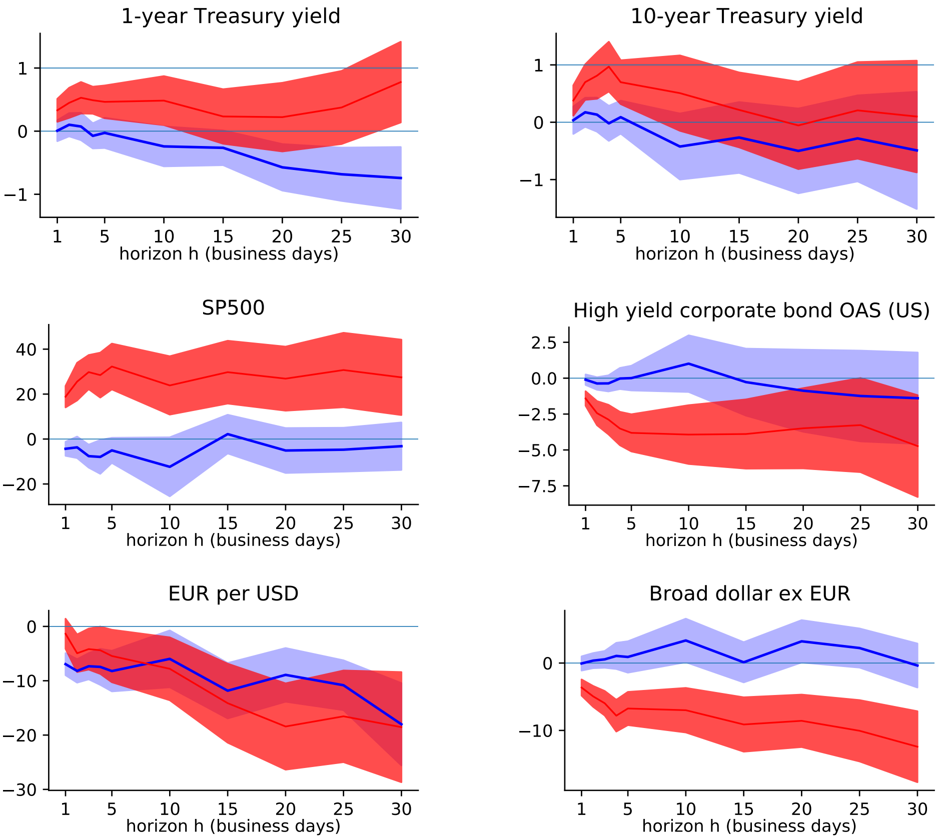
[10] The R-squared are reported in Appendix Table C.3. The Appendix reports also the significant drop in the VIX at all horizons.

Figure 2: The effect of ECB shocks on US financial variables: elasticities β_h^{MP} and β_h^{CBI} from local projections.

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP,ECB} + \beta_h^{CBI}\, i_t^{CBI,ECB} + u_t$$



Note. The solid lines connect the OLS estimates of $\beta_h^{j\in\{MP,CBI\}}$ at different horizons h. The shaded areas show heteroskedascity-robust one standard deviation bands. Blue lines and blue bands (lighter grey on black-and-white) show the effects of monetary policy shocks, β_h^{MP}. Red lines and red bands (darker grey on black-and-white) show the central bank information effects, β_h^{CBI}. All regressions have 261 observations. Appendix Table C.3 reports detailed estimation results.

this puzzle: it shows that the puzzle is driven by the spillover of the expansionary i^{CBI} surprises and the lack of a spillover of the contractionary i^{MP} surprises.

The third row of Figure 2 shows that a positive ECB interest rate surprise of either kind weaken the dollar against the euro to a similar extent. More interestingly, after a positive ECB information shock the dollar depreciates not only against the euro, but also against the broad basket of currencies excluding the euro. The last plot of Figure 2 shows the response of the Fed's Broad dollar index, in the foreign currency units per US dollar, from which the euro has been removed.[11] The Broad dollar ex-euro does not move much

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[11] The Broad dollar index, calculated by the Federal Reserve, is a trade-weighted exchange rate with

after an ECB monetary policy shock, but weakens significantly after an ECB information shock, suggesting the activation of complex financial transmission mechanisms.

First, the dollar has traditionally held the role of a global safe haven currency that appreciates on bad global news and depreciates on good global news (e.g. Gourinchas et al., 2010; Habib and Stracca, 2015). Furthermore, recent research finds that the Broad dollar index is a key barometer of risk-taking capacity in global financial markets. Avdjiev et al. (2019) find that a weaker dollar is associated with smaller covered interest parity deviations and more cross-border bank lending. Lilley et al. (2019) find that a weaker dollar is associated with larger US holdings of foreign bonds. Niepmann and Schmidt-Eisenlohr (2019) find that a weaker dollar is associated with a stronger demand for loans in the secondary market and, consequently, more domestic corporate lending by US banks. Summing up, the response of the dollar paints a consistent picture together with the compression of the US corporate bond spread and indicates a complex financial transmission of ECB information shocks. This financial transmission, referred to as the "international credit channel" (Rey, 2016), has been thoroughly documented in the context of US shocks (Cesa-Bianchi and Sokol, 2021). This section shows that it operates after ECB information shocks as well.

4.2 VAR estimates of the effects of ECB shocks

Next, to study the longer term dynamics, I embed the ECB shocks in a monthly VAR for the US. Again, I find that positive i^{CBI} shocks have an expansionary effect on the US economy while the i^{MP} shocks do not spill over.

Monthly variables. I aggregate each of i^{MP} and i^{CBI} to the monthly frequency by adding them up. The resulting variables are zero in the months in which there were no announcements. I take the monthly averages of the daily variables reported in Figure 2. Real GDP and GDP deflator are interpolated to the monthly frequency as in Stock and Watson (2010). The sample runs from January 1999 to June 2019.

VAR specification. I estimate the VAR following Jarociński and Karadi (2020). The estimation is Bayesian. The coefficients in the equations of i^{MP} and i^{CBI} are all set

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respect to 26 most important trading partners by volume of the bilateral trade. I have recalculated this index taking the euro out of it. See Appendix A for details.

to zero, reflecting that these variables are i.i.d. with a zero mean. For the remaining parameters I specify Random Walk priors following Litterman (1979) and the ensuing Bayesian VAR literature, with standard hyperparameter values ("overall tightness" 0.2, "decay" 1 and a nearly uninformative prior about the constant terms). See Jarociński and Karadi (2020) for details. All the variables are in (log) levels and the VAR includes six lags.

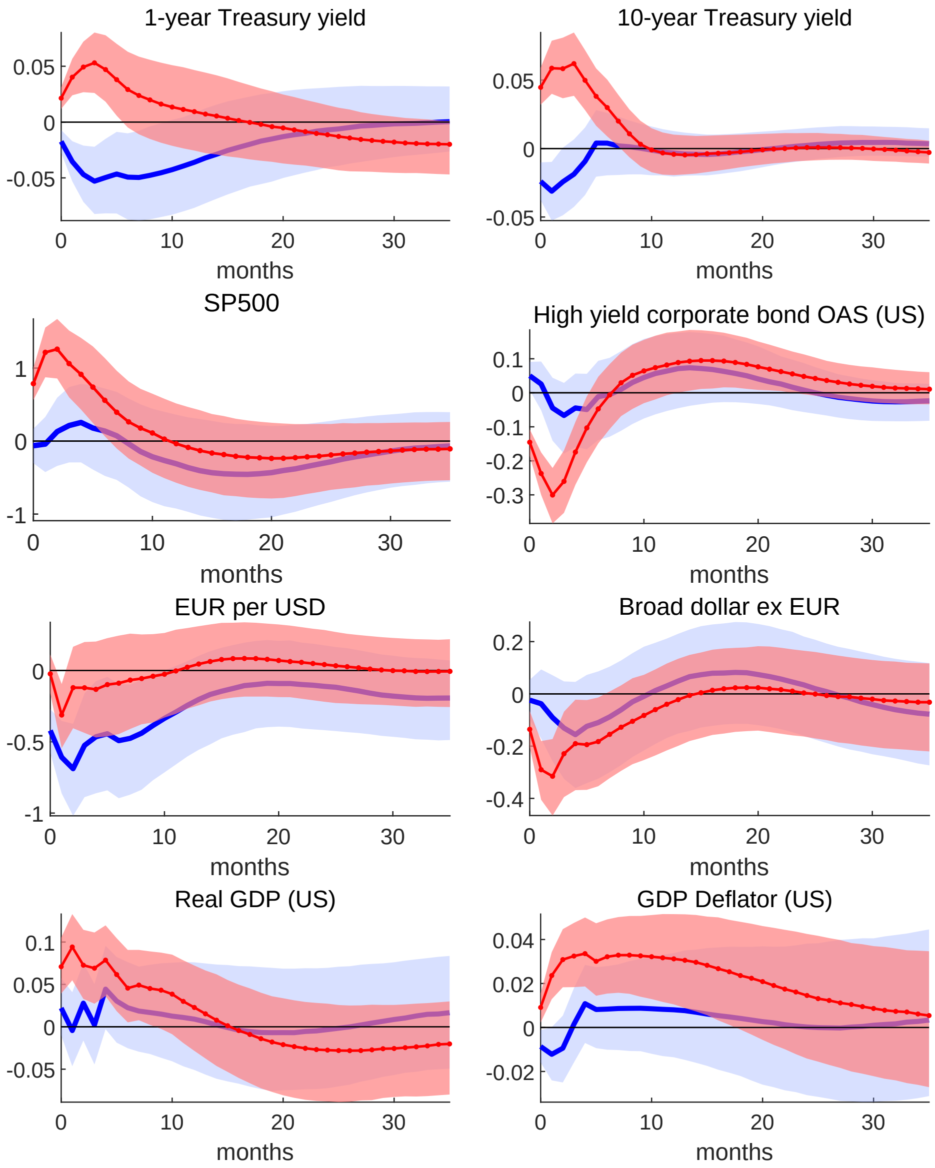
Identification. I track the effect of the surprises on the other variables by placing them first and identifying the VAR with the Choleski decomposition of Σ. That is, the surprises, measured in the narrow window around central bank announcement, are assumed not to respond to other variables in the same month, which is a standard assumption.

The VAR impulse responses imply that the effects found in the daily event study regressions persist for months. Figure 3 reports the impulse responses for the rotational sign restriction decomposition (the results for the poor man's decomposition are similar, see Appendix D). We can see that the ECB monetary policy shocks fail to move the US variables much, either because they are fundamentally less relevant for the US economy or because the Fed offsets them. The only notable effects of i^{MP} are the declining (not increasing) Treasury yields and the appreciation of the euro against the dollar. By contrast, the ECB information effects spill over, similarly as they do in the daily data: a positive i^{CBI} is followed by higher stock prices, lower corporate bond spreads, a weaker broad dollar index, stronger real activity and higher prices. Furthermore, these spillovers last for several months.

4.3 Rolling window estimates

Do the effects of the ECB shocks vary over time? It is difficult to robustly estimate time variation in a VAR model on the available short sample, so to answer this question I turn again to the local projections with daily data. I re-estimate equation (5) on rolling samples containing 100 announcements each. Figure 4 shows the results for selected horizons ($h = 1$ in most cases, but the lessons are similar for other horizons). Two main lessons follow from this figure. The spillover of the ECB information shocks to the US corporate bond spreads and exchange rates was weak until the Great Financial Crisis, i.e. until about 2008, and has increased afterwards. However, the spillovers of the ECB

Figure 3: The effect of ECB shocks on the US variables: Impulse responses to one standard deviation MP and CBI shocks in monthly VARs.



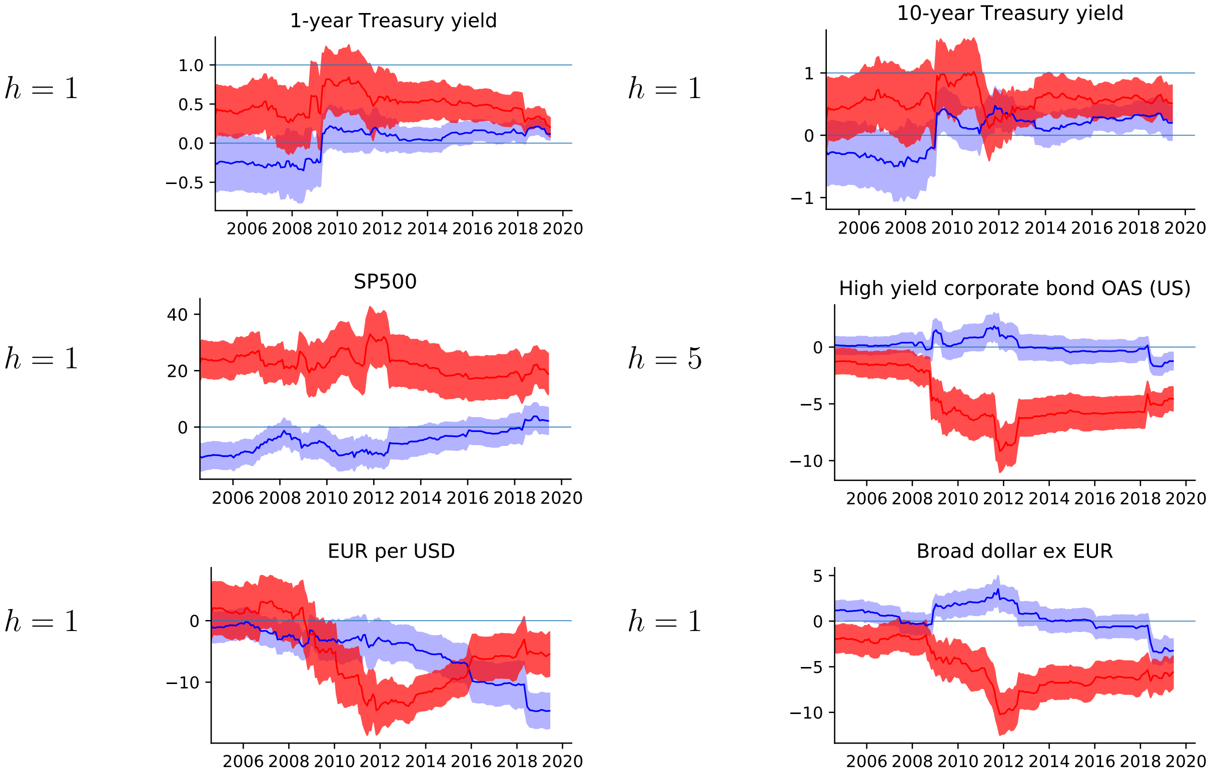
Note: The red solid-dotted lines represent the point-wise posterior medians of the impulse responses to the central bank information shock. The red areas show the pointwise 16-84 percentile bands. The blue solid lines and blue areas show the same objects for the monetary policy shock. The figure is based on 10,000 draws from the Gibbs sampler.

information shocks to the US stock prices are present throughout the studied period and quite stable over time.

More in detail, we see a lot of time variation in the responses of the exchange rates and corporate bond spreads. The on impact ($h = 1$) effect of the ECB information shocks on the dollar exchange rate, both against the euro and against the broad basket of currencies,

Figure 4: Rolling window estimates of the effects of ECB shocks: elasticities β_h^{MP} and β_h^{CBI} from local projections.

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP,ECB} + \beta_h^{CBI}\, i_t^{CBI,ECB} + u_t$$



Note. All rolling windows have 100 observations. The horizontal axis shows the end date of the rolling window. Blue lines and lighter, blue bands show the effects of monetary policy shocks, β_h^{MP} for the rolling window ending at the given date. Red lines and darker, red bands show the central bank information effects, β_h^{CBI} for the rolling window ending at the given date.

is initially insignificant, becomes stronger during the crisis, peaking in the samples ending in 2012, and weakens somewhat thereafter. The effect on the US corporate bond spread follows a similar pattern. For this variable the effect of the ECB information is always delayed, so Figure 4 shows the coefficients for $h = 5$ (but the pattern is similar for longer horizons).

In another experiment I check whether ECB information shocks affect US variables also in the low-stress subsample. It is intuitive that ECB pronouncements affected the global financial markets during the European Sovereign debt crisis, when investors were concerned about the possibility of a disorderly euro area break-up (e.g. Kane et al. 2020 and Wright 2019 highlight the importance of this dimension of ECB information effects). Are the spillovers there also during the calm periods? To answer this question I re-estimate the event study regressions using only the ECB announcements occurring in the calm period, defined based on the level of the European Composite Indicator of Systemic Stress (CISS) (Appendix D provides the details of this exercise). It turns out that the transatlantic spillovers remain similar in this calm subsample.

Figure 4 shows also interesting time variation in the spillovers of the standard ECB monetary policy i^{MP}. First, although the effect of i^{MP} on the Treasury yields never becomes significant, at least its sign changes over time from negative to positive. Second, the effect on the dollar-euro exchange rate becomes stronger (more negative) steadily over time. These findings are consistent with the fact that in the later part of the sample i^{MP} increasingly captures the ECB asset purchases, and the conventional wisdom that ECB asset purchases have a stonger effect on global financial markets than ECB interest rate policies.

However, the most striking lesson from the rolling sample estimation is that, in spite of all the crisis-related time-variation in the other variables, the response of the US stock prices (S&P500) to the ECB information shocks has remained remarkably stable and strong throughout the studied period.

5 Does the Fed respond differently to i^{MP} and i^{CBI}?

The Fed might want respond differently to a contractionary ECB monetary policy shock than to positive news about the euro area economy. In the absence of movements of the exchange rate, a contractionary ECB monetary policy shock is a negative external demand shock for the US economy and the Fed should offset such a shock, i.e. cut the fed funds rate in response. Positive news about the euro area economy is a positive external demand shock for the US economy and might also signal stronger global fundamentals, so the Fed should raise the fed funds rate in response. The movements of the dollar exchange rate dampen these effects and potentially could even annihilate them.

The impulse responses of the Treasury yields are consistent with the above simple theory that downplays the effects of the exchange rates. Under the expectations theory, different responses of the US Treasury yields to i^{MP} and i^{CBI} suggest that the markets expect a different path of short term interest rates in each case, and short term interest rates are determined by the Fed. Is there also more direct evidence in the responses of the fed funds rates themselves?

To study this question I regress the changes in the Federal Funds Target Rate on the ECB shocks, as in (5). The left hand side variable is special for two reasons. First, the Fed changes the target rate infrequently, so many changes are zero. Second, when the Fed does change the target rate, this is almost always by a multiple of 25 basis points. Furthermore, from December 16, 2008 to December 15, 2015 the fed funds rate was constrained by the Zero Lower Bound (ZLB), so I omit this period. This leaves 181 ECB announcements. After the Fed switched from a target rate to a target range I take the mean of the lower and the upper limit of the target range. I focus on longer horizons in these regressions, because the median time from an ECB announcement to the next FOMC meeting, when the Fed has a chance to adjust its rates, is 14 business days.

Table 3: The response of the Federal Funds Target Rate to ECB shocks: event study regressions (5).

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP} + \beta_h^{CBI}\, i_t^{CBI} + u_t.$$

	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
β_h^{MP} (rotation)	-0.88	-1.32*	-1.41*	-1.79**	-2.72***
	(0.69)	(0.74)	(0.78)	(0.89)	(1.05)
β_h^{CBI} (rotation)	1.58*	1.82*	1.44	1.22	1.46
	(0.96)	(1.00)	(1.20)	(1.59)	(1.63)
F-test	0.03	0.01	0.04	0.07	0.01
R-sq	0.05	0.06	0.04	0.04	0.08
N.obs.	181	181	181	181	181
β_h^{MP} (poor man)	0.12	-0.32	-0.40	-0.53	-1.39
	(0.57)	(0.70)	(0.72)	(0.75)	(1.10)
β_h^{CBI} (poor man)	-0.61	-0.32	-0.76	-1.57	-1.38
	(0.89)	(1.00)	(1.15)	(1.73)	(1.84)
F-test	0.49	1.00	0.79	0.58	0.99
R-sq	0.01	0.00	0.01	0.02	0.03
N.obs.	181	181	181	181	181

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. F-test: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table 3 reports the regressions for the horizons $h = 10, 15, 20, 25, 30$ business days. The evidence is mixed. For the rotation-based decomposition the coefficients of the ECB monetary policy shocks are negative and significant, except for the 10 days horizon, and the coefficients of the ECB information shocks are positive and significant at 10 and 15 days horizons. In all cases I reject the null that the coefficients of the two ECB shocks are the same. However, none of the coefficients is significant for the poor man's decomposition.

6 Are the spillovers of CBI shocks similar to the spillovers of other euro area macroeconomic news?

In this section I compare the transatlantic effects of ECB information shocks with the transatlantic effects to two important European macroeconomic news releases: the European industry confidence indicator and the euro area unemployment rate. Industry confidence is a based on a monthly survey of managers' production expectations, their assessments of the current level of overall order books and of the stocks of finished products. Both industry confidence and unemployment news have a strong impact on European financial variables so they provide a relevant case study.

6.1 The transatlantic spillover of industry confidence and unemployment surprises

As is standard in the literature, I compute the *release surprise* as the difference between the actual release and its ex ante expectations. I take the release dates, the actual releases and expectations from Bloomberg. For the expectation I use the median forecast from the Bloomberg survey of professional forecasters. I regress the changes in the financial variables on the standardized surprises z_t^j

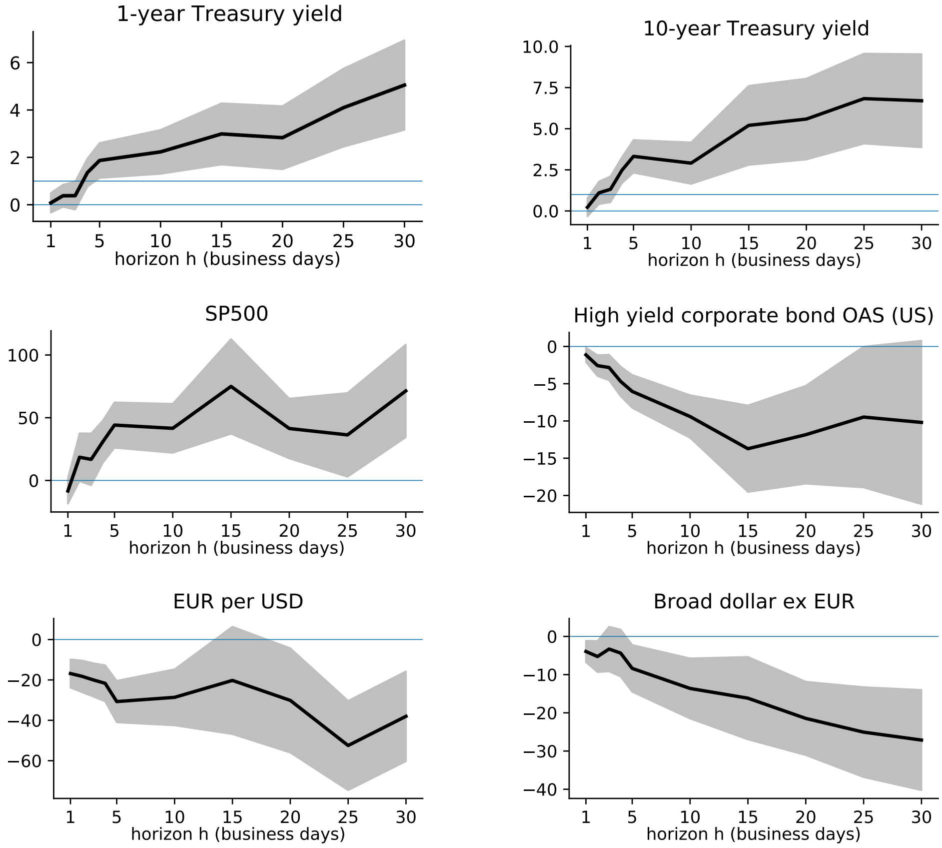
$$y_{t+h} - y_{t-1} = \alpha + \beta_h^j \, z_t^j + u_t. \tag{6}$$

t runs over the release days (I have 201 releases of industry confidence and 233 releases of unemployment in the sample). I run a separate regression with each type of data release. The coefficient β_h^j summarizes the change in y_t, in basis points, per one standard deviation surprise z_t^j.

It turns out that a positive surprise in the European industry confidence triggers a

Figure 5: The effect of European industrial confidence surprises on US financial variables: elasticities β_h from local projections.

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{IndConf} + u_t$$



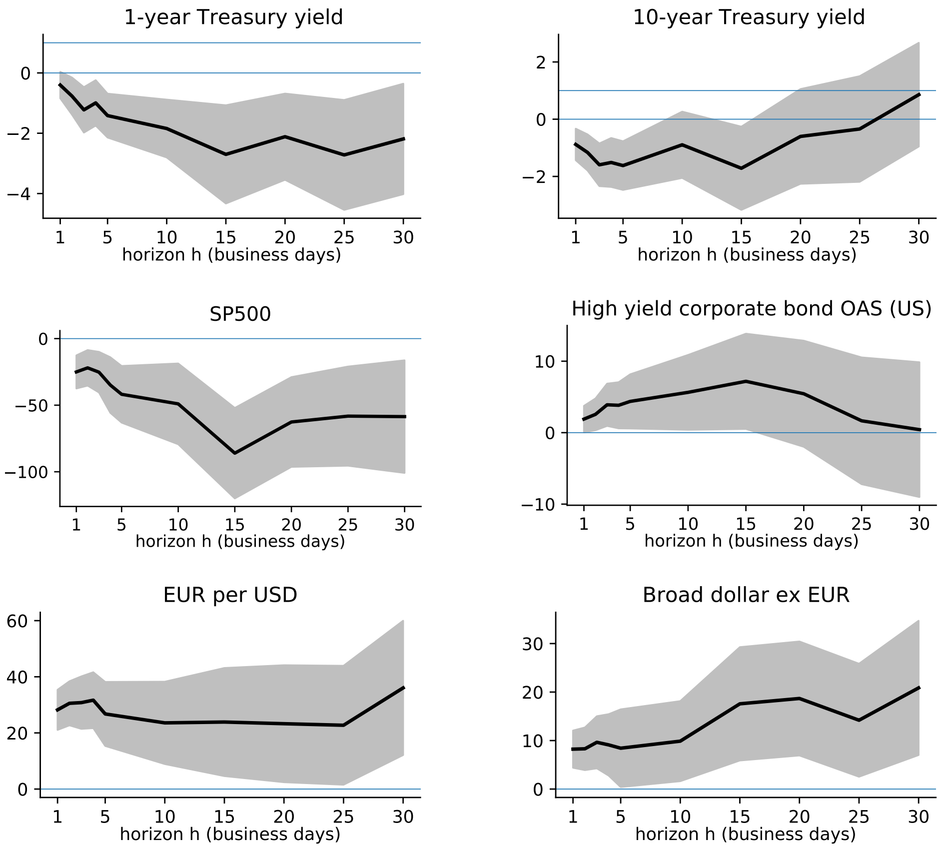
Note. The solid lines connect the OLS estimates of β_h at different horizons h. The shaded areas show heteroskedascity-robust one standard deviation bands. All regressions have 201 observations. Appendix Table C.4 reports detailed estimation results.

similar response of the US variables as a positive ECB information shock does. Figure 5 shows that the Treasury yields increase (shadowing the response of the German bund yields, omitted for brevity), stock prices increase, corporate bond spreads decrease, and the dollar depreciates both against the euro and against the broad basket of currencies excluding the euro. Thus, all the channels of financial transmission observed after i^{CBI} surprises operate remarkably similarly after European industry confidence surprises.

A positive surprise in the euro area unemployment rate also triggers a similar response, but with the reversed sign (it is bad news when the actual unemployment rate is higher than expected). Figure 6 shows that the Treasury yields and stock prices decline, corporate bond spreads increase, though their response is not statistically significant, and the

Figure 6: The effect of euro area unemployment surprises on US financial variables: elasticities β_h from local projections.

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{Unemp} + u_t$$



Note. The solid lines connect the OLS estimates of β_h at different horizons h. The shaded areas show heteroskedascity-robust one standard deviation bands. All regressions have 235 observations. Appendix Table C.5 reports detailed estimation results.

dollar appreciates.

Quantitatively, the responses to a one standard deviation industry confidence and unemployment surprise are similar: within two weeks, the 1-year Treasury yield moves by about 2 basis points, the S&P500 by about 50 basis points and the dollar exchange rate by about 20 basis points against the euro and about 10 basis points against the broad basket of currencies. Many of these responses are statistically significant (see Appendix C, Tables C.4 and C.5).

Moreover, these effects are quite similar to the effects of a one standard deviation ECB information shock i^{CBI}. If we multiply the responses from Figure 2 by the standard deviation of i^{CBI}, which is 2.3 basis points, we also find that within two weeks the 1-

year Treasury yield moves by 1 basis point, the S&P500 by about 50 basis points, the dollar exchange rate by about 20 basis points against the euro and about 15 basis points against the broad basket of currencies. The response of the 1-year Treasury yield is half as large as after macroeconomic news, but this is not a big difference given the estimation uncertainty. The remaining responses are similar. To conclude, the transatlantic spillovers of a positive ECB information shock are remarkably similar to the transatlantic spillovers of a positive European macroeconomic news surprise.

6.2 The cross-sectional heterogeneity in the responses of US stock prices

The S&P500 stock index reacts quite similarly to ECB information shocks and to European macroeconomic news, but this could hide cross-sectional differences that shed light on the transatlantic transmission channels.

Why do US stocks respond to news coming from Europe? First, European economic situation directly affects the revenues of the globally operating companies listed on the US stock market. In particular, the S&P500 companies derive about 30% of their revenues outside of the US.[12] Second, European and US economic fundamentals are correlated, so any news about European fundamentals are informative also about the US fundamentals. Third, European and US financial markets are tightly integrated. This implies that improved prospects of a subset of businesses can improve the balance sheets and credit conditions throughout the system. This financial transmission can be consistent with fully rational investors, but it can also involve behavioral finance phenomena such as investor sentiment (Baker and Wurgler, 2006).

To shed light on these channels I construct three variables. The first is the log difference between the S&P500 Focused Foreign Revenue Index and the S&P500 Focused US Revenue Index. These indices measure the performance of companies in the S&P500 with relatively focused revenue exposure to non-US or to the US respectively. (Unfortunately, the S&P do not provide an index of euro area-exposed US companies, and the indices are only available since November 2008.) Figure 7 shows in the first plot that after the

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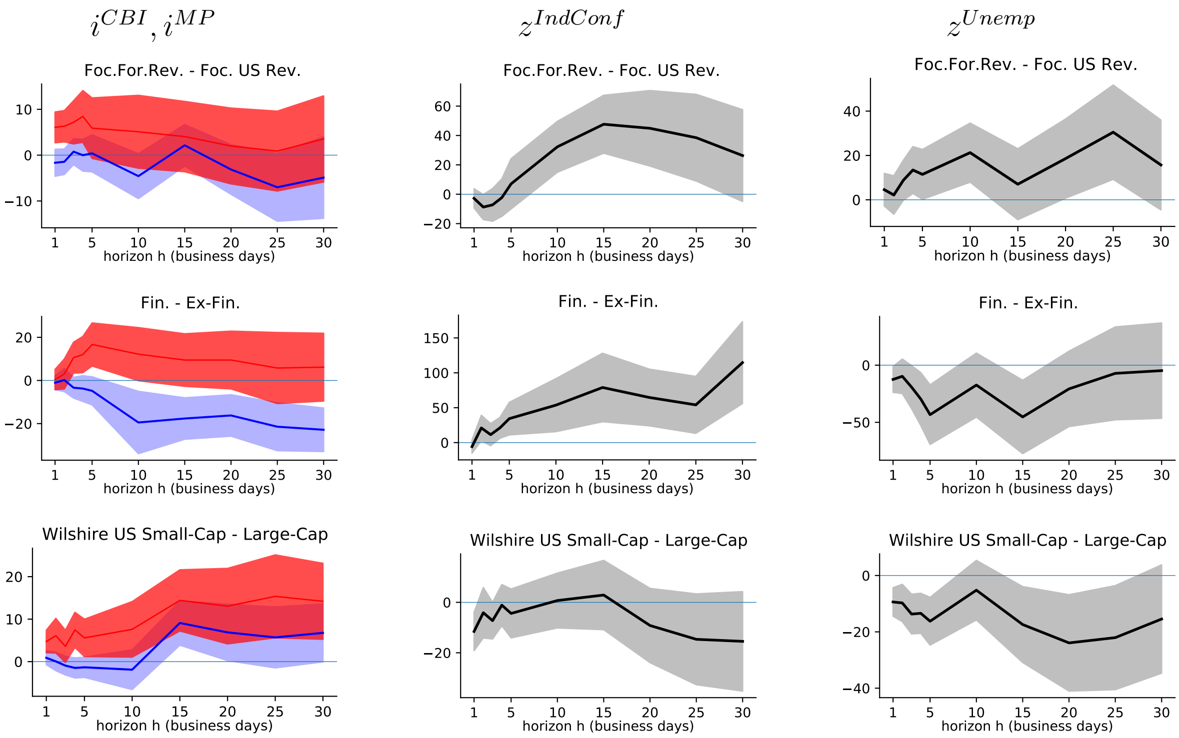
[12] Brzenk, Phillip (March 19, 2018). "The Impact of the Global Economy on the S&P 500". S&P Global.

Figure 7: The effects of European shocks across stock sub-indices: elasticities β_h^j from local projections.



Note. The solid lines connect the OLS estimates of $\beta_h^j, j \in \{MP, CBI, IndConf, Unemp\}$ at different horizons h. The shaded areas show heteroskedascity-robust one standard deviation bands. Blue lines and blue bands (lighter grey on black-and-white) show the effects of monetary policy shocks, β_h^{MP}. Red lines and red bands (darker grey on black-and-white) show the central bank information effects, β_h^{CBI}. Appendix Tables C.6, C.7 and C.8 report detailed estimation results.

ECB information shock the Foreign Focused subindex slightly outperforms the US Focused stocks but the difference is only a few basis points (recall that the S&P500 moves by more than 20 basis points) and not significant. By contrast, after the Industry confidence surprise the Foreign Focused subindex significantly outperforms the US Focused subindex. However, one should not jump to the conclusion that the news conveyed in the i^{CBI} shock is more "global" than the European macroeconomic news, because after the euro area unemployment surprise the US focused subindex drops more than the Foreign focused subindex, yielding the difference between them positive (but not statistically significant). Hence, by this metric, the euro area unemployment surprises might be no less "global" than the ECB information shocks, although the results are not clear enough to draw strong conclusions.

The second row of Figure 7 reports the log difference between the S&P500 Financials and the S&P500 Ex-Financials subindices, and the third the difference between the Wilshire small-cap with the Wilshire large-cap index.[13] Strong responses of financial and small stocks suggest that the stock market effects are driven by general investor sentiment. A classic paper by Baker and Wurgler (2006) argues that investor sentiment has larger effects on stocks that are more difficult to value and arbitrage. Among others, they show that small stocks are more affected. Financial companies are also particularly difficult to value, as suggested e.g. by the disagreements in bond ratings (Morgan, 2002). For recent evidence that financial stocks respond more than others to general investor sentiment see also Hvid and Kristiansen (2020).

Figure 7 shows that indeed financial and small stocks outperform non-financial and large stocks after an ECB information shock. However, first, the differences are rarely significant and second, these patterns are not systemically different from the effects of European macroeconomic news. After industry confidence and unemployment surprises financial stocks also move more strongly than non-financial stocks. Furthermore, after euro area unemployment surprises, small cap stocks also move more strongly than large cap stocks (though there is no such difference after European industry confidence surprises).

Summing up, ECB information shocks affect both the US exposed and foreign exposed stocks, both financial and non-financial, small and large cap US stocks. These findings suggest that their effect on the US stocks is not just the mechanical result of the exposure of the US companies to European markets. Instead, these broad based effects suggest some combination of correlated fundamentals, financial transmission and possibly impact on investor sentiment. The results do not reveal systematic differences between the effects of ECB information shocks and European macroeconomic surprises.

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[13] S&P500 is a Blue Chip index so for the small-cap–large-cap comparison the broader Wilshire index is more useful. The flagship Wilshire 5000 index responds to ECB shocks very similarly as the S&P500 so it is omitted here for brevity.

7 Do the Fed information shocks affect Europe as well?

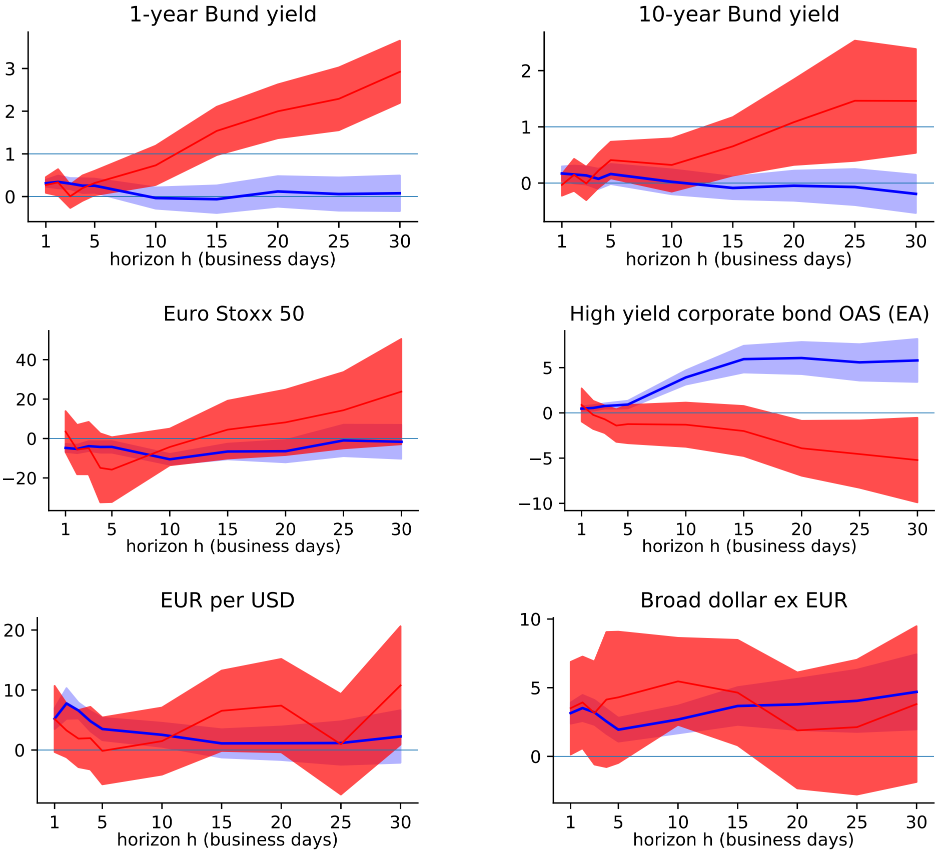
This section repeats the same baseline exercises to study the effects of the Fed announcements on Europe and shows that, even though monetary policy shocks dominate in the Fed announcements, the information effects are present there as well and spill over to Europe. First, this provides a point of comparison for the findings about the ECB surprises, using exactly the same methodology. Second, this section independently confirms the international spillovers of Fed information effects uncovered also in Stavrakeva and Tang (2019) and Cesa-Bianchi and Sokol (2021).

This section uses the 170 Fed announcements decomposed into monetary policy shocks and information effects. Figure 8 reports the event study regressions, with the details provided in Appendix Table C.9. Figure 9 reports the VAR impulse responses.

The VAR results in Figure 9 show a strong expansionary effect of a positive Fed information shock on the European financial variables. European corporate bond spreads shrink, consistently with the "international credit channel" highlighted by Cesa-Bianchi and Sokol (2021). The dollar depreciates against the euro and against the broad basket of other currencies, similarly as after an ECB information shock (cf. Figure 3). The dollar weakens even though the shock is constructed as an increase in the US interest rates, indicating that investors increase their demand for riskier and non-dollar denominated assets. See Stavrakeva and Tang (2019) for a detailed analysis of the role of the Fed information effects for explaining the dollar exchange rate.

The Fed monetary policy shocks, reported in blue in Figure 9, are contractionary and spill over strongly across the Atlantic, consistently with the rich empirical evidence in the literature. The euro area bond spreads increase, while euro area stock prices, real GDP and its deflator contract. The decline in the German bund yields is consistent with their role of a safe haven for the European investors, implying that their yields fall after an adverse global shocks, such as the Fed's contractionary monetary policy shock. The decline in the German bund yields is also consistent with the ECB trying to offset the Fed monetary policy shocks. However, the tightening of risk premia and financial conditions imported from the US dominates the offsetting effects of lower European safe interest

Figure 8: The effect of Fed shocks: elasticities β_h^{MP} and β_h^{CBI} from local projections.
$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP,Fed} + \beta_h^{CBI}\, i_t^{CBI,Fed} + u_t$

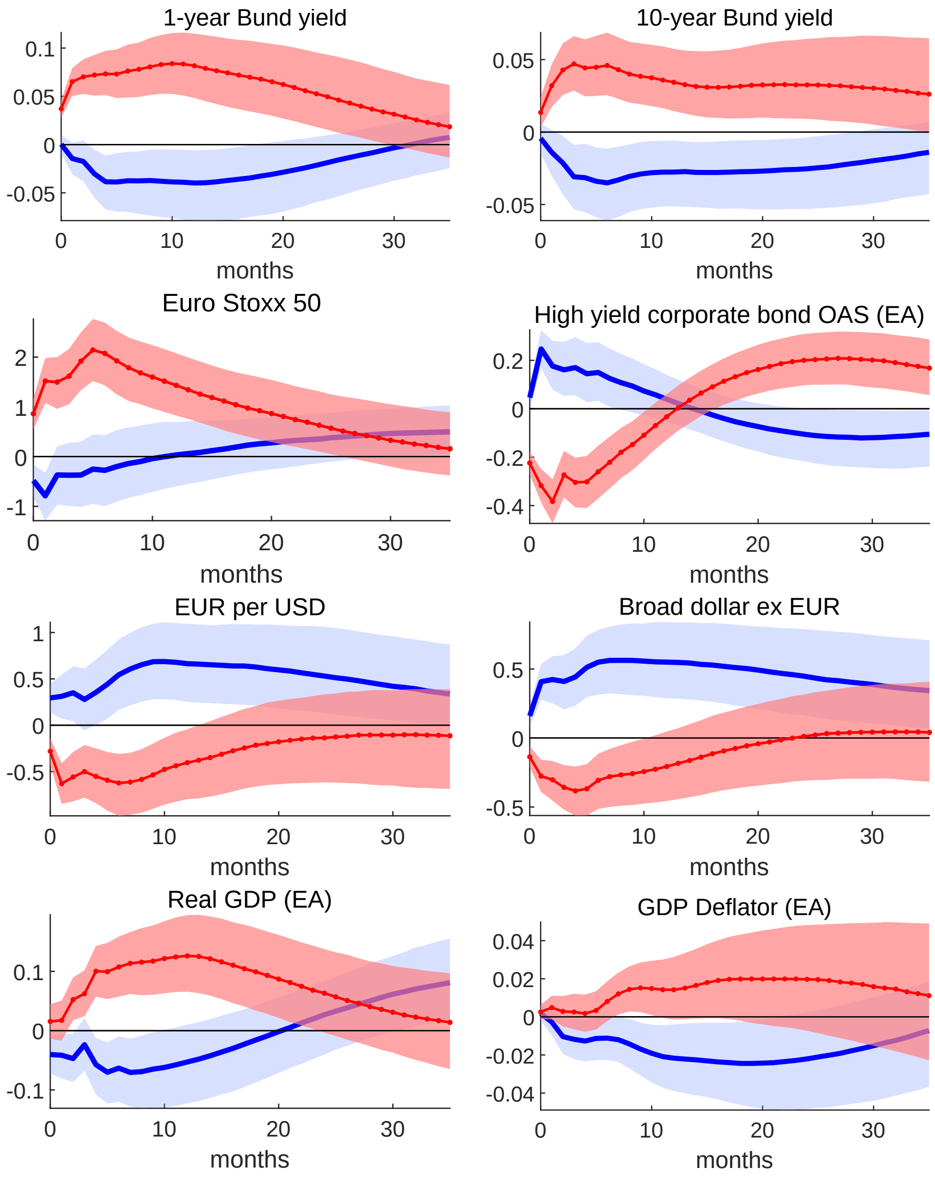


Note. The solid lines connect the OLS estimates of $\beta_h^{j\in\{MP,CBI\}}$ at different horizons h. The shaded areas show heteroskedasticity-robust one standard deviation bands. Blue lines and blue bands (lighter grey on black-and-white) show the effects of monetary policy shocks, β_h^{MP}. Red lines and red bands (darker grey on black-and-white) show the central bank information effects, β_h^{CBI}. All regressions have 170 observations. Appendix Table C.9 reports detailed estimation results.

rates (Cesa-Bianchi and Sokol, 2021; Degasperi et al., 2021).

Significant spillovers of Fed monetary policy show up also in the event study regressions (Figure 8). At the daily frequency we can see that the German bund yields initially increase, following the Fed tightening (see the blue impulse responses in Figure 8). This is consistent with the findings of Curcuru et al. (2018) who primarily use intraday data. However, here I track the yields also in the days that follow and we can see that the responses diverge over time: the effect of i^{MP} shock vanishes within two weeks, while after the i^{CBI} shock the Bund yields continue to increase. The euro area corporate bond spreads increase and the Euro Stoxx 50 falls significantly, similarly to what we see in the

Figure 9: The effect of Fed shocks: Impulse responses to one standard deviation MP and CBI shocks in a monthly VAR.



Note: The red solid-dotted lines represent the point-wise posterior medians of the impulse responses to the central bank information shock. The red areas show the pointwise 16-84 percentile bands. The blue solid lines and blue areas show the same objects for the monetary policy shock. The figure is based on 10,000 draws from the Gibbs sampler.

monthly VAR.

The Fed information effects are much less precisely estimated in the daily event study regressions. The signs of the red responses in Figure 8 are mostly consistent with the expansionary effect, but they are not significant. But we can conclude that after a positive Fed information shock the European stock prices do not fall, bond spreads do not increase, and the dollar does not appreciate significantly, unlike after the Fed monetary policy shock.

Overall, the VAR results strongly suggest, and the event study regressions do not rule out, that the spillovers of Fed policies to the euro area are also in part driven by the information effects.

8 Conclusions

There is a large literature on the international spillovers of Fed monetary policy shocks. By contrast, the literature has struggled to find intuitive spillovers of ECB monetary policy shocks. This paper shows why: after ECB policy announcements, US interest rates only follow the European ones when the European interest rates and stock prices co-move positively. Hence, these transatlantic spillovers cannot be driven by ECB monetary policy shocks. In fact, the ECB interest rate hikes that do spill over have a significant expansionary, not contractionary, effect on the US financial markets and the economy. This effect is quite similar to the effect of an unexpectedly good reading of the euro area industrial confidence or an unexpectedly low euro area unemployment.

Appendix (for online publication)

Appendix A Data

A.1 High-frequency financial data

- **ECB interest rate surprise** - The first principal component of the Monetary Event window changes in overnight index swaps (OIS) with maturities 1-, 3- and 6-months and 1-year (Identifiers: OIS1M, OIS3M, OIS6M, OIS1Y). *Source:* EA-MPD of Altavilla et al. (2019). The Monetary Event window change is the change in the median quote from the window 13:25-13:35 before the press release to the median quote in the window 15:40-15:50 after the press conference. The first principal component is rescaled so that its variance equals that of 1 year OIS rate changes in the Monetary Event window.

- **ECB stock price surprise** - Euro Stoxx 50 index change in the Monetary Event window in percentage points. Identifier: STOXX50E. *Source:* EA-MPD of Altavilla et al. (2019).
- **Fed interest rate surprise** - The first principal component of the Tight Window changes in the current-month and three-month-ahead federal funds futures contracts and changes in price of the second, third, and fourth eurodollar futures contracts, which have 1.5, 2.5, and 3.5 quarters to expiration on average. Identifiers: MP1, FF4, ED2, ED3, ED4. *Source:* Gürkaynak et al. (2005) database updated till May 2019. The tight window is the 30-minute window from 10 minutes before the FOMC announcement to 20 minutes after it. The first principal component is rescaled so that its variance equals that of the changes in the fourth eurodollar futures contract in the tight window.
- **Fed stock price surprise** - S&P500 index change in the tight window, in percentage points. Identifier: SP500. *Source:* Gürkaynak et al. (2005) database updated till May 2019.

A.2 Macroeconomic news surprises

- **Industry confidence** - European Commission Eurozone Industrial Confidence. Ticker: EUICEMU. *Source:* Bloomberg. *Units:* Index.
- **Unemployment rate** - Eurostat Unemployment Eurozone SA. Ticker: UMRTEMU. *Source:* Bloomberg. *Units:* Percent.

A.3 Daily financial data

- **1-year Bund yield, 10-year Bund yield** - *Source:* Deutsche Bundesbank: Term structure of interest rates on listed Federal securities (method by Svensson) `https://www.bundesbank.de/dynamic/action/en/statistics/time-series-databases/`

Table A.1: Summary statistics of the surprises

	Total interest rate surprise, i^{Total}	Stock price surprise, s
ECB surprises		
Mean (std. err.)	0.00 (0.26)	-8.43 (3.98)
Standard deviation	4.18	64.38
Auto-correlation (P-value)	-0.08 (0.22)	-0.05 (0.40)
Correlation (i^{Total}, s)	-0.13	
N. of observations	261	
Fed surprises		
Mean (std. err.)	-0.00 (0.52)	1.85 (4.99)
Standard deviation	6.81	65.06
Auto-correlation (P-value)	0.05 (0.55)	-0.05 (0.48)
Correlation (i^{Total}, s)	-0.54	
N. of observations	170	

`time-series-databases/759784/759784?listId=www_skms_it03a`. *Units:* percent. *Transformation:* none.

- **1-year Treasury bond yield, 10-year Treasury bond yield** - Zero-coupon yield, Continuously Compounded. *Source:* `https://www.federalreserve.gov/pubs/feds/2006/200628/200628abs.html` Identifiers: SVENY01, SVENY10. Reference: Gürkaynak et al. (2007) *Units*: percent. *Transformation:* none.

- **S&P500** - Standard and Poors 500 Composite Index *Source:* Datastream. *Units:* index. *Transformation:* 100*log.

- **Euro Stoxx 50** - Dow Jones Euro Stoxx 50 EUR Price Index - *Source:* Bloomberg. *Units:* index. *Transformation:* 100*log.

- **High yield corporate bond OAS (US)** - ICE BofA US High Yield Index Option-Adjusted Spread (OAS). US dollar denominated below investment grade rated corporate debt publicly issued in the US domestic market. *Source:* Fred, after Ice Data Indices, LLC. Identifier: bamlh0a0hym2. *Units:* percent. *Transformation:* none.

- **High yield corporate bond OAS (EA)** - ICE BofA Euro High Yield Index Option-Adjusted Spread (OAS). Euro denominated below investment grade corporate debt publicly issued in the euro domestic or eurobond markets. *Source:* Fred, after Ice Data Indices, LLC. Identifier: bamlhe00ehyioas. *Units:* percent. *Transformation:* none.

- **EUR per USD** - Exchange rate. *Source:* ECB. *Units:* Euros per one US dollar. *Transformation:* 100*log.

- **Broad dollar ex EUR** - The Broad dollar index, calculated by the Federal Reserve, is a trade-weighted exchange rate with respect to 26 most important trading partners by volume of the bilateral trade. I have recalculated this index taking the euro out of it. The construction of the Broad dollar index is explained in Beschwitz et al. (2019), `https://www.federalreserve.gov/econres/notes/feds-notes/revisions-to-the-federal-reserve-dollar-indexes-20190115.htm`. The Broad dollar index back to 2006 was downloaded from the Federal Reserve website `https://www.federalreserve.gov/datadownload/Build.aspx?rel=H10` and the euro's weights back to 2006 was downloaded from `https://www.federalreserve.gov/releases/h10/weights/default.htm`. The Broad dollar index and the euro's weights before 2006 were taken from the data appendix of Beschwitz et al. (2019), `https://www.federalreserve.gov/econres/notes/ifdp-notes/IFDP_Note_Data_Appendix.xlsx`. I have removed the euro from the Broad dollar index and rescaled so that the weights of the remaining currencies add up to 1. *Units:* Index, foreign currency per one US dollar. *Transformation:* 100*log.

  More in detail, the Broad dollar index at time t (I_t) is $I_t = I_{t-1}\prod_j^N (e_{j,t}/e_{j,t-1})^{w_{j,t}}$, where $e_{j,t}$ is the price of the dollar in terms of the foreign currency j at time t and $w_{j,t}$ is its weight (Beschwitz et al., 2019). Let the euro be the Nth currency, let $\Delta i_t = \ln(I_t/I_{t-1})$ be the log change of the broad dollar index and let $c_{N,t} = w_{N,t}\ln(e_{N,t}/e_{N,t-1})$ be the euro's contribution to it. The log change of the Broad dollar ex EUR is computed as $\Delta i_t^{\text{exEUR}} = 1/(1-w_{N,t})(\Delta i_t - c_{N,t})$.

- **Federal Funds Target Rate** - *Source:* Fred, after Board of Governors of the Federal Reserve System. Identifier: DFEDTAR. Effective December 16, 2008, target rate is reported as a range. Therefore, from December 16 on the variable is computed as the average of the Federal Funds Target Range - Lower Limit (Identifier: DFEDTARL) and the Federal Funds Target Range - Upper Limit (Identifier: DFEDTARU) *Units:* percent. *Transformation:* none.

- **S&P 500 Focused US Revenue Exposure** - The S&P 500 Focused U.S. Revenue Exposure Index is designed to measure the performance of companies in the S&P 500 with relatively focused revenue exposure to the U.S. Number of companies: 124. Total Return index. Ticker: SPXRFUT. First value date: November 21, 2008. *Source:* Bloomberg. *Units:* index. *Transformation:* 100*log.

- **S&P 500 Focused Foreign Revenue Exposure** - The S&P 500 Focused Foreign Revenue Exposure Index is designed to measure the performance of companies in the S&P 500 with relatively focused revenue exposure to regions outside the U.S. Number of companies: 125. Total Return index. Ticker: SPXFFRUT. First value date: November 21, 2008. *Source:* Bloomberg. *Units:* index. *Transformation:* 100*log.

- **S&P500 Financials** - The S&P 500 Financials comprises those companies included in the S&P 500 that are classified as members of the GICS financials sector. Number of companies: 66. Total Return index. Ticker: SPTRFINL. *Source:* Bloomberg. *Units:* index. *Transformation:* 100*log.

- **S&P500 Ex-Financials** - The S&P 500 Ex-Financials is designed to provide broad market exposure except for members of the financials sector. Number of companies: 439. Total Return index. Ticker: SPXXFIST. *Source:* Bloomberg. *Units:* index. *Transformation:* 100*log.

- **Wilshire US Small-Cap** - The Wilshire US Small-Cap is a float-adjusted, market capitalization-weighted index of the issues ranked between 750 and 2,500 by market capitalization of the Wilshire 5000 Total Market Index. Number of companies: 1745. Fred identifier: WILLSMLCAP. *Source*: Fred after Wilshire Associates. *Units:* index. *Transformation:* 100*log.

- **Wilshire US Large-Cap** - The Wilshire US Large-Cap Index is a float-adjusted, market capitalization-weighted index of the issues ranked above 750 by market capitalization of the Wilshire 5000 Total Market Index. Together, the components of the

Wilshire US Large-Cap, Wilshire US Small-Cap Index and Wilshire US Micro-Cap Index comprise the Wilshire 5000 without gaps or overlaps. Number of companies: 750. Fred identifier: WILLLRGCAP. *Source*: Fred after Wilshire Associates. *Units:* index. *Transformation:* 100*log.

- **CISS** - Composite Index of Systemic Stress in the euro area, constructed by Hollo et al. (2012). The index is a nonlinear aggregation of 15 individual financial stress indicators in the equity, bond, money and foreign exchange rate markets. *Source:* ECB Statistical Data Warehouse. *Units:* index. *Transformation:* none.

A.4 Interpolated monthly variables

- **US Real GDP and GDP Deflator** - Interpolation by Stock and Watson (2010) updated to 2019Q1. See the replication files for Jarociński and Karadi (2020).
- **Euro area Real GDP and GDP Deflator** - Own interpolation following Stock and Watson (2010). See the replication files for Jarociński and Karadi (2020).

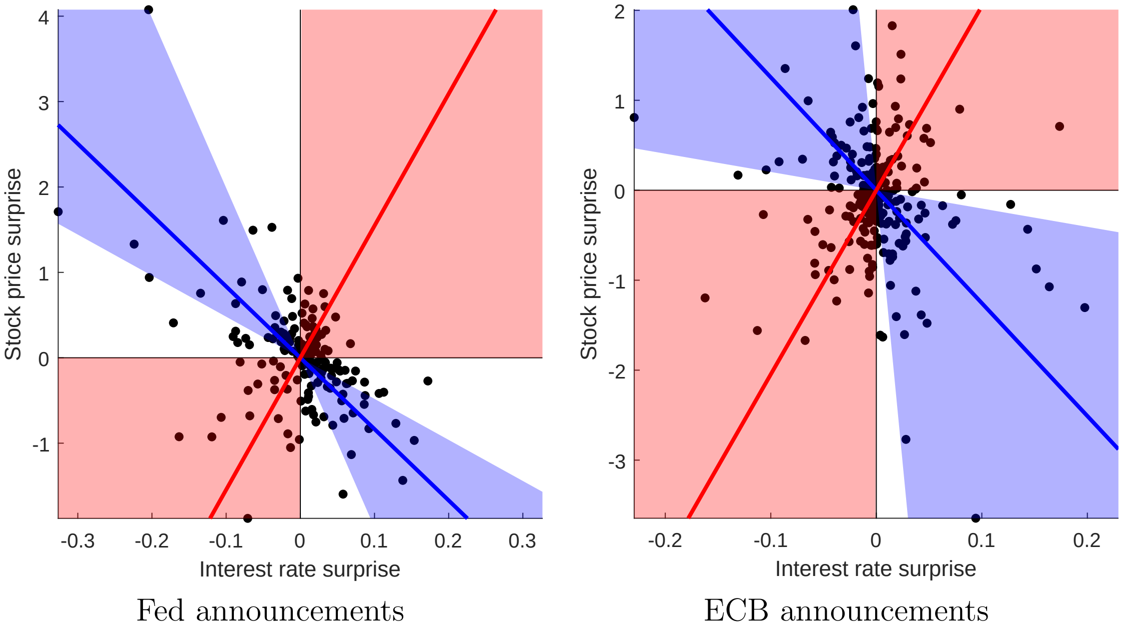
Appendix B Rotational sign restrictions

This section explains the details of rotational sign restrictions. Recall that the goal is to decompose the interest rate surprises into a sum of two orthogonal components, such that the first one is associated with a negative co-movement of the interest rate and stock price surprises and the second is associated with their positive co-movement.

Recall also that i^{Total} is a vector of interest rate surprises, s is a vector of stock price surprises, i^{MP} is a vector of monetary policy shock proxies and i^{CBI} is a vector of central bank information shock proxies. Each of the four vectors has length T, where T is the number of central bank announcements in the dataset. Let $M = (i^{Total}, s)$ be a $T \times 2$ matrix with columns i^{Total} and s. I decompose M as

$$M = UC, \quad \text{where} \quad U = \left(i^{MP}, i^{CBI}\right), \quad (i^{MP})' i^{CBI} = 0 \quad \text{and} \quad C = \begin{pmatrix} 1 & c_{MP} < 0 \\ 1 & c_{CBI} > 0 \end{pmatrix}. \tag{B.1}$$

Figure B.1: Alternative sign restriction-based decompositions of central bank surprises.



Fed announcements

ECB announcements

Note. Each dot corresponds to one announcement. Blue, negatively sloped, lines show the relationship $s = c_{MP} * i^{MP}$ and red, positively sloped, lines show the relationship $s = c_{CBI} * i^{CBI}$ for the decomposition used in this paper. Blue and red ranges represent the slopes of these relations for all the admissible decompositions.

The decomposition in (B.1) is not unique. There is a range of "rotations" of U and

C that all satisfy the sign restrictions $c_{MP} < 0$ and $c_{CBI} > 0$. Figure B.1 illustrates this non-uniqueness. The scatter plots show the interest rate surprises and stock price surprises for all Fed and ECB announcements. The blue regions indicate all the admissible negative relations between i^{Total} and s conditionally on the monetary policy shock, i.e. all the admissible lines $s = c_{MP}\, i^{MP}$. The red regions indicate all the corresponding positive relations between i^{Total} and s conditionally on the central bank shock, i.e. all the admissible lines $s = c_{CBI}\, i^{CBI}$.

B.1 Computing the decomposition

U and C are computed as

$$U = QPD \quad \text{and} \quad C = D^{-1}P'R \tag{B.2}$$

where the matrices Q, P, D, R are obtained in three steps.

1. *Decompose M into two orthogonal components* using the QR decomposition,

$$M = QR, \quad \text{where} \quad Q'Q = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \quad \text{and} \quad R = \begin{pmatrix} r_{11} > 0 & r_{12} \\ 0 & r_{22} > 0 \end{pmatrix}. \tag{B.3}$$

Note that in many software packages do not impose the normalization that the diagonal elements of R are positive, in this case this has to be imposed ex post.

2. *Rotate* these orthogonal components using the rotation matrix P,

$$P = \begin{pmatrix} \cos(\alpha) & \sin(\alpha) \\ -\sin(\alpha) & \cos(\alpha) \end{pmatrix}. \tag{B.4}$$

- To satisfy the sign restrictions use any angle α in the following range

$$\alpha \in \left(0, \arctan\frac{-r_{22}}{r_{12}}\right) \quad \text{if} \quad r_{12} < 0, \tag{B.5a}$$

$$\alpha \in \left(\arctan\frac{r_{12}}{r_{22}}, \frac{\pi}{2}\right) \quad \text{if} \quad r_{12} \geq 0. \tag{B.5b}$$

- To obtain the desired variance share $\text{var}(i^{MP})/\,\text{var}(i^{Total})$ use

$$\alpha = \arccos\sqrt{\frac{\text{var}(i^{MP})}{\text{var}(i^{Total})}}. \tag{B.6}$$

3. *Rescale* the resulting orthogonal components with a diagonal matrix D to ensure that they add up to the interest rate surprises i^{Total}. It is straightforward to show that

$$D = \begin{pmatrix} r_{11}\cos(\alpha) & 0 \\ 0 & r_{11}\sin(\alpha) \end{pmatrix}. \tag{B.7}$$

B.2 Properties and derivations

Result 1. The variance shares implied by the above decomposition are

$$\frac{\text{var}(i^{MP})}{\text{var}(i^{Total})} = \cos^2(\alpha) \quad \text{and} \quad \frac{\text{var}(i^{CBI})}{\text{var}(i^{Total})} = \sin^2(\alpha). \tag{B.8}$$

Proof This is the straighforward implication of using the matrix D given in (B.7) in $U = QPD$.■

Result 2. Considering $\alpha \in (-\pi, \pi)$, the sign restrictions $c_{MP} < 0$ and $c_{CBI} > 0$ are satisfied if and only if α satisfies (B.5a)-(B.5b).

Proof. Consider the "unscaled" decomposition $M = \tilde{U}\tilde{C}$ where $\tilde{U} = QP$ and $\tilde{C} = P'R$. $\tilde{C}$ contains the impact of the two "unscaled" shocks in $\tilde{U}$ on the interest rate and stock price surprises, so $\tilde{C}$ should satisfy

$$\tilde{C} = \begin{pmatrix} \tilde{c}_{11} > 0 & \tilde{c}_{12} < 0 \\ \tilde{c}_{21} > 0 & \tilde{c}_{22} > 0 \end{pmatrix}$$

$\tilde{C} = P'R$ implies the following system of inequalities

$$r_{11} \cos\alpha > 0 \tag{B.9}$$

$$r_{12} \cos\alpha - r_{22} \sin\alpha < 0 \tag{B.10}$$

$$r_{11} \sin\alpha > 0 \tag{B.11}$$

$$r_{12} \sin\alpha + r_{22} \cos\alpha > 0 \tag{B.12}$$

Assume without loss of generality that $\alpha \in (-\pi, \pi)$. (B.9) and (B.11) imply that $\alpha \in (0, \pi/2)$. If $r_{12} < 0$, (B.10) is slack and (B.12) implies (B.5a). If $r_{12} > 0$, (B.12) is slack and (B.10) implies (B.5b). ■

Result 3. The variance share of the monetary policy shock must be within the following bounds:

$$\frac{\text{var}(i^{MP})}{\text{var}(i^{Total})} \in \begin{cases} (\rho^2, 1) & \text{if } \rho < 0, \\ (0, 1 - \rho^2) & \text{if } \rho \geq 0. \end{cases} \tag{B.13}$$

Proof. This follows from (B.5a), (B.5b) and (B.8). To simplify the expressions use the fact that $\cos(\arctan(x)) = 1/\sqrt{1 + x^2}$. This implies

$$\frac{\text{var}(i^{MP})}{\text{var}(i^{Total})} \in \left(\frac{r_{12}^2}{r_{22}^2 + r_{12}^2}, 1 \right) \text{ if } r_{12} < 0 \text{ and } \frac{\text{var}(i^{MP})}{\text{var}(i^{Total})} \in \left(0, \frac{r_{22}^2}{r_{12}^2 + r_{22}^2} \right) \text{ if } r_{12} \geq 0. \tag{B.14}$$

To simplify further notice that $M'M = R'Q'QR = R'R$, and hence

$$\begin{pmatrix} i^{Total\prime} i^{Total} & i^{Total\prime} s \\ \dots & s's \end{pmatrix} = \begin{pmatrix} r_{11}^2 & r_{11} r_{12} \\ \dots & r_{12}^2 + r_{22}^2 \end{pmatrix}. \blacksquare \tag{B.15}$$

Appendix C Detailed local projection results

Table C.1: The effect of ECB total interest rate surprises on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, i_t^{Total,ECB} + u_t.$$

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
1-year Bund yield										
β_h	1.03***	1.01***	1.03***	0.95***	0.97***	0.86**	0.90**	0.94**	0.80**	0.96*
	(0.16)	(0.18)	(0.22)	(0.24)	(0.28)	(0.35)	(0.35)	(0.45)	(0.40)	(0.51)
R-sq	0.37	0.26	0.24	0.18	0.16	0.08	0.06	0.04	0.02	0.03
N.obs.	261	261	261	261	261	261	261	261	261	261
1-year Treasury yield										
β_h	0.11	0.21	0.22	0.11	0.13	-0.01	-0.10	-0.32	-0.34	-0.26
	(0.16)	(0.18)	(0.20)	(0.18)	(0.22)	(0.28)	(0.24)	(0.33)	(0.37)	(0.44)
R-sq	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N.obs.	261	261	261	261	261	261	261	261	261	261
10-year Bund yield										
β_h	0.38***	0.43**	0.51**	0.53**	0.62**	0.35	0.24	0.12	0.42	0.58
	(0.14)	(0.19)	(0.20)	(0.23)	(0.26)	(0.34)	(0.42)	(0.50)	(0.44)	(0.50)
R-sq	0.04	0.04	0.04	0.04	0.04	0.01	0.00	0.00	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
10-year Treasury yield										
β_h	0.15	0.34	0.35	0.30	0.28	-0.13	-0.11	-0.36	-0.12	-0.30
	(0.20)	(0.24)	(0.29)	(0.30)	(0.27)	(0.51)	(0.53)	(0.65)	(0.67)	(0.89)
R-sq	0.00	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
N.obs.	261	261	261	261	261	261	261	261	261	261
Euro Stoxx 50										
β_h	0.61	4.34	1.92	5.22	6.62	-0.00	10.96	3.93	2.94	8.18
	(3.94)	(4.97)	(6.25)	(9.07)	(8.39)	(11.37)	(10.92)	(10.80)	(11.00)	(12.81)
R-sq	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
N.obs.	261	261	261	261	261	261	261	261	261	261
SP500										
β_h	3.10	5.69	4.38	3.72	6.92	-0.75	11.03	5.15	6.63	6.64
	(2.86)	(5.26)	(5.01)	(7.61)	(6.33)	(12.09)	(8.79)	(9.55)	(9.36)	(9.39)
R-sq	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00
N.obs.	261	261	261	261	261	261	261	261	261	261
High yield corporate bond OAS (EA)										
β_h	-1.31***	-1.61***	-1.67**	-1.94**	-2.43**	-1.69	-2.91	-3.01	-3.78	-4.76
	(0.43)	(0.55)	(0.75)	(0.84)	(1.06)	(1.86)	(2.50)	(2.59)	(2.94)	(3.25)
R-sq	0.07	0.06	0.04	0.04	0.05	0.01	0.02	0.02	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
High yield corporate bond OAS (US)										
β_h	-0.52	-1.03**	-1.17*	-1.14	-1.22	-0.57	-1.43	-1.71	-1.89	-2.47
	(0.36)	(0.53)	(0.66)	(0.81)	(0.92)	(1.83)	(2.14)	(2.50)	(2.75)	(2.74)
R-sq	0.02	0.05	0.05	0.03	0.03	0.00	0.01	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
EUR per USD										
β_h	-5.15***	-7.15***	-6.32***	-6.47**	-7.33**	-6.56*	-12.57***	-11.96***	-12.66***	-18.18***
	(1.61)	(1.97)	(2.10)	(2.81)	(3.06)	(3.59)	(3.93)	(3.84)	(3.74)	(6.69)
R-sq	0.05	0.06	0.04	0.03	0.04	0.01	0.04	0.03	0.03	0.05
N.obs.	261	261	261	261	261	261	261	261	261	261
Broad dollar ex EUR										
β_h	-1.23	-1.43	-0.91	-1.78	-1.59	0.03	-2.90	-0.47	-1.65	-4.16
	(0.93)	(1.10)	(1.68)	(1.83)	(2.08)	(2.80)	(2.85)	(2.77)	(2.50)	(2.65)
R-sq	0.02	0.01	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.01
N.obs.	261	261	260	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.2: The effect of Fed total interest rate surprises on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, i_t^{Total,Fed} + u_t.$$

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
1-year Bund yield										
β_h	0.37***	0.47***	0.38***	0.40***	0.39***	0.23	0.24	0.34	0.39	0.42
	(0.06)	(0.09)	(0.09)	(0.11)	(0.12)	(0.23)	(0.34)	(0.39)	(0.41)	(0.45)
R-sq	0.28	0.20	0.14	0.13	0.11	0.01	0.01	0.01	0.02	0.01
N.obs.	167	167	167	167	167	167	167	167	167	167
1-year Treasury yield										
β_h	0.56***	0.52***	0.61***	0.57***	0.57***	0.60***	0.43	0.70**	0.98***	0.97**
	(0.13)	(0.15)	(0.17)	(0.18)	(0.17)	(0.22)	(0.27)	(0.28)	(0.33)	(0.41)
R-sq	0.28	0.21	0.19	0.14	0.15	0.08	0.03	0.06	0.07	0.05
N.obs.	167	167	167	167	167	167	167	167	167	167
10-year Bund yield										
β_h	0.24**	0.29***	0.23	0.22	0.28*	0.19	0.07	0.25	0.32	0.25
	(0.10)	(0.11)	(0.14)	(0.16)	(0.17)	(0.21)	(0.23)	(0.24)	(0.28)	(0.32)
R-sq	0.07	0.06	0.03	0.02	0.03	0.01	0.00	0.01	0.01	0.00
N.obs.	167	167	167	167	167	167	167	167	167	167
10-year Treasury yield										
β_h	0.47***	0.53**	0.53**	0.57**	0.61***	0.47	0.22	0.61	0.48	0.38
	(0.17)	(0.24)	(0.22)	(0.23)	(0.23)	(0.30)	(0.36)	(0.42)	(0.52)	(0.56)
R-sq	0.08	0.09	0.08	0.07	0.08	0.03	0.00	0.02	0.01	0.01
N.obs.	167	167	167	167	167	167	167	167	167	167
Euro Stoxx 50										
β_h	-2.78	-5.02*	-4.20	-5.83	-6.25*	-8.52***	-4.41	-3.57	4.42	4.15
	(2.62)	(2.82)	(2.98)	(3.61)	(3.71)	(3.18)	(4.55)	(6.07)	(7.93)	(9.17)
R-sq	0.01	0.02	0.01	0.02	0.02	0.03	0.00	0.00	0.00	0.00
N.obs.	167	167	167	167	167	167	167	167	167	167
SP500										
β_h	-8.87***	-7.16***	-6.82***	-7.28***	-8.27***	-10.54***	-12.55***	-10.18*	-3.79	-3.60
	(1.80)	(1.84)	(2.30)	(2.60)	(3.00)	(2.78)	(4.46)	(5.25)	(6.41)	(6.68)
R-sq	0.12	0.06	0.04	0.04	0.05	0.06	0.05	0.03	0.00	0.00
N.obs.	167	167	167	167	167	167	167	167	167	167
High yield corporate bond OAS (EA)										
β_h	0.32	0.25	0.42	0.43	0.66	2.91***	5.09***	5.03**	4.50*	4.12
	(0.30)	(0.36)	(0.36)	(0.44)	(0.48)	(0.91)	(1.73)	(2.05)	(2.33)	(2.79)
R-sq	0.01	0.00	0.01	0.01	0.01	0.11	0.16	0.11	0.06	0.04
N.obs.	167	167	167	167	167	167	166	167	167	167
High yield corporate bond OAS (US)										
β_h	0.40	0.84*	0.98*	1.20*	1.50**	3.14**	4.22**	4.34**	4.17*	4.45*
	(0.38)	(0.46)	(0.54)	(0.63)	(0.76)	(1.41)	(2.04)	(2.03)	(2.33)	(2.60)
R-sq	0.02	0.05	0.07	0.08	0.09	0.16	0.15	0.11	0.08	0.07
N.obs.	167	167	167	167	167	167	166	167	167	167
EUR per USD										
β_h	6.04***	7.27**	5.80***	4.25**	2.73	2.21	1.38	1.27	2.14	5.23
	(1.35)	(2.82)	(1.27)	(1.71)	(2.01)	(2.18)	(2.40)	(2.83)	(3.55)	(4.31)
R-sq	0.13	0.13	0.08	0.04	0.01	0.01	0.00	0.00	0.00	0.01
N.obs.	167	167	167	167	167	167	167	167	167	167
Broad dollar ex EUR										
β_h	3.47***	4.07***	3.60***	2.97***	2.61***	3.24***	4.08***	3.86*	3.86	4.95*
	(0.69)	(0.71)	(0.74)	(0.92)	(0.94)	(1.07)	(1.26)	(2.00)	(2.51)	(2.90)
R-sq	0.14	0.17	0.11	0.06	0.05	0.05	0.05	0.03	0.02	0.03
N.obs.	166	166	166	166	166	166	166	166	165	166

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.3: The effect of ECB monetary policy and information shocks on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP} + \beta_h^{CBI}\, i_t^{CBI} + u_t.$$

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
1-year Bund yield										
β_h^{MP} (rotation)	0.90***	0.86***	0.88***	0.72***	0.69**	0.51	0.42	0.36	0.18	0.25
	(0.18)	(0.19)	(0.23)	(0.24)	(0.29)	(0.38)	(0.38)	(0.49)	(0.42)	(0.57)
β_h^{CBI} (rotation)	1.28***	1.33***	1.35***	1.43***	1.56***	1.60***	1.92***	2.16***	2.11***	2.48***
	(0.19)	(0.23)	(0.29)	(0.33)	(0.35)	(0.39)	(0.46)	(0.57)	(0.66)	(0.72)
F-test	0.04	0.03	0.08	0.03	0.01	0.01	0.00	0.00	0.01	0.01
R-sq	0.38	0.28	0.25	0.20	0.19	0.11	0.10	0.08	0.05	0.06
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.93***	0.88***	0.86***	0.72***	0.65**	0.53	0.48	0.49	0.34	0.38
	(0.21)	(0.22)	(0.25)	(0.27)	(0.30)	(0.42)	(0.41)	(0.56)	(0.43)	(0.62)
β_h^{CBI} (poor man)	1.22***	1.28***	1.38***	1.44***	1.64***	1.55***	1.79***	1.90***	1.79**	2.19***
	(0.20)	(0.26)	(0.35)	(0.38)	(0.43)	(0.46)	(0.51)	(0.60)	(0.71)	(0.70)
F-test	0.32	0.24	0.24	0.12	0.06	0.10	0.04	0.09	0.08	0.05
R-sq	0.38	0.27	0.25	0.20	0.20	0.10	0.09	0.07	0.04	0.05
N.obs.	261	261	261	261	261	261	261	261	261	261
1-year Treasury yield										
β_h^{MP} (rotation)	0.01	0.10	0.07	-0.07	-0.03	-0.24	-0.26	-0.57	-0.68	-0.74
	(0.17)	(0.18)	(0.22)	(0.20)	(0.24)	(0.32)	(0.27)	(0.37)	(0.42)	(0.49)
β_h^{CBI} (rotation)	0.33*	0.45*	0.53**	0.49**	0.46*	0.48	0.23	0.22	0.37	0.78
	(0.18)	(0.24)	(0.25)	(0.21)	(0.26)	(0.39)	(0.43)	(0.54)	(0.58)	(0.64)
F-test	0.05	0.10	0.06	0.02	0.05	0.09	0.31	0.19	0.11	0.03
R-sq	0.01	0.02	0.02	0.02	0.01	0.01	0.00	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.08	0.03	0.00	-0.11	-0.02	-0.26	-0.32	-0.61	-0.69	-0.75
	(0.18)	(0.20)	(0.24)	(0.22)	(0.29)	(0.35)	(0.29)	(0.38)	(0.46)	(0.57)
β_h^{CBI} (poor man)	0.52***	0.59**	0.68***	0.56***	0.44*	0.53	0.36	0.30	0.40	0.80
	(0.16)	(0.26)	(0.23)	(0.18)	(0.26)	(0.43)	(0.44)	(0.64)	(0.60)	(0.70)
F-test	0.01	0.09	0.04	0.02	0.24	0.15	0.19	0.22	0.15	0.08
R-sq	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.3: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
10-year Bund yield										
β_h^{MP} (rotation)	0.28	0.35	0.50**	0.47*	0.54*	0.33	0.23	0.08	0.34	0.63
	(0.18)	(0.24)	(0.25)	(0.28)	(0.31)	(0.39)	(0.47)	(0.58)	(0.50)	(0.58)
β_h^{CBI} (rotation)	0.60***	0.58**	0.51*	0.67**	0.78**	0.40	0.26	0.19	0.59	0.47
	(0.21)	(0.26)	(0.27)	(0.31)	(0.34)	(0.45)	(0.54)	(0.56)	(0.62)	(0.67)
F-test	0.28	0.48	0.98	0.58	0.56	0.89	0.95	0.86	0.71	0.83
R-sq	0.05	0.04	0.04	0.04	0.04	0.01	0.00	0.00	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.33*	0.42	0.53*	0.52	0.57*	0.27	0.00	-0.13	0.03	0.24
	(0.18)	(0.26)	(0.28)	(0.32)	(0.34)	(0.43)	(0.52)	(0.66)	(0.50)	(0.59)
β_h^{CBI} (poor man)	0.48***	0.45**	0.45*	0.57**	0.72**	0.52	0.74	0.65	1.24**	1.31**
	(0.16)	(0.23)	(0.24)	(0.27)	(0.33)	(0.49)	(0.54)	(0.48)	(0.55)	(0.63)
F-test	0.52	0.91	0.82	0.90	0.76	0.70	0.33	0.34	0.11	0.21
R-sq	0.05	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
10-year Treasury yield										
β_h^{MP} (rotation)	0.04	0.17	0.13	-0.02	0.09	-0.42	-0.27	-0.50	-0.28	-0.49
	(0.24)	(0.25)	(0.30)	(0.31)	(0.29)	(0.58)	(0.62)	(0.74)	(0.75)	(1.02)
β_h^{CBI} (rotation)	0.38	0.70**	0.81**	0.97**	0.70*	0.51	0.22	-0.06	0.21	0.10
	(0.26)	(0.31)	(0.40)	(0.43)	(0.38)	(0.66)	(0.65)	(0.76)	(0.84)	(0.97)
F-test	0.27	0.09	0.08	0.02	0.13	0.21	0.52	0.59	0.58	0.56
R-sq	0.01	0.02	0.03	0.03	0.01	0.01	0.00	0.00	0.00	0.00
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.11	0.22	0.08	0.03	0.18	-0.52	-0.40	-0.70	-0.57	-0.79
	(0.28)	(0.29)	(0.32)	(0.32)	(0.32)	(0.59)	(0.68)	(0.83)	(0.82)	(1.17)
β_h^{CBI} (poor man)	0.22	0.61**	0.93**	0.86*	0.51	0.71	0.49	0.36	0.83	0.72
	(0.19)	(0.30)	(0.43)	(0.51)	(0.42)	(0.69)	(0.61)	(0.72)	(0.81)	(0.86)
F-test	0.76	0.36	0.11	0.16	0.52	0.17	0.33	0.33	0.22	0.30
R-sq	0.00	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.3: Continued

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
Euro Stoxx 50										
β_h^{MP} (rotation)	-14.55***	-11.52**	-15.61**	-16.54*	-12.92	-18.61	-7.76	-16.77	-16.43	-11.66
	(4.24)	(5.22)	(6.84)	(9.18)	(8.36)	(11.88)	(10.78)	(11.10)	(11.60)	(14.14)
β_h^{CBI} (rotation)	32.74***	37.97***	39.06***	51.32***	48.03***	39.42**	50.64***	47.78***	43.98**	50.23**
	(5.68)	(7.75)	(8.56)	(12.25)	(11.58)	(15.86)	(17.04)	(17.86)	(20.97)	(22.98)
F-test	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
R-sq	0.17	0.14	0.14	0.15	0.12	0.06	0.06	0.05	0.03	0.03
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-7.16*	-5.07	-8.86	-10.22	-9.41	-17.16	-3.21	-9.66	-6.92	-3.75
	(4.30)	(5.01)	(6.91)	(9.45)	(8.43)	(12.15)	(12.07)	(11.58)	(11.08)	(13.87)
β_h^{CBI} (poor man)	17.08***	24.30**	24.76***	37.92**	40.58***	36.36**	41.00**	32.71*	23.82	33.45
	(5.55)	(9.60)	(9.35)	(14.75)	(11.66)	(15.93)	(17.36)	(18.68)	(22.57)	(24.50)
F-test	0.00	0.01	0.00	0.01	0.00	0.01	0.04	0.05	0.22	0.18
R-sq	0.04	0.05	0.05	0.08	0.08	0.05	0.04	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
SP500										
β_h^{MP} (rotation)	-4.33	-3.69	-7.61	-7.95	-5.04	-12.36	2.20	-5.11	-4.73	-3.18
	(3.13)	(4.78)	(5.11)	(7.53)	(5.60)	(13.13)	(8.60)	(9.99)	(9.76)	(10.56)
β_h^{CBI} (rotation)	18.85***	25.55***	29.79***	28.44***	32.28***	23.86*	29.76**	26.87*	30.71*	27.45
	(4.78)	(8.37)	(7.59)	(10.00)	(10.19)	(12.98)	(13.97)	(14.25)	(16.56)	(16.78)
F-test	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.03	0.05	0.12
R-sq	0.07	0.08	0.09	0.07	0.07	0.04	0.03	0.02	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-1.58	-2.33	-5.43	-8.48	-5.67	-16.68	-0.25	-6.15	-2.10	-0.41
	(2.67)	(3.95)	(5.01)	(7.50)	(5.12)	(14.28)	(9.42)	(10.54)	(10.34)	(10.43)
β_h^{CBI} (poor man)	13.01**	22.68**	25.18***	29.56***	33.62***	33.02***	34.95**	29.08**	25.12	21.57
	(5.15)	(11.05)	(8.43)	(11.06)	(10.60)	(11.42)	(13.96)	(14.43)	(16.17)	(16.78)
F-test	0.01	0.03	0.00	0.00	0.00	0.01	0.04	0.05	0.15	0.26
R-sq	0.03	0.06	0.06	0.08	0.07	0.07	0.04	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.3: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
High yield corporate bond OAS (EA)										
β_h^{MP} (rotation)	-0.63	-0.64	-0.50	-0.43	-0.86	0.18	-0.60	-0.70	-2.16	-2.90
	(0.43)	(0.54)	(0.72)	(0.78)	(0.95)	(1.93)	(2.47)	(2.67)	(3.19)	(3.58)
β_h^{CBI} (rotation)	-2.75***	-3.67***	-4.15***	-5.14***	-5.77***	-5.68**	-7.79**	-7.91**	-7.22*	-8.70*
	(0.66)	(0.96)	(1.25)	(1.39)	(1.69)	(2.44)	(3.40)	(3.52)	(4.33)	(4.72)
F-test	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.04	0.27	0.26
R-sq	0.12	0.10	0.08	0.10	0.09	0.04	0.04	0.04	0.02	0.03
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.61*	-0.69*	-0.50	-0.47	-0.64	0.78	0.70	0.39	-0.87	-1.70
	(0.33)	(0.41)	(0.60)	(0.71)	(0.88)	(2.10)	(2.58)	(2.82)	(3.37)	(3.91)
β_h^{CBI} (poor man)	-2.79***	-3.55***	-4.16***	-5.06***	-6.23***	-6.94***	-10.56***	-10.22***	-9.95**	-11.23***
	(0.68)	(1.03)	(1.37)	(1.57)	(1.92)	(2.51)	(3.41)	(3.43)	(4.06)	(4.34)
F-test	0.00	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.08	0.10
R-sq	0.12	0.10	0.08	0.10	0.11	0.06	0.08	0.06	0.04	0.04
N.obs.	261	261	261	261	261	261	261	261	261	261
High yield corporate bond OAS (US)										
β_h^{MP} (rotation)	-0.11	-0.37	-0.36	-0.02	0.01	1.01	-0.27	-0.87	-1.24	-1.40
	(0.37)	(0.44)	(0.56)	(0.74)	(0.86)	(1.97)	(2.33)	(2.86)	(3.16)	(3.18)
β_h^{CBI} (rotation)	-1.41***	-2.44***	-2.88***	-3.51***	-3.81***	-3.93*	-3.89	-3.49	-3.27	-4.73
	(0.51)	(0.84)	(1.03)	(1.17)	(1.30)	(2.05)	(2.41)	(2.79)	(3.28)	(3.55)
F-test	0.01	0.01	0.01	0.00	0.00	0.01	0.12	0.38	0.57	0.41
R-sq	0.05	0.08	0.09	0.09	0.08	0.03	0.02	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.13	-0.26	-0.24	-0.01	0.02	1.31	0.59	0.34	0.10	-0.12
	(0.40)	(0.41)	(0.53)	(0.76)	(0.89)	(2.25)	(2.65)	(3.20)	(3.55)	(3.47)
β_h^{CBI} (poor man)	-1.35**	-2.67**	-3.15**	-3.53**	-3.85**	-4.57**	-5.72**	-6.06**	-6.11**	-7.44**
	(0.54)	(1.04)	(1.32)	(1.51)	(1.68)	(2.12)	(2.35)	(2.47)	(2.76)	(3.06)
F-test	0.07	0.03	0.04	0.04	0.04	0.06	0.07	0.11	0.16	0.11
R-sq	0.04	0.10	0.11	0.10	0.08	0.05	0.05	0.03	0.03	0.03
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.3: Continued

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
log VSTOXX										
β_h^{MP} (rotation)	0.33*	0.22	0.35	0.31	0.24	0.54	-0.10	0.28	0.15	-0.04
	(0.18)	(0.21)	(0.23)	(0.26)	(0.25)	(0.34)	(0.29)	(0.27)	(0.30)	(0.42)
β_h^{CBI} (rotation)	-0.99***	-1.06***	-1.09***	-1.21***	-1.01**	-1.08*	-1.34***	-1.24***	-1.13**	-1.58**
	(0.28)	(0.37)	(0.39)	(0.43)	(0.44)	(0.59)	(0.50)	(0.45)	(0.53)	(0.62)
F-test	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.01	0.06	0.06
R-sq	0.09	0.07	0.07	0.07	0.04	0.03	0.04	0.03	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.24*	0.14	0.22	0.19	0.20	0.51**	-0.22	0.10	-0.07	-0.24
	(0.13)	(0.16)	(0.20)	(0.25)	(0.21)	(0.25)	(0.27)	(0.23)	(0.25)	(0.39)
β_h^{CBI} (poor man)	-0.80***	-0.89*	-0.81	-0.97*	-0.92*	-1.02*	-1.09**	-0.87**	-0.67	-1.15**
	(0.29)	(0.48)	(0.50)	(0.55)	(0.53)	(0.59)	(0.50)	(0.38)	(0.47)	(0.52)
F-test	0.00	0.04	0.05	0.06	0.05	0.02	0.13	0.03	0.25	0.16
R-sq	0.05	0.05	0.04	0.04	0.03	0.03	0.03	0.01	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
log VIX										
β_h^{MP} (rotation)	0.12	0.06	0.24	0.17	0.21	0.37	-0.48	0.06	-0.04	-0.29
	(0.18)	(0.22)	(0.21)	(0.27)	(0.26)	(0.36)	(0.31)	(0.35)	(0.38)	(0.51)
β_h^{CBI} (rotation)	-0.83***	-1.20**	-1.15***	-1.34***	-1.26***	-1.28**	-1.11**	-1.14**	-1.21**	-1.13*
	(0.30)	(0.48)	(0.34)	(0.47)	(0.47)	(0.61)	(0.52)	(0.49)	(0.61)	(0.67)
F-test	0.01	0.00	0.00	0.00	0.01	0.02	0.27	0.06	0.16	0.36
R-sq	0.05	0.07	0.06	0.07	0.05	0.03	0.03	0.02	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	0.06	0.08	0.16	0.15	0.20	0.39	-0.39	0.03	-0.10	-0.34
	(0.11)	(0.14)	(0.18)	(0.22)	(0.21)	(0.28)	(0.29)	(0.31)	(0.29)	(0.49)
β_h^{CBI} (poor man)	-0.71**	-1.24*	-0.99***	-1.29**	-1.24***	-1.33**	-1.30**	-1.07***	-1.07**	-1.03**
	(0.31)	(0.65)	(0.35)	(0.53)	(0.47)	(0.61)	(0.54)	(0.36)	(0.46)	(0.49)
F-test	0.02	0.05	0.00	0.01	0.01	0.01	0.14	0.02	0.08	0.32
R-sq	0.03	0.08	0.05	0.06	0.05	0.04	0.04	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.3: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
EUR per USD										
β_h^{MP} (rotation)	-6.94***	-8.19***	-7.33***	-7.45**	-8.22**	-5.97	-11.83**	-8.92*	-10.82**	-18.01**
	(2.04)	(2.16)	(2.41)	(3.31)	(3.74)	(5.23)	(5.10)	(4.94)	(4.59)	(7.57)
β_h^{CBI} (rotation)	-1.35	-4.94	-4.17	-4.39	-5.44	-7.80	-14.13*	-18.42**	-16.55**	-18.54*
	(2.77)	(3.46)	(3.77)	(4.36)	(4.83)	(5.79)	(7.27)	(7.94)	(8.43)	(10.13)
F-test	0.11	0.39	0.47	0.55	0.64	0.83	0.81	0.34	0.58	0.96
R-sq	0.06	0.06	0.04	0.04	0.04	0.01	0.04	0.03	0.03	0.05
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-5.76***	-8.44***	-6.87***	-7.42**	-7.27*	-7.14	-13.30***	-11.54***	-12.64***	-22.63***
	(2.02)	(2.18)	(2.34)	(3.55)	(3.83)	(4.77)	(4.59)	(4.32)	(3.67)	(7.88)
β_h^{CBI} (poor man)	-3.84	-4.41	-5.15	-4.44	-7.45	-5.33	-11.02	-12.86	-12.70	-8.76
	(2.76)	(3.99)	(4.28)	(4.52)	(5.11)	(4.66)	(7.15)	(7.87)	(8.66)	(11.10)
F-test	0.58	0.38	0.73	0.61	0.98	0.78	0.79	0.88	0.99	0.31
R-sq	0.05	0.07	0.04	0.04	0.04	0.01	0.04	0.03	0.03	0.05
N.obs.	261	261	261	261	261	261	261	261	261	261
Broad dollar ex EUR										
β_h^{MP} (rotation)	-0.06	0.36	0.55	1.06	0.90	3.35	0.11	3.23	2.23	-0.37
	(1.05)	(1.12)	(1.25)	(1.94)	(2.33)	(3.23)	(2.98)	(3.14)	(2.90)	(3.26)
β_h^{CBI} (rotation)	-3.63***	-4.95***	-5.97***	-7.81***	-6.75***	-7.00**	-9.12**	-8.57**	-10.05**	-12.42**
	(1.20)	(1.55)	(1.82)	(2.36)	(2.46)	(3.30)	(4.03)	(3.89)	(4.55)	(5.27)
F-test	0.01	0.00	0.00	0.00	0.01	0.01	0.04	0.01	0.03	0.07
R-sq	0.04	0.05	0.06	0.07	0.04	0.03	0.03	0.03	0.03	0.03
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.26	-0.22	-0.11	0.37	1.15	2.56	-0.76	2.29	0.57	-2.52
	(1.09)	(1.18)	(1.27)	(2.14)	(2.46)	(3.57)	(3.36)	(3.39)	(2.82)	(2.88)
β_h^{CBI} (poor man)	-3.21***	-3.71**	-4.58**	-6.35**	-7.27***	-5.33*	-7.26*	-6.59*	-6.54	-7.85
	(1.23)	(1.80)	(2.26)	(2.64)	(2.43)	(3.13)	(4.12)	(3.88)	(4.36)	(5.15)
F-test	0.07	0.10	0.08	0.05	0.01	0.09	0.22	0.08	0.17	0.36
R-sq	0.03	0.03	0.04	0.04	0.05	0.02	0.02	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.4: The effect of European industrial confidence surprises on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{IndConf} + u_t$$

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
1-year Bund yield										
β_h	0.53	0.72	0.64	0.88	1.69***	2.09**	3.05***	4.20***	5.56***	6.04***
	(0.44)	(0.46)	(0.51)	(0.54)	(0.56)	(0.90)	(1.17)	(1.33)	(1.59)	(1.67)
R-sq	0.01	0.01	0.01	0.01	0.03	0.02	0.04	0.06	0.07	0.06
N.obs.	199	199	199	199	199	199	198	198	198	198
1-year Treasury yield										
β_h	0.08	0.38	0.38	1.36**	1.87**	2.23**	2.99**	2.83**	4.10**	5.05***
	(0.42)	(0.47)	(0.59)	(0.59)	(0.74)	(0.93)	(1.29)	(1.33)	(1.65)	(1.89)
R-sq	0.00	0.00	0.00	0.03	0.04	0.03	0.04	0.03	0.04	0.05
N.obs.	201	201	201	201	201	201	201	201	200	200
10-year Bund yield										
β_h	0.16	0.54	0.73	1.34*	2.14***	2.25***	2.33**	2.94**	4.80***	4.24**
	(0.42)	(0.46)	(0.52)	(0.71)	(0.78)	(0.83)	(1.14)	(1.48)	(1.84)	(1.69)
R-sq	0.00	0.01	0.01	0.02	0.04	0.02	0.02	0.02	0.05	0.03
N.obs.	196	196	196	196	196	196	196	196	195	195
10-year Treasury yield										
β_h	0.22	1.10	1.32*	2.48***	3.32***	2.91**	5.20**	5.59**	6.83**	6.70**
	(0.56)	(0.69)	(0.79)	(0.79)	(1.00)	(1.26)	(2.41)	(2.46)	(2.74)	(2.84)
R-sq	0.00	0.02	0.02	0.05	0.06	0.03	0.05	0.05	0.06	0.05
N.obs.	201	201	201	201	201	201	201	201	200	200
Euro Stoxx 50										
β_h	-11.44	10.45	4.46	19.53	38.97*	44.33	58.68*	35.97	14.09	49.16
	(9.90)	(15.18)	(22.09)	(22.99)	(21.14)	(30.63)	(34.74)	(31.01)	(41.12)	(44.54)
R-sq	0.01	0.00	0.00	0.01	0.02	0.01	0.02	0.00	0.00	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
SP500										
β_h	-8.41	18.50	16.79	30.89*	44.14**	41.54**	74.96**	41.38*	36.31	71.37*
	(10.18)	(19.13)	(20.70)	(16.87)	(18.13)	(19.58)	(37.80)	(23.90)	(33.46)	(37.00)
R-sq	0.00	0.01	0.01	0.02	0.03	0.02	0.04	0.01	0.01	0.02
N.obs.	201	201	201	201	201	201	201	201	200	200
High yield corporate bond OAS (EA)										
β_h	2.08	1.23	0.79	-0.51	-1.34	-5.69*	-11.55**	-14.73***	-11.94*	-10.37
	(1.62)	(1.79)	(2.18)	(2.97)	(3.04)	(3.39)	(4.88)	(5.72)	(7.21)	(10.53)
R-sq	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.01	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
High yield corporate bond OAS (US)										
β_h	-1.13	-2.57*	-2.82	-4.69**	-6.03***	-9.40***	-13.72**	-11.84*	-9.48	-10.19
	(0.97)	(1.41)	(1.72)	(1.99)	(2.22)	(2.87)	(5.81)	(6.58)	(9.46)	(10.98)
R-sq	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.02	0.01	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
EUR per USD										
β_h	-16.83**	-18.22**	-20.03**	-21.67**	-30.71***	-28.62**	-20.24	-30.13	-52.48**	-38.01*
	(7.02)	(7.89)	(8.31)	(8.99)	(10.32)	(13.92)	(26.62)	(25.87)	(22.16)	(22.27)
R-sq	0.04	0.03	0.03	0.03	0.04	0.02	0.01	0.01	0.03	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
Broad dollar ex EUR										
β_h	-3.93	-5.26	-3.30	-4.35	-8.37	-13.61*	-16.17	-21.46**	-25.05**	-27.13**
	(2.82)	(4.09)	(5.86)	(6.17)	(6.15)	(7.90)	(10.82)	(9.63)	(11.79)	(13.14)
R-sq	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02
N.obs.	201	201	201	201	201	201	201	201	200	200

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.5: The effect of euro area unemployment rate surprises on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{Unemp} + u_t$$

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
1-year Bund yield										
β_h	-0.01	-0.54	-1.13**	-1.52**	-1.88**	-1.79**	-2.01**	-2.47**	-3.01**	-2.73*
	(0.37)	(0.47)	(0.56)	(0.69)	(0.81)	(0.77)	(0.90)	(1.09)	(1.21)	(1.45)
R-sq	0.00	0.01	0.03	0.04	0.04	0.02	0.02	0.02	0.02	0.01
N.obs.	233	233	233	233	233	233	232	232	232	232
1-year Treasury yield										
β_h	-0.40	-0.77	-1.23	-0.99	-1.42*	-1.84*	-2.70*	-2.11	-2.72	-2.19
	(0.44)	(0.62)	(0.75)	(0.75)	(0.73)	(0.96)	(1.63)	(1.43)	(1.82)	(1.83)
R-sq	0.00	0.01	0.02	0.01	0.02	0.02	0.03	0.01	0.02	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234
10-year Bund yield										
β_h	-0.30	-1.09*	-1.16*	-0.97	-1.26	-0.58	-0.53	-0.08	-0.27	0.58
	(0.64)	(0.63)	(0.69)	(0.75)	(0.93)	(0.95)	(1.03)	(1.10)	(1.20)	(1.41)
R-sq	0.00	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00
N.obs.	230	230	230	230	230	230	230	229	229	229
10-year Treasury yield										
β_h	-0.88	-1.16*	-1.59**	-1.51*	-1.62*	-0.89	-1.71	-0.60	-0.34	0.86
	(0.55)	(0.63)	(0.75)	(0.86)	(0.85)	(1.16)	(1.45)	(1.66)	(1.85)	(1.81)
R-sq	0.01	0.02	0.02	0.01	0.01	0.00	0.01	0.00	0.00	0.00
N.obs.	235	235	235	235	235	235	235	235	234	234
Euro Stoxx 50										
β_h	1.75	3.07	-7.21	-8.88	-25.26	-19.07	-66.13*	-61.91*	-56.16	-54.99
	(15.51)	(15.51)	(16.51)	(19.29)	(22.78)	(28.44)	(35.93)	(36.23)	(39.99)	(44.92)
R-sq	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234
SP500										
β_h	-25.03**	-21.96	-25.20*	-34.85*	-41.83**	-49.01	-86.05**	-62.62*	-58.22	-58.59
	(12.47)	(13.39)	(15.31)	(20.92)	(21.32)	(30.37)	(34.02)	(33.74)	(37.28)	(42.33)
R-sq	0.02	0.01	0.01	0.02	0.02	0.02	0.04	0.02	0.01	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234
High yield corporate bond OAS (EA)										
β_h	3.71*	5.14**	7.02**	6.89**	8.00**	11.15*	14.11*	15.36*	11.33	8.49
	(2.16)	(2.41)	(2.88)	(3.32)	(4.04)	(5.88)	(7.89)	(8.99)	(9.34)	(10.36)
R-sq	0.03	0.04	0.06	0.04	0.04	0.03	0.03	0.03	0.01	0.00
N.obs.	235	235	235	235	234	235	235	235	234	234
High yield corporate bond OAS (US)										
β_h	1.90	2.56	3.90	3.83	4.38	5.64	7.19	5.45	1.66	0.42
	(1.86)	(2.23)	(2.96)	(3.23)	(3.80)	(5.24)	(6.67)	(7.43)	(8.88)	(9.44)
R-sq	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.00
N.obs.	235	235	235	235	234	235	235	235	234	234
EUR per USD										
β_h	28.22***	30.55***	30.79***	31.67***	26.76**	23.58	23.88	23.28	22.73	36.04
	(7.15)	(7.86)	(9.36)	(9.96)	(11.41)	(14.67)	(19.26)	(20.84)	(21.19)	(23.93)
R-sq	0.10	0.08	0.07	0.06	0.04	0.01	0.01	0.01	0.01	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234
Broad dollar ex EUR										
β_h	8.23**	8.30*	9.64*	9.10	8.42	9.88	17.58	18.68	14.19	20.86
	(3.84)	(4.40)	(5.38)	(6.35)	(8.01)	(8.26)	(11.69)	(11.76)	(11.65)	(13.85)
R-sq	0.04	0.03	0.02	0.02	0.01	0.01	0.02	0.02	0.01	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.6: The effect of ECB monetary policy and information shocks on stock indices.

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
SP500 Focused Foreign Rev.										
β_h^{MP} (rotation)	3.58	13.35	7.89	16.11*	9.84	9.17	34.45***	25.98*	13.90	10.06
	(5.94)	(10.00)	(8.28)	(9.28)	(9.12)	(12.55)	(13.04)	(15.28)	(19.77)	(23.28)
β_h^{CBI} (rotation)	25.04***	35.94**	40.60***	51.26***	44.44***	49.83***	53.07***	43.25**	35.07	22.82
	(9.16)	(16.75)	(11.71)	(14.46)	(12.95)	(19.18)	(18.99)	(20.39)	(23.62)	(24.99)
F-test	0.01	0.03	0.00	0.01	0.00	0.02	0.27	0.42	0.48	0.72
R-sq	0.10	0.15	0.18	0.19	0.13	0.09	0.13	0.06	0.03	0.01
N.obs.	109	109	109	109	109	109	109	109	109	109
β_h^{MP} (poor man)	3.58	7.10	1.08	9.25	6.05	7.20	36.61**	29.22*	25.64	23.26
	(5.87)	(8.11)	(8.68)	(8.30)	(11.42)	(13.86)	(16.75)	(17.50)	(21.11)	(23.80)
β_h^{CBI} (poor man)	21.59**	42.81**	46.79***	57.14***	45.25***	46.63**	46.47**	35.05	11.98	-1.37
	(11.01)	(20.80)	(8.29)	(13.74)	(9.46)	(20.33)	(20.23)	(22.35)	(26.81)	(25.64)
F-test	0.15	0.11	0.00	0.00	0.01	0.11	0.70	0.84	0.69	0.48
R-sq	0.07	0.17	0.20	0.20	0.12	0.07	0.12	0.05	0.02	0.01
N.obs.	109	109	109	109	109	109	109	109	109	109
SP500 Focused US Rev.										
β_h^{MP} (rotation)	5.24	14.80	7.13	16.12**	9.45	13.75	32.30***	29.12**	20.91	14.96
	(4.93)	(9.89)	(6.74)	(8.16)	(6.77)	(10.22)	(10.87)	(13.51)	(14.61)	(16.76)
β_h^{CBI} (rotation)	18.97**	29.63*	33.43***	42.82***	38.55***	44.73***	49.02***	41.25**	34.18*	19.29
	(8.26)	(16.50)	(10.26)	(13.46)	(10.23)	(14.91)	(14.89)	(20.31)	(20.76)	(21.40)
F-test	0.03	0.16	0.00	0.01	0.00	0.01	0.20	0.52	0.57	0.88
R-sq	0.08	0.14	0.18	0.21	0.16	0.10	0.15	0.07	0.04	0.01
N.obs.	109	109	109	109	109	109	109	109	109	109
β_h^{MP} (poor man)	5.21	8.93	1.28	11.48*	8.69	15.07	34.75**	30.57**	29.07*	21.35
	(4.46)	(7.19)	(6.92)	(6.61)	(8.72)	(12.13)	(14.15)	(13.77)	(15.57)	(16.26)
β_h^{CBI} (poor man)	16.83	37.10*	39.04***	46.33***	35.17***	37.54**	42.23***	36.87	18.36	7.88
	(11.03)	(22.52)	(9.45)	(16.58)	(9.92)	(18.04)	(16.37)	(27.18)	(22.92)	(22.25)
F-test	0.33	0.23	0.00	0.05	0.04	0.30	0.73	0.83	0.70	0.62
R-sq	0.06	0.17	0.21	0.21	0.12	0.07	0.14	0.07	0.04	0.02
N.obs.	109	109	109	109	109	109	109	109	109	109
Foc.For.Rev. - Foc. US Rev.										
β_h^{MP} (rotation)	-1.66	-1.45	0.76	-0.01	0.39	-4.58	2.15	-3.13	-7.01	-4.90
	(2.95)	(2.78)	(2.85)	(3.47)	(4.05)	(4.90)	(4.53)	(5.41)	(7.41)	(8.89)
β_h^{CBI} (rotation)	6.06*	6.31*	7.17	8.44	5.89	5.10	4.05	2.00	0.89	3.54
	(3.37)	(3.42)	(4.71)	(5.66)	(6.61)	(7.95)	(7.67)	(8.27)	(8.71)	(9.40)
F-test	0.09	0.09	0.21	0.14	0.40	0.24	0.83	0.56	0.47	0.51
R-sq	0.05	0.05	0.03	0.03	0.01	0.02	0.00	0.00	0.01	0.01
N.obs.	109	109	109	109	109	109	109	109	109	109
β_h^{MP} (poor man)	-1.62	-1.83	-0.20	-2.23	-2.63	-7.87*	1.85	-1.35	-3.43	1.91
	(2.86)	(2.42)	(2.40)	(3.56)	(4.43)	(4.32)	(4.23)	(5.11)	(7.44)	(9.81)
β_h^{CBI} (poor man)	4.76	5.71	7.75	10.81*	10.09	9.09	4.24	-1.82	-6.39	-9.25
	(2.98)	(3.66)	(5.24)	(5.94)	(6.55)	(6.62)	(7.79)	(10.74)	(11.53)	(10.28)
F-test	0.12	0.09	0.17	0.06	0.11	0.03	0.79	0.97	0.83	0.43
R-sq	0.02	0.03	0.03	0.05	0.03	0.04	0.00	0.00	0.01	0.01
N.obs.	109	109	109	109	109	109	109	109	109	109

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.6: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
SP500 Financials										
β_h^{MP} (rotation)	-5.21	-3.17	-10.44	-11.09	-9.06	-29.05	-12.97	-18.69	-22.87	-22.47
	(5.14)	(8.56)	(8.41)	(12.16)	(9.86)	(24.95)	(15.82)	(16.85)	(17.37)	(16.48)
β_h^{CBI} (rotation)	19.09**	27.58**	38.81***	38.42**	46.25***	33.84	37.67*	34.78	35.38	32.66
	(7.77)	(13.28)	(12.12)	(15.80)	(16.83)	(21.22)	(21.40)	(22.80)	(27.29)	(26.81)
F-test	0.01	0.02	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.06
R-sq	0.03	0.04	0.07	0.06	0.06	0.05	0.02	0.02	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-3.56	-5.55	-11.04	-13.56	-10.17	-36.00	-14.15	-22.04	-22.22	-20.29
	(4.77)	(7.34)	(8.00)	(12.38)	(9.88)	(28.19)	(18.03)	(18.60)	(20.18)	(17.22)
β_h^{CBI} (poor man)	15.60*	32.61*	40.06***	43.66**	48.60***	48.58***	40.18*	41.88*	33.99	28.04
	(8.63)	(16.69)	(13.43)	(18.07)	(18.38)	(18.03)	(21.35)	(24.76)	(24.28)	(26.15)
F-test	0.05	0.04	0.00	0.01	0.00	0.01	0.05	0.04	0.07	0.12
R-sq	0.02	0.06	0.07	0.07	0.06	0.08	0.03	0.03	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
SP500 Ex-Financials										
β_h^{MP} (rotation)	-4.16	-3.36	-7.09	-7.33	-4.26	-9.56	4.67	-2.46	-1.43	0.39
	(2.90)	(4.29)	(4.67)	(6.77)	(5.12)	(11.40)	(7.57)	(9.04)	(8.84)	(9.96)
β_h^{CBI} (rotation)	18.67***	24.57***	28.23***	26.41***	29.57***	21.65*	28.21**	25.31*	29.62*	26.49*
	(4.45)	(7.72)	(7.07)	(9.19)	(9.38)	(12.01)	(13.12)	(13.28)	(15.27)	(15.57)
F-test	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.05	0.07	0.16
R-sq	0.07	0.08	0.09	0.07	0.06	0.03	0.03	0.02	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-1.21	-1.67	-4.45	-7.55	-4.81	-13.56	2.11	-3.23	1.55	3.47
	(2.42)	(3.56)	(4.61)	(6.69)	(4.65)	(12.22)	(8.10)	(9.37)	(9.00)	(9.65)
β_h^{CBI} (poor man)	12.40***	20.98**	22.65***	26.88***	30.75***	30.12***	33.63**	26.93**	23.31	19.96
	(4.74)	(10.17)	(7.80)	(10.08)	(9.56)	(10.70)	(13.18)	(13.35)	(15.28)	(15.69)
F-test	0.01	0.04	0.00	0.00	0.00	0.01	0.04	0.06	0.22	0.37
R-sq	0.03	0.06	0.06	0.07	0.07	0.06	0.04	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
Fin. - Ex-Fin.										
β_h^{MP} (rotation)	-1.04	0.19	-3.36	-3.76	-4.80	-19.49	-17.64*	-16.23*	-21.44*	-22.86**
	(3.22)	(5.37)	(4.83)	(5.97)	(6.53)	(14.45)	(9.62)	(9.62)	(11.12)	(10.09)
β_h^{CBI} (rotation)	0.42	3.02	10.57	12.01	16.68*	12.19	9.46	9.47	5.77	6.17
	(4.72)	(6.95)	(7.19)	(8.40)	(9.99)	(12.32)	(12.19)	(13.39)	(16.48)	(15.72)
F-test	0.78	0.71	0.08	0.05	0.03	0.01	0.03	0.05	0.10	0.09
R-sq	0.00	0.00	0.01	0.01	0.02	0.04	0.02	0.02	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-2.35	-3.88	-6.58	-6.01	-5.36	-22.44	-16.26	-18.82*	-23.76*	-23.76**
	(3.18)	(5.06)	(4.50)	(6.21)	(7.25)	(16.74)	(11.06)	(10.86)	(13.03)	(10.41)
β_h^{CBI} (poor man)	3.20	11.63	17.41**	16.78*	17.85	18.46*	6.55	14.96	10.69	8.08
	(4.98)	(7.46)	(7.51)	(9.86)	(11.09)	(10.86)	(13.08)	(15.60)	(14.64)	(15.89)
F-test	0.34	0.08	0.01	0.05	0.08	0.04	0.18	0.08	0.08	0.09
R-sq	0.00	0.02	0.04	0.03	0.02	0.05	0.02	0.03	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.6: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
Wilshire US Small-Cap										
β_h^{MP} (rotation)	-3.23	-3.88	-8.80	-9.78	-6.98	-14.21	11.92	1.99	1.51	2.34
	(3.64)	(5.93)	(6.07)	(8.92)	(6.77)	(16.84)	(11.60)	(15.15)	(15.06)	(15.79)
β_h^{CBI} (rotation)	23.94***	32.84***	33.56***	35.99***	37.46***	32.27*	44.60**	39.84**	46.49**	42.72*
	(6.62)	(11.76)	(10.16)	(12.80)	(12.60)	(17.26)	(17.93)	(19.97)	(22.62)	(23.84)
F-test	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.08	0.09	0.17
R-sq	0.07	0.08	0.09	0.07	0.06	0.04	0.04	0.02	0.02	0.02
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-0.42	-2.38	-7.36	-10.14	-7.79	-20.98	6.25	-2.49	3.35	4.39
	(3.23)	(4.77)	(5.85)	(8.94)	(6.41)	(18.05)	(12.33)	(15.81)	(15.42)	(14.66)
β_h^{CBI} (poor man)	17.98**	29.66*	30.51**	36.77**	39.17***	46.62***	56.60***	49.34***	42.60**	38.36
	(7.90)	(16.49)	(11.97)	(15.18)	(13.32)	(15.36)	(17.75)	(19.15)	(20.63)	(23.44)
F-test	0.03	0.06	0.00	0.01	0.00	0.00	0.02	0.04	0.13	0.22
R-sq	0.04	0.07	0.07	0.08	0.07	0.08	0.06	0.03	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
Wilshire US Large-Cap										
β_h^{MP} (rotation)	-4.13	-3.93	-7.86	-8.29	-5.65	-12.32	2.82	-4.89	-4.19	-4.43
	(3.16)	(4.86)	(5.16)	(7.55)	(5.65)	(13.39)	(8.41)	(10.18)	(9.89)	(10.91)
β_h^{CBI} (rotation)	19.20***	26.74***	29.96***	28.52***	31.87***	24.67*	30.19**	26.79*	31.13*	28.52*
	(4.87)	(8.64)	(7.80)	(10.14)	(10.30)	(13.38)	(14.02)	(14.39)	(16.70)	(17.30)
F-test	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.04	0.06	0.10
R-sq	0.07	0.08	0.09	0.07	0.06	0.03	0.03	0.02	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	-1.46	-2.48	-5.79	-8.93	-6.36	-16.82	0.37	-5.92	-1.31	-1.38
	(2.70)	(3.99)	(5.06)	(7.51)	(5.17)	(14.53)	(9.13)	(10.71)	(10.41)	(10.81)
β_h^{CBI} (poor man)	13.52**	23.68**	25.56***	29.88***	33.39***	34.22***	35.38**	28.97**	25.02	22.07
	(5.32)	(11.56)	(8.68)	(11.19)	(10.69)	(11.78)	(14.24)	(14.61)	(16.47)	(17.39)
F-test	0.01	0.03	0.00	0.00	0.00	0.01	0.04	0.05	0.17	0.25
R-sq	0.03	0.06	0.06	0.08	0.07	0.07	0.04	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
Wilshire US Small-Cap - Large-Cap										
β_h^{MP} (rotation)	0.90	0.05	-0.93	-1.48	-1.33	-1.89	9.09*	6.88	5.70	6.76
	(1.64)	(2.18)	(2.20)	(2.37)	(2.38)	(4.68)	(5.22)	(6.63)	(7.18)	(6.82)
β_h^{CBI} (rotation)	4.75*	6.10	3.60	7.47*	5.59	7.60	14.41**	13.06	15.36	14.20
	(2.65)	(4.07)	(3.79)	(4.14)	(4.40)	(6.53)	(7.20)	(8.88)	(9.76)	(8.94)
F-test	0.17	0.16	0.31	0.06	0.17	0.22	0.54	0.57	0.44	0.55
R-sq	0.02	0.02	0.00	0.02	0.01	0.01	0.03	0.02	0.01	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261
β_h^{MP} (poor man)	1.04	0.11	-1.57	-1.21	-1.43	-4.16	5.88	3.43	4.65	5.78
	(1.66)	(1.89)	(1.99)	(2.28)	(2.26)	(4.64)	(5.29)	(6.79)	(7.34)	(6.11)
β_h^{CBI} (poor man)	4.46	5.98	4.95	6.89	5.78	12.40**	21.22***	20.37***	17.58***	16.29**
	(3.04)	(5.21)	(4.00)	(4.76)	(4.53)	(5.16)	(5.07)	(6.26)	(6.40)	(7.45)
F-test	0.32	0.29	0.15	0.13	0.16	0.02	0.04	0.07	0.19	0.28
R-sq	0.02	0.01	0.01	0.01	0.01	0.02	0.04	0.03	0.02	0.01
N.obs.	261	261	261	261	261	261	261	261	261	261

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.7: The effect of European industrial confidence surprises on stock subindices

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{IndConf} + u_t$$

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
SP500 Focused Foreign Rev.										
β_h	-2.53	46.16	36.96	38.93	60.16*	83.43**	88.63**	55.64	30.61	95.50
	(13.89)	(33.68)	(28.89)	(30.64)	(34.80)	(38.33)	(43.28)	(50.56)	(66.07)	(72.21)
R-sq	0.00	0.03	0.02	0.02	0.03	0.04	0.03	0.01	0.00	0.02
N.obs.	133	133	133	133	133	133	133	133	132	132
SP500 Focused US Rev.										
β_h	0.28	54.91	44.20	41.25	53.08	51.14	40.97	10.74	-7.87	69.18
	(13.50)	(36.25)	(31.07)	(31.41)	(37.19)	(37.29)	(36.27)	(41.53)	(55.09)	(67.20)
R-sq	0.00	0.05	0.03	0.02	0.03	0.02	0.01	0.00	0.00	0.01
N.obs.	133	133	133	133	133	133	133	133	132	132
Foc.For.Rev. - Foc. US Rev.										
β_h	-2.81	-8.75	-7.24	-2.31	7.08	32.29*	47.66**	44.89*	38.48	26.32
	(6.58)	(8.54)	(11.15)	(12.77)	(17.13)	(17.34)	(19.74)	(25.73)	(29.55)	(31.28)
R-sq	0.00	0.01	0.00	0.00	0.00	0.03	0.04	0.03	0.02	0.01
N.obs.	133	133	133	133	133	133	133	133	132	132
SP500 Financials										
β_h	-12.89	37.09	26.71	48.65*	74.10**	87.90*	142.57*	96.54*	81.35	168.73**
	(16.62)	(33.68)	(32.64)	(27.09)	(35.14)	(47.92)	(76.30)	(50.92)	(59.98)	(80.03)
R-sq	0.00	0.02	0.01	0.02	0.03	0.03	0.05	0.02	0.01	0.04
N.obs.	201	201	201	201	201	201	201	201	200	200
SP500 Ex-Financials										
β_h	-7.14	16.09	15.32	27.48*	39.75**	34.21**	63.58*	31.83	27.29	54.11
	(9.34)	(17.24)	(19.04)	(15.83)	(16.61)	(17.25)	(32.92)	(22.27)	(31.10)	(33.19)
R-sq	0.00	0.01	0.01	0.02	0.03	0.01	0.03	0.01	0.00	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
Fin. - Ex-Fin.										
β_h	-5.75	21.00	11.40	21.17	34.35	53.68	79.00	64.71	54.06	114.62*
	(9.57)	(18.23)	(15.91)	(15.03)	(23.40)	(38.00)	(49.10)	(40.65)	(40.82)	(58.72)
R-sq	0.00	0.02	0.00	0.01	0.02	0.03	0.04	0.03	0.01	0.04
N.obs.	201	201	201	201	201	201	201	201	200	200
Wilshire US Small-Cap										
β_h	-19.54	13.96	9.01	30.14	39.95*	41.20	76.75	28.50	20.33	53.34
	(16.30)	(27.40)	(26.28)	(23.04)	(23.79)	(27.43)	(48.66)	(33.75)	(47.79)	(51.47)
R-sq	0.01	0.00	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.01
N.obs.	201	201	201	201	201	201	201	201	200	200
Wilshire US Large-Cap										
β_h	-8.00	18.08	16.26	31.25*	44.35**	40.48**	73.85*	37.68	34.99	68.81*
	(10.29)	(19.26)	(20.73)	(16.91)	(18.05)	(19.67)	(38.33)	(23.58)	(33.77)	(36.88)
R-sq	0.00	0.01	0.01	0.02	0.03	0.02	0.04	0.01	0.01	0.02
N.obs.	201	201	201	201	201	201	201	201	200	200
Wilshire US Small-Cap - Large-Cap										
β_h	-11.54	-4.11	-7.26	-1.10	-4.40	0.72	2.90	-9.18	-14.66	-15.47
	(7.62)	(10.03)	(7.27)	(8.18)	(9.71)	(10.88)	(13.74)	(14.73)	(18.02)	(19.73)
R-sq	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N.obs.	201	201	201	201	201	201	201	201	200	200

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.8: The effect of euro area unemployment rate surprises on stock subindices

$$y_{t+h} - y_{t-1} = \alpha + \beta_h \, z_t^{Unemp} + u_t$$

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
SP500 Focused Foreign Rev.										
β_h	-19.19	-10.80	-8.02	-7.63	-12.19	8.00	-51.30	-40.76	-12.96	-18.64
	(22.50)	(25.65)	(24.11)	(26.69)	(24.70)	(29.63)	(41.17)	(48.50)	(60.82)	(49.99)
R-sq	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
N.obs.	133	133	133	133	133	133	133	133	132	132
SP500 Focused US Rev.										
β_h	-23.74	-12.95	-16.85	-21.06	-23.65	-13.27	-58.32*	-59.33	-43.45	-34.35
	(18.73)	(21.28)	(19.95)	(23.60)	(24.28)	(28.42)	(34.38)	(41.13)	(54.62)	(42.96)
R-sq	0.02	0.00	0.01	0.01	0.01	0.00	0.02	0.02	0.01	0.00
N.obs.	133	133	133	133	133	133	133	133	132	132
Foc.For.Rev. - Foc. US Rev.										
β_h	4.55	2.16	8.83	13.43	11.46	21.27	7.02	18.58	30.48	15.71
	(7.37)	(8.67)	(9.05)	(10.57)	(11.25)	(13.33)	(16.00)	(17.86)	(21.28)	(20.27)
R-sq	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00
N.obs.	133	133	133	133	133	133	133	133	132	132
SP500 Financials										
β_h	-35.42*	-29.46	-41.08	-56.92	-77.53*	-62.62	-122.95**	-78.02	-62.37	-60.22
	(19.07)	(23.11)	(25.81)	(36.13)	(39.63)	(44.52)	(54.01)	(55.35)	(65.55)	(70.42)
R-sq	0.02	0.01	0.02	0.02	0.03	0.01	0.03	0.02	0.01	0.00
N.obs.	235	235	235	235	235	235	235	235	234	234
SP500 Ex-Financials										
β_h	-22.94*	-19.73	-21.88	-27.23	-34.22*	-45.22	-77.65**	-57.28*	-55.21	-55.45
	(11.91)	(12.54)	(14.61)	(19.69)	(19.13)	(29.44)	(31.72)	(31.37)	(34.19)	(39.07)
R-sq	0.02	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.01	0.01
N.obs.	235	235	235	235	235	235	235	235	234	234
Fin. - Ex-Fin.										
β_h	-12.48	-9.73	-19.21	-29.69	-43.31*	-17.39	-45.30	-20.74	-7.16	-4.78
	(11.34)	(15.11)	(18.86)	(23.20)	(26.09)	(28.04)	(32.14)	(33.01)	(40.68)	(41.74)
R-sq	0.01	0.00	0.01	0.01	0.02	0.00	0.01	0.00	0.00	0.00
N.obs.	235	235	235	235	235	235	235	235	234	234
Wilshire US Small-Cap										
β_h	-34.95**	-32.74*	-40.27*	-48.79*	-58.23**	-54.69	-105.21**	-86.90*	-81.05	-74.66
	(15.79)	(18.58)	(20.70)	(26.11)	(27.62)	(37.69)	(42.59)	(47.10)	(50.96)	(55.92)
R-sq	0.03	0.02	0.02	0.02	0.03	0.01	0.04	0.02	0.01	0.01
N.obs.	235	235	235	235	234	235	235	235	234	233
Wilshire US Large-Cap										
β_h	-25.55**	-23.00*	-26.58*	-35.36*	-42.00*	-49.48	-87.80***	-62.98*	-59.00	-59.21
	(12.51)	(13.48)	(15.57)	(21.24)	(21.49)	(30.61)	(33.94)	(33.98)	(37.22)	(42.55)
R-sq	0.02	0.02	0.01	0.02	0.02	0.02	0.04	0.02	0.01	0.01
N.obs.	235	235	235	235	234	235	235	235	234	233
Wilshire US Small-Cap - Large-Cap										
β_h	-9.39*	-9.74	-13.69*	-13.42*	-16.23*	-5.21	-17.41	-23.92	-22.05	-15.45
	(5.06)	(6.63)	(7.05)	(7.12)	(8.49)	(10.58)	(13.48)	(17.11)	(18.47)	(19.23)
R-sq	0.01	0.01	0.02	0.01	0.02	0.00	0.01	0.01	0.01	0.00
N.obs.	235	235	235	235	234	235	235	235	234	233

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity.

Table C.9: The effect of Fed monetary policy and information shocks on financial variables

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP} + \beta_h^{CBI}\, i_t^{CBI} + u_t.$$

	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
1-year Bund yield										
β_h^{MP} (rotation)	0.31***	0.34**	0.30**	0.25	0.25	-0.03	-0.06	0.12	0.06	0.08
	(0.08)	(0.15)	(0.13)	(0.17)	(0.17)	(0.25)	(0.32)	(0.36)	(0.39)	(0.42)
β_h^{CBI} (rotation)	0.27	0.33	0.01	0.20	0.32	0.73	1.54***	2.00***	2.29***	2.92***
	(0.18)	(0.31)	(0.27)	(0.30)	(0.29)	(0.46)	(0.57)	(0.63)	(0.74)	(0.73)
F-test	0.83	0.97	0.32	0.85	0.82	0.11	0.01	0.01	0.01	0.00
R-sq	0.22	0.12	0.09	0.06	0.05	0.02	0.05	0.06	0.07	0.09
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	0.28***	0.33**	0.30**	0.24	0.27	0.01	-0.02	0.24	0.22	0.25
	(0.08)	(0.15)	(0.14)	(0.19)	(0.18)	(0.26)	(0.33)	(0.37)	(0.40)	(0.43)
β_h^{CBI} (poor man)	0.48***	0.41**	0.05	0.28	0.21	0.43	1.21***	1.12**	1.06*	1.63***
	(0.15)	(0.20)	(0.23)	(0.25)	(0.26)	(0.38)	(0.43)	(0.50)	(0.62)	(0.59)
F-test	0.28	0.74	0.37	0.92	0.84	0.36	0.02	0.16	0.26	0.06
R-sq	0.22	0.12	0.08	0.05	0.05	0.01	0.03	0.03	0.02	0.03
N.obs.	170	170	170	170	170	170	170	170	170	170
1-year Treasury yield										
β_h^{MP} (rotation)	0.57***	0.64***	0.76***	0.70***	0.61***	0.53***	0.44	0.62**	0.71**	0.55
	(0.11)	(0.15)	(0.18)	(0.18)	(0.16)	(0.19)	(0.28)	(0.31)	(0.35)	(0.43)
β_h^{CBI} (rotation)	0.59*	0.17	0.44	0.69	0.87**	1.56**	2.14**	2.16**	3.38***	4.46***
	(0.35)	(0.40)	(0.48)	(0.46)	(0.39)	(0.72)	(0.85)	(0.96)	(1.07)	(1.29)
F-test	0.95	0.34	0.59	0.99	0.54	0.17	0.07	0.17	0.03	0.01
R-sq	0.31	0.28	0.26	0.20	0.19	0.11	0.10	0.11	0.15	0.16
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	0.54***	0.60***	0.72***	0.68***	0.61***	0.55***	0.48*	0.64***	0.83***	0.67**
	(0.11)	(0.13)	(0.16)	(0.17)	(0.15)	(0.17)	(0.27)	(0.23)	(0.27)	(0.31)
β_h^{CBI} (poor man)	0.80*	0.47	0.72*	0.80**	0.88***	1.38*	1.90**	2.00**	2.47***	3.53***
	(0.43)	(0.29)	(0.37)	(0.41)	(0.32)	(0.80)	(0.83)	(0.78)	(0.91)	(1.12)
F-test	0.55	0.67	0.99	0.79	0.44	0.31	0.10	0.10	0.08	0.01
R-sq	0.32	0.26	0.26	0.20	0.19	0.10	0.09	0.10	0.11	0.11
N.obs.	170	170	170	170	170	170	170	170	170	170

Notes: Heteroskedasticity robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.9: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
10-year Bund yield										
β_h^{MP} (rotation)	0.17	0.15	0.14	0.07	0.16	0.02	-0.09	-0.05	-0.07	-0.19
	(0.13)	(0.16)	(0.16)	(0.18)	(0.18)	(0.22)	(0.20)	(0.27)	(0.32)	(0.34)
β_h^{CBI} (rotation)	-0.03	0.15	-0.01	0.22	0.41	0.32	0.65	1.08	1.46	1.46
	(0.19)	(0.28)	(0.30)	(0.31)	(0.32)	(0.47)	(0.52)	(0.76)	(1.07)	(0.92)
F-test	0.25	0.98	0.62	0.62	0.43	0.52	0.16	0.14	0.17	0.09
R-sq	0.03	0.02	0.01	0.01	0.02	0.00	0.01	0.02	0.02	0.02
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	0.14	0.15	0.14	0.09	0.19	0.02	-0.08	0.01	0.02	-0.14
	(0.14)	(0.17)	(0.18)	(0.19)	(0.19)	(0.23)	(0.21)	(0.28)	(0.32)	(0.32)
β_h^{CBI} (poor man)	0.19	0.13	-0.03	0.12	0.19	0.35	0.62	0.62	0.77	1.07
	(0.15)	(0.23)	(0.29)	(0.28)	(0.31)	(0.44)	(0.41)	(0.69)	(0.95)	(0.79)
F-test	0.83	0.94	0.61	0.92	0.99	0.51	0.13	0.41	0.45	0.16
R-sq	0.03	0.02	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170
10-year Treasury yield										
β_h^{MP} (rotation)	0.33	0.44*	0.48**	0.52**	0.47*	0.40	0.10	0.26	0.08	-0.16
	(0.21)	(0.27)	(0.24)	(0.26)	(0.28)	(0.31)	(0.32)	(0.43)	(0.46)	(0.49)
β_h^{CBI} (rotation)	0.58	0.10	0.22	0.34	0.76	0.33	1.35	1.76	2.47	2.87*
	(0.53)	(0.54)	(0.54)	(0.53)	(0.56)	(0.68)	(0.96)	(1.33)	(1.53)	(1.52)
F-test	0.66	0.54	0.67	0.76	0.62	0.92	0.21	0.26	0.11	0.04
R-sq	0.05	0.06	0.06	0.06	0.06	0.02	0.02	0.02	0.03	0.04
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	0.34	0.45	0.49**	0.55**	0.52*	0.45	0.23	0.46	0.33	0.06
	(0.22)	(0.29)	(0.25)	(0.27)	(0.29)	(0.33)	(0.35)	(0.49)	(0.52)	(0.53)
β_h^{CBI} (poor man)	0.54*	0.03	0.11	0.10	0.41	-0.02	0.36	0.23	0.60	1.24
	(0.31)	(0.40)	(0.40)	(0.39)	(0.44)	(0.32)	(0.74)	(1.10)	(1.31)	(1.31)
F-test	0.60	0.39	0.42	0.35	0.84	0.31	0.88	0.85	0.85	0.41
R-sq	0.05	0.06	0.06	0.06	0.06	0.02	0.01	0.01	0.01	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.9: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
Euro Stoxx 50										
β_h^{MP} (rotation)	-4.76**	-5.29**	-3.87	-4.28	-4.25	-10.55***	-6.59*	-6.44	-0.97	-1.66
	(2.06)	(2.17)	(2.53)	(2.92)	(2.95)	(2.74)	(3.99)	(5.67)	(8.00)	(8.61)
β_h^{CBI} (rotation)	3.52	-5.62	-4.86	-14.91	-15.79	-4.30	4.52	8.20	14.35	23.81
	(10.41)	(12.53)	(13.31)	(17.51)	(16.45)	(9.31)	(14.67)	(16.62)	(19.37)	(26.73)
F-test	0.44	0.98	0.94	0.56	0.50	0.52	0.48	0.42	0.46	0.38
R-sq	0.02	0.02	0.01	0.02	0.02	0.05	0.01	0.01	0.00	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	-5.69***	-5.91***	-4.10*	-3.43	-3.87	-8.51***	-5.15	-2.41	2.27	0.45
	(1.80)	(2.05)	(2.31)	(2.56)	(2.62)	(2.67)	(3.82)	(5.52)	(8.10)	(7.87)
β_h^{CBI} (poor man)	10.61	-0.96	-3.13	-21.33	-18.63	-19.75*	-6.38	-22.33*	-10.27	7.86
	(9.08)	(12.66)	(12.95)	(16.09)	(15.68)	(11.34)	(13.67)	(12.70)	(16.97)	(29.72)
F-test	0.08	0.70	0.94	0.27	0.35	0.34	0.93	0.15	0.51	0.81
R-sq	0.05	0.03	0.01	0.03	0.03	0.05	0.01	0.01	0.00	0.00
N.obs.	170	170	170	170	170	170	170	170	170	170
SP500										
β_h^{MP} (rotation)	-11.86***	-8.72***	-9.39***	-6.53***	-9.06***	-15.43***	-17.91***	-15.29***	-10.86*	-8.89
	(1.52)	(1.69)	(2.42)	(2.34)	(2.59)	(2.45)	(3.80)	(4.79)	(6.34)	(6.20)
β_h^{CBI} (rotation)	-0.81	-7.65	5.29	-4.20	-1.56	9.68	18.22	10.29	17.76	16.38
	(5.26)	(6.94)	(8.77)	(10.86)	(8.66)	(12.10)	(17.41)	(12.25)	(16.09)	(17.66)
F-test	0.05	0.89	0.13	0.84	0.41	0.05	0.05	0.06	0.10	0.19
R-sq	0.18	0.09	0.07	0.04	0.06	0.13	0.11	0.06	0.03	0.02
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	-11.42***	-8.84***	-8.87***	-5.69***	-8.34***	-13.50***	-16.66***	-13.12***	-8.67	-7.91
	(1.51)	(1.54)	(2.12)	(2.15)	(2.56)	(2.15)	(3.93)	(4.95)	(6.37)	(5.92)
β_h^{CBI} (poor man)	-4.12	-6.74	1.39	-10.55	-7.02	-4.93	8.79	-6.16	1.11	8.98
	(5.28)	(6.85)	(7.65)	(9.75)	(8.44)	(10.58)	(13.93)	(9.25)	(13.92)	(17.17)
F-test	0.18	0.77	0.20	0.63	0.88	0.43	0.08	0.51	0.52	0.35
R-sq	0.17	0.09	0.06	0.04	0.06	0.10	0.09	0.05	0.01	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.9: Continued

	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	$h=10$	$h=15$	$h=20$	$h=25$	$h=30$
High yield corporate bond OAS (EA)										
β_h^{MP} (rotation)	0.47*	0.55*	0.77***	0.84**	0.92**	3.92***	5.94***	6.06***	5.58***	5.80**
	(0.26)	(0.32)	(0.29)	(0.37)	(0.42)	(0.79)	(1.48)	(1.78)	(2.01)	(2.38)
β_h^{CBI} (rotation)	0.88	-0.22	-0.70	-1.40	-1.24	-1.30	-2.00	-3.91	-4.55	-5.22
	(1.83)	(1.55)	(1.53)	(1.80)	(2.12)	(2.44)	(2.77)	(3.04)	(3.72)	(4.68)
F-test	0.83	0.64	0.36	0.25	0.34	0.06	0.00	0.00	0.01	0.03
R-sq	0.03	0.02	0.03	0.04	0.03	0.19	0.21	0.16	0.10	0.08
N.obs.	170	170	170	170	170	170	169	170	170	170
β_h^{MP} (poor man)	0.50**	0.54*	0.70**	0.65*	0.69	3.47***	5.59***	5.49***	5.00**	5.42**
	(0.24)	(0.32)	(0.30)	(0.38)	(0.42)	(0.81)	(1.59)	(1.91)	(2.14)	(2.50)
β_h^{CBI} (poor man)	0.68	-0.20	-0.23	-0.03	0.49	2.11	0.69	0.46	-0.12	-2.35
	(1.43)	(1.23)	(1.10)	(1.16)	(1.34)	(1.76)	(2.77)	(2.67)	(2.77)	(3.62)
F-test	0.90	0.56	0.41	0.58	0.89	0.48	0.13	0.13	0.14	0.08
R-sq	0.03	0.02	0.03	0.02	0.02	0.16	0.18	0.12	0.07	0.06
N.obs.	170	170	170	170	170	170	169	170	170	170
High yield corporate bond OAS (US)										
β_h^{MP} (rotation)	0.38	0.75	0.73	0.85	1.52**	3.33***	4.39**	4.98***	5.07**	5.61**
	(0.37)	(0.50)	(0.66)	(0.78)	(0.71)	(1.27)	(1.87)	(1.82)	(2.08)	(2.30)
β_h^{CBI} (rotation)	-0.87	-0.57	-0.64	-0.91	-0.31	-0.14	-2.67	-4.31	-5.57	-6.03
	(1.27)	(1.12)	(1.13)	(1.31)	(1.35)	(1.81)	(2.96)	(3.80)	(4.52)	(5.05)
F-test	0.34	0.24	0.20	0.15	0.17	0.03	0.01	0.02	0.02	0.03
R-sq	0.02	0.04	0.04	0.04	0.09	0.16	0.16	0.16	0.12	0.11
N.obs.	170	170	170	170	170	170	169	170	170	170
β_h^{MP} (poor man)	0.39	0.71	0.66	0.71	1.40*	3.03**	4.07**	4.49**	4.59**	5.22**
	(0.40)	(0.55)	(0.73)	(0.88)	(0.78)	(1.41)	(2.06)	(1.99)	(2.24)	(2.48)
β_h^{CBI} (poor man)	-0.95	-0.26	-0.08	0.15	0.59	2.11	-0.19	-0.64	-1.97	-3.08
	(0.94)	(0.71)	(0.70)	(0.76)	(0.83)	(1.37)	(2.37)	(3.07)	(3.46)	(3.85)
F-test	0.19	0.29	0.47	0.63	0.48	0.64	0.18	0.16	0.11	0.07
R-sq	0.03	0.04	0.03	0.02	0.08	0.14	0.13	0.12	0.09	0.09
N.obs.	170	170	170	170	170	170	169	170	170	170

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Table C.9: Continued

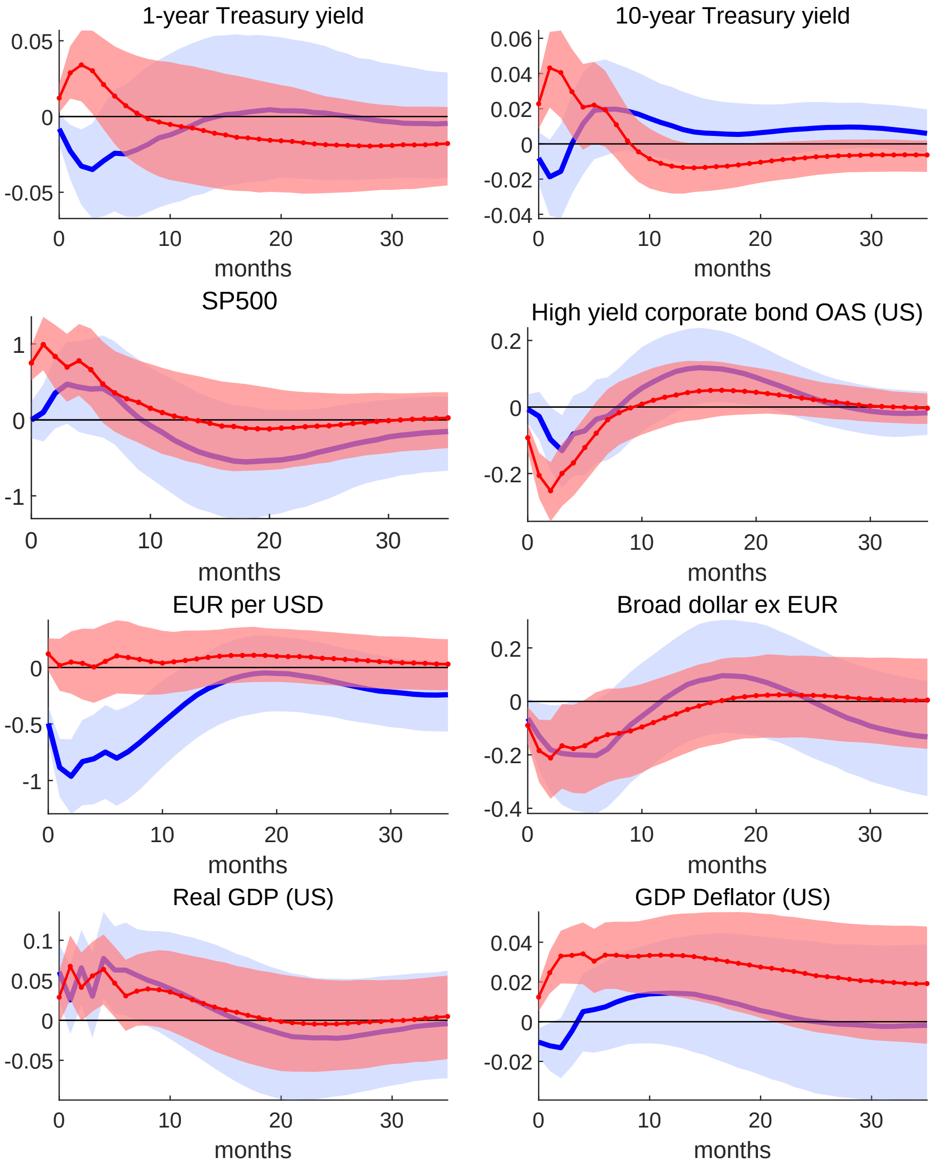
	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$	$h = 30$
EUR per USD										
β_h^{MP} (rotation)	5.22***	7.76***	6.58***	4.81***	3.50*	2.53	1.11	1.13	1.17	2.25
	(1.74)	(2.56)	(1.33)	(1.69)	(1.87)	(2.00)	(2.36)	(2.80)	(3.62)	(4.38)
β_h^{CBI} (rotation)	5.18	3.26	1.90	1.98	-0.15	1.49	6.54	7.40	0.96	10.78
	(5.51)	(4.47)	(4.76)	(5.22)	(5.57)	(5.59)	(6.70)	(7.78)	(8.38)	(9.87)
F-test	0.99	0.34	0.39	0.63	0.55	0.86	0.46	0.46	0.98	0.41
R-sq	0.11	0.15	0.11	0.05	0.02	0.01	0.00	0.00	0.00	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	5.33***	7.83***	6.20***	4.59***	3.30*	2.94	2.16	1.53	1.04	1.92
	(1.77)	(2.70)	(1.14)	(1.53)	(1.77)	(1.93)	(2.40)	(2.82)	(3.69)	(4.31)
β_h^{CBI} (poor man)	4.32	2.73	4.80	3.65	1.40	-1.58	-1.45	4.36	1.94	13.30
	(3.20)	(2.52)	(2.98)	(3.63)	(4.53)	(4.95)	(4.64)	(5.78)	(7.25)	(8.81)
F-test	0.78	0.17	0.66	0.81	0.70	0.40	0.49	0.66	0.91	0.25
R-sq	0.11	0.15	0.10	0.05	0.02	0.01	0.00	0.00	0.00	0.01
N.obs.	170	170	170	170	170	170	170	170	170	170
Broad dollar ex EUR										
β_h^{MP} (rotation)	3.15***	3.52***	3.20***	2.55***	1.94**	2.68***	3.67***	3.79**	4.04*	4.70*
	(0.77)	(0.95)	(0.91)	(0.91)	(0.87)	(1.01)	(1.38)	(1.86)	(2.27)	(2.74)
β_h^{CBI} (rotation)	3.51	3.93	3.15	4.14	4.30	5.46*	4.64	1.89	2.13	3.81
	(3.37)	(3.34)	(3.75)	(4.92)	(4.78)	(3.17)	(3.84)	(4.22)	(4.91)	(5.67)
F-test	0.92	0.91	0.99	0.76	0.64	0.44	0.82	0.68	0.72	0.89
R-sq	0.13	0.15	0.09	0.06	0.04	0.05	0.05	0.03	0.03	0.03
N.obs.	170	170	170	170	170	170	170	170	170	170
β_h^{MP} (poor man)	3.28***	3.54***	3.03***	2.48***	1.88**	2.80***	3.80***	3.69*	4.09*	4.79*
	(0.79)	(0.97)	(0.89)	(0.85)	(0.80)	(0.95)	(1.32)	(1.93)	(2.35)	(2.79)
β_h^{CBI} (poor man)	2.50	3.74*	4.41*	4.66	4.80	4.59**	3.64	2.63	1.80	3.12
	(2.16)	(2.08)	(2.43)	(3.37)	(3.34)	(2.34)	(2.97)	(3.30)	(4.59)	(5.28)
F-test	0.73	0.93	0.59	0.53	0.40	0.48	0.96	0.78	0.66	0.78
R-sq	0.13	0.15	0.10	0.06	0.04	0.05	0.05	0.03	0.03	0.03
N.obs.	170	170	170	170	170	170	170	170	170	170

Notes: Heteroskedasticity robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant terms are not reported for brevity. Ftest: p-value of the F-test for H0: $\beta_h^{MP} = \beta_h^{CBI}$.

Appendix D Additional VAR results

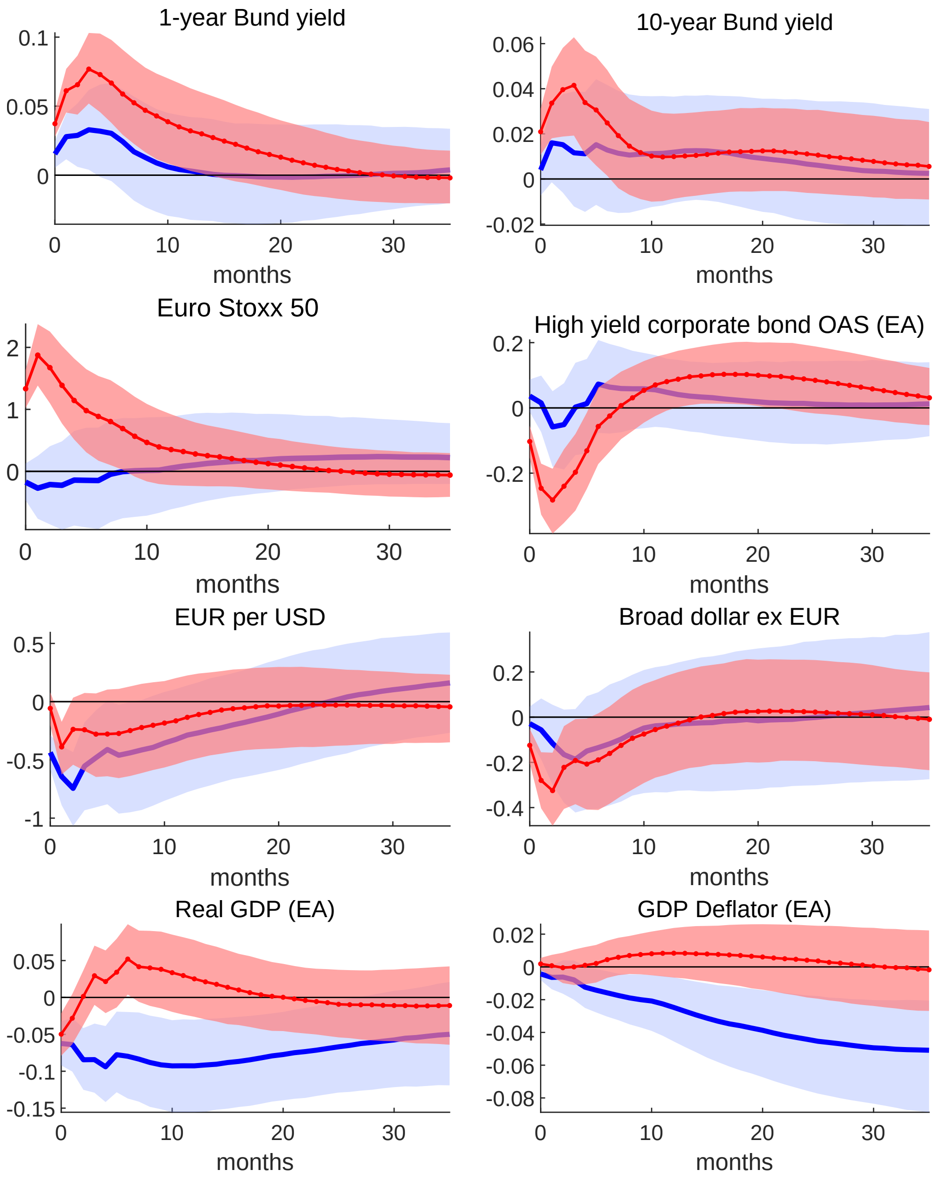
D.1 “Poor man” shocks, domestic effects

Figure D.1: The effects of ECB shocks on the US variables: Impulse responses to one standard deviation “poor man’s” MP and CBI shocks in monthly VARs.



Note: The red solid-dotted lines represent the point-wise posterior medians of the impulse responses to the central bank information shock. The red areas show the pointwise 16-84 percentile bands. The blue solid lines and blue areas show the same objects for the monetary policy shock. The figure is based on 10,000 draws from the Gibbs sampler.

Figure D.2: The effects of ECB shocks on the euro area variables: Impulse responses to one standard deviation "rotation-based" MP and CBI shocks in monthly VARs.



Note: The red solid-dotted lines represent the point-wise posterior medians of the impulse responses to the central bank information shock. The red areas show the pointwise 16-84 percentile bands. The blue solid lines and blue areas show the same objects for the monetary policy shock. The figure is based on 10,000 draws from the Gibbs sampler.

D.2 Local projections in the low stress subsample

Is the i^{CBI} surprise conveying information about the probability of the eurozone break-up? Not only, it seems. First, we have seen in the rolling sample exercise that the information effects were also present in the calm period before the 2008 Financial crisis, before any concerns about the eurozone break-up emerged. Second, the present section finds similar ECB information effects also in the low eurozone stress subsample. In this subsample I retain only the 183 announcements occurring when the Composite Indicator of Systemic Stress (CISS) for Europe was below the threshold of 0.2. As shown in Figure D.3, this leaves out most of the period from late 2007 until the summer of 2012, as well as several other announcements. Figure D.4 reports the effects of both ECB shocks in this subsample. Comparing Figure D.4 with Figure 2, plot by plot, we can see that the information effects are somewhat less precisely estimated, which is not surprising given the less informative sample, but overall quite similar to those observed in the full sample.

Figure D.3: Composite Index of Systemic Stress (CISS) for the euro area on the days of ECB announcements.

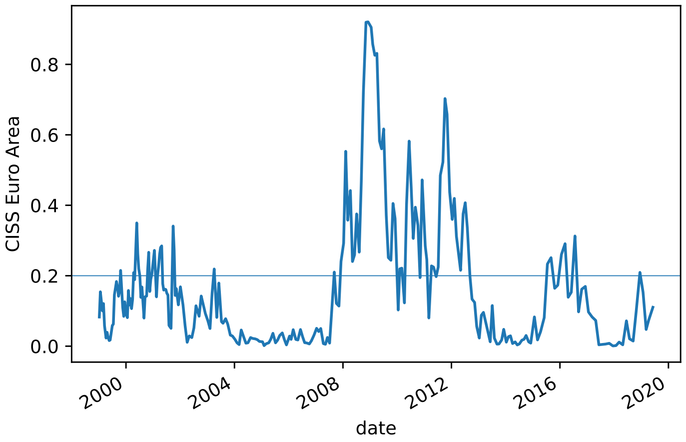
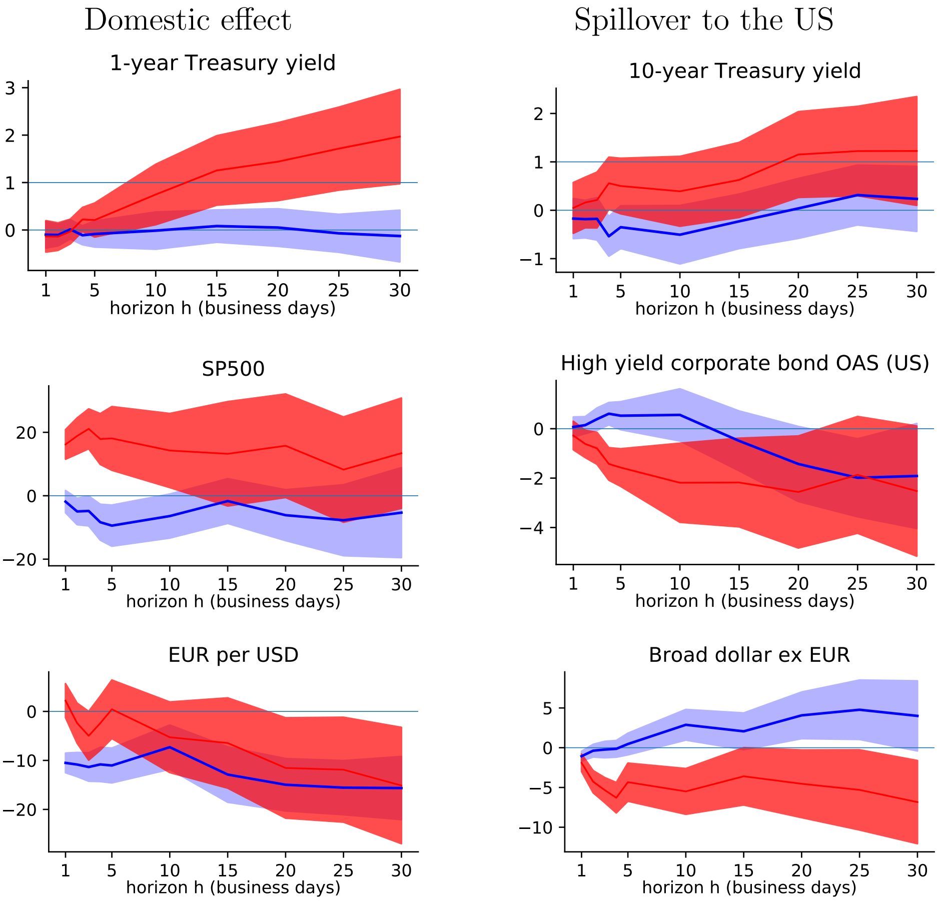


Figure D.4: Low eurozone stress period (CISS< 0.2) The effects of ECB shocks: elasticities β_h^{MP} and β_h^{CBI} from local projections.

$$y_{t+h} - y_{t-1} = \alpha + \beta_h^{MP}\, i_t^{MP,ECB} + \beta_h^{CBI}\, i_t^{CBI,ECB} + u_t$$



Note. The solid lines connect the OLS estimates of $\beta_h^{j\in\{MP,CBI\}}$ at different horizons h. The shaded areas show heteroskedascity-robust one standard deviation bands. Blue lines and blue bands (lighter grey on black-and-white) show the effects of monetary policy shocks, β_h^{MP}. Red lines and red bands (darker grey on black-and-white) show the central bank information effects, β_h^{CBI}. All regressions have 183 observations.

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