Information Effects of Euro Area Monetary Policy *

Mark Kerssenfischer
Deutsche Bundesbank

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Abstract

This paper provides evidence for central bank information effects in the euro area. ECB announcements seem to convey information not only about monetary policy, but also about economic fundamentals. I separate these "information surprises" from "pure policy surprises" via sign restrictions and find intuitive effects of both surprise on a wide set of financial market prices, survey expectations and macroeconomic aggregates. Both surprise series are updated and made publicly available.

Keywords: Monetary Policy, High-Frequency Identification, Central Bank Information.

JEL classification: E52, E44, E32, C32.

*Contact address: Deutsche Bundesbank, Wilhelm-Esptein-Str. 14, 60431 Frankfurt am Main, Germany. Email: mark.kerssenfischer@bundesbank.de. The views expressed in this paper are those of the author and do not necessarily coincide with the views of the Deutsche Bundesbank or the Eurosystem. The surprise series from this paper are available for download at www.sites.google.com/site/markkerssenfischer

1 Introduction

Based on the high-frequency identification approach, the monetary literature has reached a broad consensus: central bank announcements have large effects on interest rates, both on short- and long-term rates and both in nominal and real terms.[1] On the other hand, a supposedly contractionary announcement – i.e. one that raises interest rates – lowers expected unemployment, raises growth and inflation expectations, and is often accompanied by rising stock prices.[2]

So-called "central bank information effects" could explain these seemingly contradictory findings. The idea, dating back to at least Romer and Romer (2000), is that central bank announcements convey information not only about monetary policy, but also about the central bank's economic outlook. By revealing a better-than-expected outlook, an announcement might thus raise interest rates alongside economic expectations and stock prices.[3]

In this paper, I exploit high-frequency futures data to isolate market reactions to euro area monetary policy announcements. My contribution is twofold. First, I measure policy surprises as the immediate change in 2-year German bond yields as a reference. This naive surprise measure has strong effects of ECB announcements on interest and exchange rates, but hardly any effect on stock prices and economic expectations, confirming the contradictory findings in the literature. Second, and more importantly, I show that the puzzling findings are resolved when accounting for central bank information effects.

2 The Surprise Measures

All surprises I compute are based on the immediate reaction of 2-year German bond yields and the Euro STOXX 50 index to scheduled ECB Governing Council meeting (GCM) announcements. The event window ranges from 10 minutes prior to the ECB's press release to 20 minutes after the end of the ensuing press conference.

As a benchmark, I define a "policy news" surprise as the change in the 2-year yield. This is in line with Hanson and Stein (2015), who argue that 2-year sovereign yields provide a reliable measure of the foreseeable path of monetary policy. If information

[1] For US evidence see Kuttner (2001); Cochrane and Piazzesi (2002); Gürkaynak, Sack, and Swanson (2005); Bernanke and Kuttner (2005); Wright (2012); Hanson and Stein (2015); Gilchrist, Lopez-Salido, and Zakrajsek (2015). For euro area evidence, see Brand, Buncic, and Turunen (2010); Leombroni, Vedolin, Venter, and Whelan (2021); Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019).

[2] See Campbell, Evans, Fisher, and Justiniano (2012); Campbell, Fisher, Justiniano, and Melosi (2017); Nakamura and Steinsson (2018); Cieslak and Schrimpf (2019); Jarocinski and Karadi (2020); Andrade and Ferroni (2021).

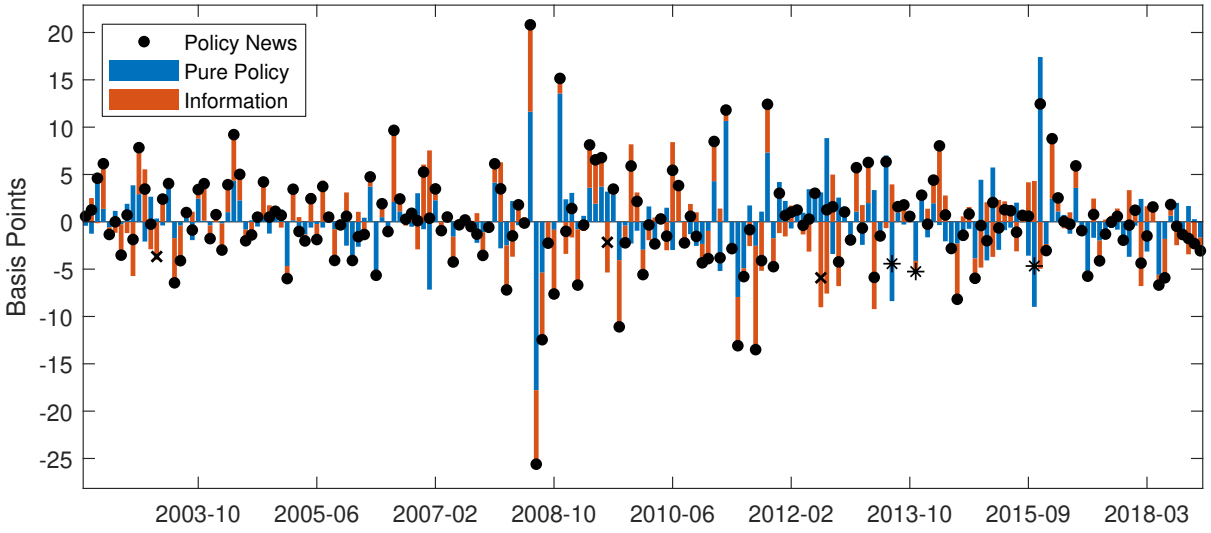
[3] See Bauer and Swanson (2020) for an alternative explanation for these information effects.

effects were negligible, any increase in yields should be tantamount to a contractionary policy surprise.

If information effects are important, on the other hand, rising yields after an announcement could also reflect a better-than-expected economic outlook by the central bank. To tell those two causes apart, I follow Jarocinski and Karadi (2020) and impose sign restrictions on the high-frequency comovement of yields and stock prices. In particular, I assume that a "pure policy" surprise raises yields and lowers stock prices, due to both a higher discount rate and lower expected dividends, while an "information" surprise raises yields along with stock prices, as it signals an improved economic outlook.

Figure 1 plots the resulting surprise series.

Figure 1: Decomposition of 2-Year Yield Changes around Event Windows



Black dots show the total change in 2-year German bond yields around the 189 Governing Council meetings. The blue and red bars decompose this change into monetary policy and central bank information surprises.

Compared to various other surprise measures in the literature,[4] my surprises offer several advantages. First, the underlying data refer to actual trades on a centralized exchange (Eurex), not indicative quotes from over-the-counter market. Second, I use narrow event windows ending 20 minutes after the end of each ECB press conference, instead of assuming a uniform press conference duration. Third, I control for the effect of contemporaneous US macro news releases.[5].

This paper uses data on all ECB meetings between March 2002 and April 2019. The online data also covers all subsequent meetings.

[4]See e.g. Altavilla et al. (2019), Jarocinski and Karadi (2020) and Andrade and Ferroni (2021)

[5]The Appendix illustrates the importance of the latter two points.

3 Results

3.1 Effect on Financial Markets

First off, Table 1 reports the one-day response of bond yields, inflation swaps, stocks, and exchange rates.[6] The naive policy news surprise has familiar effects on the yield curve. The effect peaks at the 2-year maturity and monotonically declines at longer horizons. Inflation swaps, in contrast, barely react at all. Since we would expect a clear downward revision of expected inflation in response to a monetary tightening, these results are puzzling (see also Nakamura and Steinsson, 2018). Even more puzzling is the muted stock market response. Neither prices nor volatility seem to react to a policy surprise. The response of exchange rates, at least, is consistent with standard monetary theory: the euro appreciates against all major currencies when an ECB announcement raises rates.

Table 1: Financial Market Reactions

		Policy News		**Pure Policy**		**Information**	
		$\hat{\beta}$	*s.e.*	$\hat{\beta}$	*s.e.*	$\hat{\beta}$	*s.e.*
Nominal Bond Yields	1 year	0.71^{***}	0.14	0.74^{***}	0.19	0.68^{***}	0.14
	2 year	1.00^{***}	0.13	1.00^{***}	0.18	1.00^{***}	0.14
	5 year	0.91^{***}	0.12	0.85^{***}	0.19	0.98^{***}	0.13
	10 year	0.61^{***}	0.10	0.54^{***}	0.17	0.69^{***}	0.13
Inflation-Linked Swaps	1 year	-0.00	0.11	-0.12	0.15	0.16	0.10
	2 year	0.04	0.12	-0.12	0.15	0.27^{**}	0.11
	5 year	-0.02	0.08	-0.15	0.10	0.17^{**}	0.07
	10 year	0.03	0.05	-0.09	0.06	0.18^{***}	0.06
Stocks	Euro STOXX 50	-1.0	3.7	-17.5^{***}	4.7	19.8^{***}	4.4
	Euro STOXX Banks	0.8	4.6	-19.8^{***}	5.8	26.9^{***}	6.3
	VSTOXX	6.6	12.7	49.8^{***}	18.9	-48.0^{***}	17.3
Exchange Rates	US Dollar	7.6^{***}	1.7	9.8^{***}	2.8	4.8^{**}	2.0
	British Pound	6.3^{***}	1.0	8.0^{***}	1.7	4.1^{***}	1.4
	Swiss Franc	3.9^{***}	1.1	3.6^{***}	1.3	4.3^{***}	1.5
	Japanese Yen	7.3^{***}	2.1	8.0^{***}	3.1	6.3^{*}	3.3
	Chinese Yuan	3.1^{**}	1.3	2.6	1.9	3.8^{**}	1.5

Each row refers to the daily response of the variable stated in the left-most column to the three different surprises stated in the column header. All coefficients refer to percentage points. The number of observations is 189, except for inflation-linked swaps (160 observations, data starts April 2004). Exchange rates are in foreign currency per euro.

Why do policy news surprises have strong and intuitive effects on bond yields and

[6] Henceforth, $*/**/***$ denotes significance at the 10/5/1% level, based on a bootstrap procedure that takes into account both estimation and identification uncertainty, see the Appendix. The Appendix also shows that treating the surprises as observable and using robust standard errors yields largely similar results.

exchange rates, but muted effects on inflation expectations and stock prices? Central bank information effects offer a simple explanation: an announcement that raises yields leads to an appreciation of the domestic currency, no matter if the yield rise is really due to a contractionary policy surprise or actually reflects an improved economic outlook. Stock prices and inflation expectations, in contrast, should decline in the first case and rise in the latter. Their muted response might thus indicate the empirical relevance of central bank information effects.

Indeed, the financial market responses to pure policy and information surprises are in line with this explanation. Both surprises lead to a euro appreciation, and both have a hump-shaped effect on bond yields along the yield curve, but their effect on inflation-linked swaps is diametrically opposite. Contractionary policy surprises lower expected inflation, as standard theory predicts. A positive information surprise, by contrast, raises inflation expectations.

3.2 Effect on Survey Expectations

A common concern regarding the financial market responses in Table 1 is that they might be driven by risk premia – as opposed to revised expectations about monetary policy and economic growth (see e.g. Hanson and Stein, 2015). Inflation-linked swaps e.g. reflect not only physical expectations, but also a risk compensation. Their subdued response to policy news surprises could thus be consistent with expected inflation going down, but higher risk premia offsetting this decline. In a similar vein, the central bank information surprise might simply capture instances where the ECB changed market participants' risk sentiment. A "risk-on" announcement, for instance, should increase the price of relatively risky assets, such as stock prices, and lower the price of relatively safe assets, such as bonds (thus raising bond yields). The sign restriction identification scheme would misclassify such an announcement as a central bank information surprise.

To address this concern, I exploit survey data – which is less likely to be contaminated by risk premia effects – to study whether and how market participants revise their economic expectations in response to ECB announcements. In particular, Table 2 reports results for weekly analyst forecasts on corporate earnings and dividends, and monthly survey expectations on main macroeconomic aggregates in the euro area.

The effect of policy news shocks on survey expectations is inconclusive. Instead of a clear downward revision in output and inflation expectations, most estimates are insignificant and economically rather small.

Separating between monetary and non-monetary news components, in contrast, yields intuitive results. An interest rate rise that is due to contractionary policy depresses economic expectations across the board: expected GDP and industrial production growth

Table 2: Revisions of Economic Expectations

		Policy News		Pure Policy		Information	
		$\hat{\beta}$	*s.e.*	$\hat{\beta}$	*s.e.*	$\hat{\beta}$	*s.e.*
Euro STOXX 50 Earnings		-1.5	2.6	-6.2**	3.8	4.9	2.8
Euro STOXX 50 Dividends		0.9	2.2	-4.0*	3.1	7.7***	2.9
GDP Growth	Euro area	-0.20	0.33	-0.95***	0.39	0.47	0.54
	Country panel	-0.26	0.31	-0.97***	0.40	0.36	0.53
Ind. Prod. Growth	Euro area	-0.52	1.08	-1.91**	1.10	0.72	1.97
	Country panel	-0.72	0.74	-1.67***	0.79	0.11	1.32
Unemp. Rate	Euro area	0.35*	0.21	0.93***	0.34	-0.16	0.28
	Country panel	0.27*	0.16	0.77***	0.25	-0.18	0.24
CPI Inflation	Euro area	-0.08	0.19	-0.40	0.29	0.21	0.30
	Country panel	-0.03	0.24	-0.50*	0.27	0.38	0.46
PPI Inflation	Euro area	-0.64	0.54	-1.62**	0.67	0.23	0.96
	Country panel	-0.30	0.37	-0.74	0.48	0.08	0.66

All coefficients refer to percentage point revisions of one year ahead forecasts. Earnings and dividend results refer to 2-week revisions in I/B/E/S analyst forecasts for the Euro STOXX 50 index, see the Appendix. The number of observations is 136. Results for macroeconomic aggregates refer to monthly survey revisions from Consensus Economics, see the Appendix. The country panel results refer to a fixed-effects panel regression for forecasts of individual member states. The number of observations is 174 per country.

falls, expected unemployment rises, and CPI and PPI inflation expectations decline. An equivalent rate rise that is due to a central bank information surprise, lastly, lifts expectations. While the magnitude of the effects is similar, only the rise in expected dividends is statistically significant.[7] Nonetheless, since risk premia shocks should by definition be unrelated to economic fundamentals, these results suggests that the non-monetary news component mainly captures central bank information effects.

3.3 Dynamic Macroeconomic Effects

To investigate the dynamic macroeconomic effects of the three different surprises from Section 2, one can employ them as external instruments in vector autoregressions (see e.g. Gertler and Karadi, 2015; Stock and Watson, 2018).

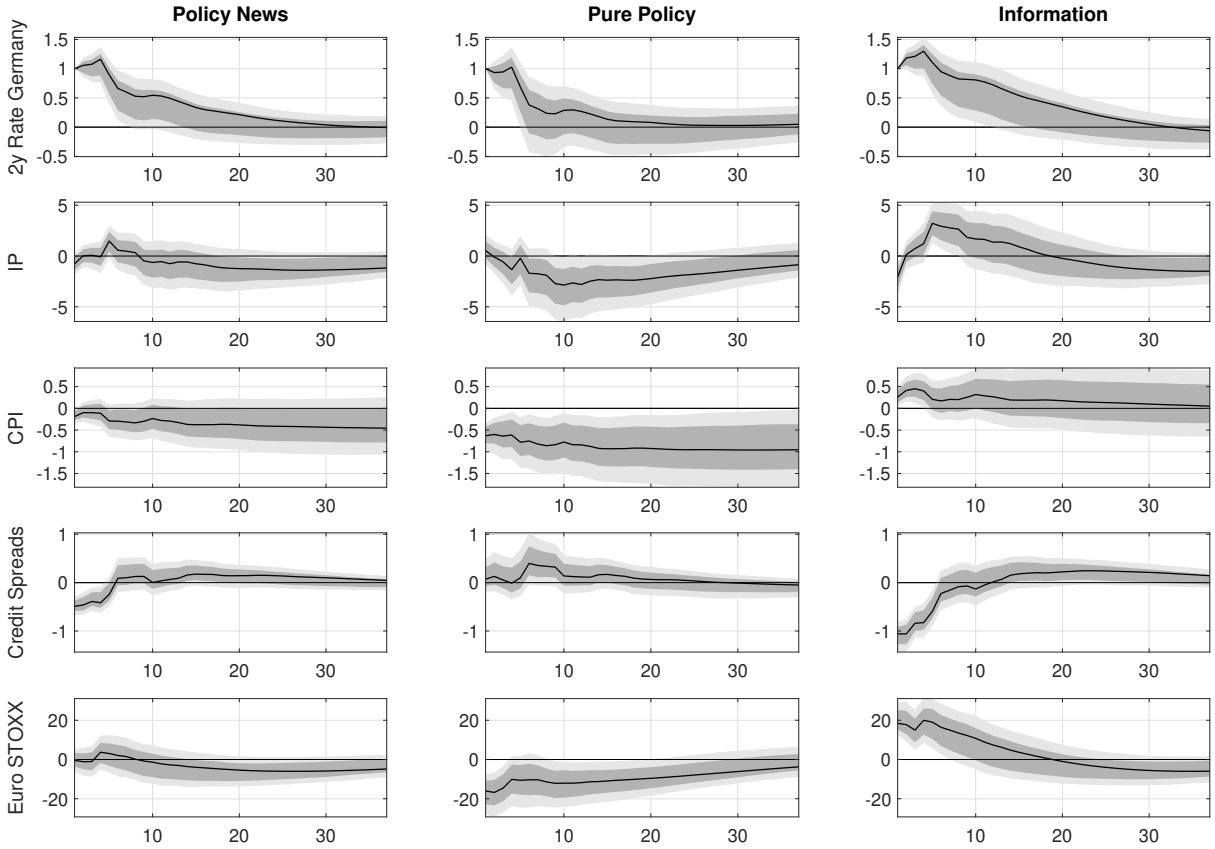
In particular, I estimate a standard VAR with five variables: the 2-year German bond yield, euro area industrial production and consumer prices (both in logs), a measure of credit spreads (see Gilchrist and Mojon, 2016), and the Euro STOXX 50 index (in logs).

[7] Andrade and Ferroni (2021) also study survey revisions in response to ECB announcements and find few significant effects, particularly of the non-monetary news component.

The VAR is estimated on data from 1999 to 2019 and the benchmark specification includes six lags.[8] Identification is achieved by regressing the reduced-form VAR residuals on the respective surprise.

Figure 2 reports impulse responses to shocks that increase the 2-year German bond yield by 100 basis points, as before. Using the policy news surprises as an external

Figure 2: External Instrument VARs



Black lines refer to point estimates, grey areas to 68% and 90% confidence bands. All responses are in percent. Each column refers to the same VAR model with a different external instrument used for identification, see Section 2.

instrument yields puzzling results. Instead of a clear decline, neither industrial production nor consumer prices exhibit a significant response. Even more implausibly, stock prices increase and credit spreads narrow after a supposedly contractionary shock.

The effects of a pure policy shock, in contrast, are in line with standard theory. Output and prices decline after a monetary tightening, while credit spreads widen (though barely significantly) and stock prices fall. A favourable information shock, moreover, has expansionary effects across the board. Both industrial production and consumer prices rise in a hump-shaped fashion after a favourable information shock, while credit spreads narrow and stock prices rise immediately. All these responses are statistically significant

[8]Confidence bands are based on the wild bootstrap procedure by Goncalves and Kilian (2004). The Appendix confirms that the VAR results are robust with respect to the chosen lag length.

and they are exactly what we would expect from a central bank announcement that signals a better-than-expected economic outlook. Reassuringly, the impact effect on stock prices closely matches the daily effects estimated in Table 1.

4 Conclusions

If the market reaction to central bank announcements was solely due to revised expectations about monetary policy, every announcement that raises interest rates would be tantamount to a contractionary surprise. According to standard theory, such a surprise should lead to downward revisions in expected growth and inflation. But this prediction is not borne out in the data.

To resolve this puzzle, I follow Jarocinski and Karadi (2020) and construct two types of surprises, pure policy and central bank information surprises, by imposing sign restrictions on the immediate response of 2-year bond yields and stock prices to ECB announcements. These two surprises produce intuitive results across the board, not only for financial market prices, but also for market participants' economic expectations and macroeconomic aggregates.

Overall, my results suggest that central bank information effects are a key channel via which ECB announcements operate.

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