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Working Paper

Media Treatment of Monetary Policy Surprises and Their Impact on Firms' and Consumers' Expectations

IES Working Paper, No. 30/2021

Provided in Cooperation with:

Charles University, Institute of Economic Studies (IES)

Suggested Citation: Pinter, Julien; Kocenda, Evzen (2021) : Media Treatment of Monetary Policy Surprises and Their Impact on Firms' and Consumers' Expectations, IES Working Paper, No. 30/2021, Charles University in Prague, Institute of Economic Studies (IES), Prague

This Version is available at:

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IES Working Paper 30/2021

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Bibliographic information:

Pinter J. and Kočenda E. (2021): "Media Treatment of Monetary Policy Surprises and Their Impact on Firms' and Consumers' Expectations" IES Working Papers 30/2021. IES FSV. Charles University.

This paper can be downloaded at: <http://ies.fsv.cuni.cz>

Media Treatment of Monetary Policy Surprises and Their Impact on Firms' and Consumers' Expectations

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September 2021

Abstract:

We empirically investigate whether monetary policy announcements affect firms' and consumers' expectations by taking into account media treatments of monetary policy announcements. To identify exogenous changes in monetary policy stances, we use the standard financial monetary policy surprise measures in the euro area. We then analyze how a general newspaper and a financial newspaper (Le Monde and The Financial Times) report on announcements. We find that 87 % of monetary policy surprises are either not associated with the general newspaper reporting a change in the monetary policy stance to their readers or have a sign that is inconsistent with the media report of the announcement. When we use the raw monetary policy surprises variable as an independent variable in the link between monetary policy announcements and firms'/consumers' expectations, we mostly do not find, in line with several previous studies, any statistically significant association. When we take only monetary policy surprises that are consistent with the general newspaper report, in almost all cases we find that monetary policy surprises on the immediate monetary policy stance do affect expectations. Surprises related to future policy inclination and information shocks usually do not appear to matter. The results appear to be in line with rational inattention theories and highlight the need for caution in the use of monetary policy surprise measures for macroeconomic investigations.

JEL: D84, E02, E52, E31

Keywords: firm expectations; consumer expectations; monetary policy surprises; European Central Bank; information effect

Acknowledgements: We are grateful for constructive comments to Marc Pourroy, Francisco Veiga, and participants at several presentations. The usual disclaimer applies.

1 Intro

"If everyone were tracking and reacting to the Federal Funds rate hour by hour, it would not matter whether the newspaper put it on page one in one inch type (...). But in fact the treatment that newspapers (and TV) give this news affects the way people react to it" (Sims 2003, p687)

Firms' and consumers' expectations are commonly considered of central importance by macroeconomists, insofar as they affect decisions and thus economic outcomes (Candia et al. (2021), Carroll (2003)). They are also, consistently, a variable that monetary policy makers seek to affect. The extent to which policy makers' decisions and communications can affect expectations has only been investigated very recently. The recent studies of Enders et al. (2019) and Kirchner (2020) find mixed evidence on the effect of monetary policy announcements on firms' expectations. Evidence is also mixed for consumers' expectations: Claus & Nguyen (2020) find that consumers update their expectations on economic activity after a monetary policy shock while Lamla & Vinogradov (2019) find that announcements have no measurable direct effect on inflation or interest rate expectations. However, as Sims (2003) argues, it makes a difference whether and how the media treat those announcements, as this should "affect the way people react to it". Since the above studies do not take into account the media treatment of the policy announcements in their design, they might miss a crucial aspect. This is most evident in Enders et al. (2019) and Kirchner (2020), who derive results from market-based measures of monetary policy surprises. If non-financial agents do not have the same information set as financial agents, as rational inattention theories suggest, then financial markets' measures of monetary policy surprises will not always be good measures of non-financial agents' monetary policy surprises. In this paper we aim to remedy this shortcoming and perform a thorough analysis that accounts for media treatment of monetary policy decisions.

We focus on firms' and households' economic and price expectations considering harmonized survey data from the European Commission. We conduct our whole analysis on the data for France, though our baseline estimates are also repeated for Spain, Germany, and Italy (the four most important economies in the euro area). For identification purposes, we use financial monetary policy surprises as an exogenous variable for changes in the monetary policy stance. More precisely, we use the overnight-index-swap (OIS) change during a monetary policy event as a measure of monetary policy surprise, from Altavilla et al. (2019). Such market-based interest rate surprises (henceforth "financial monetary policy surprises") are extensively used in academic research, since at least the work of Kuttner (2001), for the above-stated exogeneity reasons.¹ The key novelty of

¹Recent works using financial monetary policy surprises for macroeconomic investigations include for example

our analysis is, however, that we do not consider that all monetary policy surprises for financial markets are monetary policy surprises for non-financial actors. We posit that only those surprises conveyed as such by the general media are likely to be perceived as surprises by consumers and firms. Consistently, for each monetary policy event, we analyze all the media reports made by Le Monde, a general and well-reputed newspaper considered as relatively neutral in Europe, over the week of the monetary policy event, and analyze how the newspaper reports about the European Central Bank (ECB) announcement. We do so both for surprises in the immediate policy stance (henceforth "short-term surprises", taken as the change in the OIS 1-month during the press release window) and for surprises in the (expected) future monetary policy stance (henceforth "long-term surprises", taken as the change in the OIS 1-year during the press conference window). We observe that in most cases, financial monetary policy surprises are not clearly conveyed as surprises by Le Monde, and in some cases they even have a sign inconsistent with the media report. Overall, these cases count for about 87% of the monetary policy surprises considered in our sample. It is mostly the case for small surprises, but not only small surprises. For example, one of the biggest short-term financial monetary surprises in our sample arises in July 2012. It is around -10 basis points (bps), indicating that the interest rate decrease implemented that day was seen as a surprisingly accommodating policy by financial markets. Referring to this announcement, Le Monde titles one of his articles *"The sword strike into water of the ECB"*, beginning it with *"it could have been a bazooka, it ended up as a water pistol"*. The Financial Times reports the move as *"widely anticipated"*. In this case, the announcement is thus not clearly seen as a policy more accommodating than expected, as the financial surprise would have suggested. In some other cases, financial monetary policy surprises are consistently reported as such in Le Monde. This is for example the case in November 2011, where Le Monde starts one of its articles with *"to everyone's surprise, the European Central Bank has decreased (...)"*, and explains that *"the ECB took by surprise observers and the market"*, while the OIS change is indeed negative. It is also the case for example in November 2013 when the ECB decided to decrease its key interest rate, and an article from Le Monde begins by mentioning that *"more than one analyst almost fell from their chair"*, while the OIS shock is indeed negative. After carefully coding more than 500 media reports from Le Monde, we select only the financial monetary policy surprises that consistently appear as monetary policy surprises in Le Monde. To avoid capturing potential unilateral interpretations from Le Monde, we also checked whether The Financial Times offered a consistent reading in such cases (it was always the case in our sample).

Gürkaynak et al. (2021), Jarociński & Karadi (2020), Miranda-Agrippino & Rey (2020), Altavilla et al. (2019), Enders et al. (2019), Nakamura & Steinsson (2018).

Consistent with our intuition, we then run two general regressions where the dependent variable is a variable related to firms' or consumers' expectations, and the main independent variable is the financial monetary policy surprise. The first general regression considers all financial monetary policy surprises, as in other works such as Enders et al. (2019). The second general regression considers only financial monetary policy surprises that appear consistent with the general media report. The results suggest that taking media treatment into account is key. When we use all monetary policy surprises as an independent variable, we mostly do not find a statistically significant association between monetary policy surprises and firms' or consumers' expectations. On the other hand, when we take only monetary policy surprises consistent with the newspaper-reported inclination change, in the vast majority of cases we find that monetary policy surprises affect expectations. We find only a recurrent effect for surprises in the immediate policy stance, and only in a few cases an effect of surprises in the future monetary policy stance. In many cases we find that a surprise loosening leads to lower economic expectations, which is in line with the findings of Campbell et al. (2012) or Nakamura & Steinsson (2018) for professional forecasters' expectations, or with Enders et al. (2019) in his baseline specification. This is true considering a wide range of control variables selected from LASSO techniques or considering controls suggested by Bauer & Swanson (2020) to deal with the potential endogeneity of the surprise in such a framework. There is however heterogeneity in the sign of the response to the surprises across countries and, sometimes, across sectors.

We dig deeper into the latter finding (the sign of the relationship) by first dissociating between so-called "information shocks" and "pure monetary policy shocks" (Jarociński & Karadi 2020). The fact that we most often find a positive relationship between monetary policy surprises and economic expectations is indeed in itself consistent with the view that the monetary policy announcements reveal information about the economy: surprise loosening could come with information or be interpreted as a sign that the economy is weaker than expected, and such "information shocks" may prevail in agents' expectations. We thus use the "information shocks" and "pure monetary policy shocks" from Jarociński & Karadi (2020) and repeat our initial analysis. That is, we code for each "information shock" whether or not they are consistently reported in the media, and run our baseline regressions with media-consistent shocks only. We observe here also that several information shocks do not clearly appear as such in the media report. For example, in September 2011, Le Monde titles one of its articles *"The ECB revises downward its growth forecasts for 2011 and 2012"* and conveys substantial new negative information on the economy, while that day the second-biggest positive "information shock" in our sample is recorded. In fact, only about 16% of the "information shocks" in our sample appear consistent with the media report. Many big

"information shocks" from Jarociński & Karadi (2020) also do not appear in the media report directly related to information on the economic outlook, but rather as related to the consideration or the extension of asset purchases programs. Irrespective of whether we consider these distinctions, we do not find strong support that our key result reflects an informational effect. We then try to test for the possibility that our result reflects the impact of "narrative shocks" as analyzed by ter Ellen et al. (2021). The authors suggest that sharp changes in the media content related to central bank policy can have an aggregate economic effect similar to that of "information shocks". Using the index of Picault et al. (2021) to test for such a possibility, we find some support for the narrative shock explanation but it is not entirely conclusive.

Overall, our results suggest that monetary policy surprises do matter for firms' and consumers' expectations but that the key aspect here is the media report: only monetary policy surprises that are consistent with the media report appear to matter in our estimates. This is in itself consistent with theories emphasizing agents' limited cognition. For example, rational inattention theories posit that agents will rationally spend their cognitive resources on activities according to their perceived payoff. Firms and consumers may naturally have less incentive to carefully monitor central bank communication as compared to financial investors. That can imply that only surprises clearly appearing as such in general newspapers impact them. This would in itself be consistent with the above quote of Sims (2003), but also with the evidence showing that firms and households are usually "largely uninformed" about monetary policy (Candia et al. 2021).

The rest of the paper is structured as follows. The next section discusses the literature on firms' and households' expectations and monetary policy. The third section details our data on monetary policy surprises and their consistency with media reports. Section four details our empirical strategy. The next sections present the baseline results and the other tests performed for robustness and interpretation. The last section concludes.

2 Related literature

Macroeconomists have long recognized that expectations of households and firms about the future state of key economic variables have an important effect on their decisions (Candia et al. (2021), Carroll (2003)). What factors affect these expectations, how these are formed, and whether monetary policy plays a particular role in their formation has however been empirically investigated in a deeper way only recently.

Regarding firms' expectations, the recent studies of Candia et al. (2021) and Coibion et al. (2018) shed important light. Through a large-scale survey of US firms, Candia et al. (2021)

extract forecasts of aggregate short-term and long-term inflation for 10 consecutive quarters. They reach the conclusion that *"inflation expectations of U.S. managers appear far from anchored"* and that *"like households, U.S. managers are largely uninformed about recent aggregate inflation dynamics or monetary policy"*. The fraction of CEOs that correctly identify 2 percent as the Fed inflation target in their sample is for example less than 20%. The authors do not directly test whether monetary policy announcements matter for firms' expectations, however they note that the share of firms reporting a numerical target when asked about the Fed inflation target more than doubled when concerns about future inflation were extensively covered by the media, suggesting that media coverage plays a significant role in firms' expectations. Coibion et al. (2018) also provide evidence that inattention to inflation and to monetary policy can be pervasive among firms in advanced economies. The authors build a large-scale survey of firms in New Zealand and extract backcasts as well as forecasts on a wide range of economic variables in four consecutive waves. They report that not all firms are well-informed about recent macroeconomic conditions. They find robust evidence that firms' inattentiveness to macroeconomic information stems from rational considerations, with business-specific characteristics playing a particular role. At the same time, they find inattentiveness to be time-variant. Using experimental methods, they also show that firms systematically adjust their forecasts in response to information about the economy, with a particularly large response in the case in which the information relates to the central bank.

A few other studies have directly focused on the link between monetary policy announcements and expectations. The study of Enders et al. (2019), related the closest to our paper, uses firm-level expectations on production and prices for the next three months, from the Ifo Business Survey Industry in Germany. They look at whether monetary policy announcements affect firms' expectations, mostly considering monetary policy surprises built from financial instruments. The main result of their analysis is that monetary policy surprises do significantly impact firms' expectations, but in a nonlinear way. In their baseline linear specification, they are not able to find a robust relationship between monetary policy surprises and firms' expectations: the relevant coefficient is only significant for price expectations at the 10% level when relevant controls are used. They obtain a positive coefficient in each case. Only when they include a cubic term and exclude the four largest surprises do the resulting estimates yield significant coefficients for the linear and cubic terms for both price and production expectations. They conclude that moderate surprises are positively correlated to firms' expectations but that very large surprises no longer affect firm expectations, a conclusion that is difficult to economically interpret and is thus not always seen as convincing.² They also find in separate estimates that a few of the unconventional monetary

²See Bachmann (2019) e.g..

policy announcements they considered significantly affected firms' expectations. In essence, the results corroborate those of Kirchner (2020), who analyzes the effect of monetary policy surprises in Australia on consumer and business confidence, using indexes partly built from economic expectation data. The author indeed finds a positive but only slightly significant coefficient for his monetary policy surprise variable, when firms' business confidence is the dependent variable.

Regarding households' expectations, most studies agree that households are generally poorly informed on monetary policy, but there is dissonant evidence on whether monetary policy announcements feed into households' expectations. Using the Michigan Survey of Consumers, Binder (2017) for example finds that consumers' expectations are imperfectly anchored, but that anchoring near the Fed 2 % inflation target slightly increased following the Fed's announcement of this target. In a similar vein, Coibion et al. (2019), who consider that firms' and households' expectations "*seem to be unresponsive to central bank announcements*", conduct a randomized controlled trial of U.S. households and find that the provision of information on the Fed inflation target do affect inflation expectations, with mildly persistent effects. Lamla & Vinogradov (2019) use an online survey tool to survey households before and after Fed monetary policy announcements. They find that announcement events have no measurable direct effects on perceptions or expectations of inflation or interest rates. They note however that FOMC announcements with press conferences increase the probability of receiving monetary policy news, especially at a time of interest rate change. Lewis et al. (2019) find in contrast that consumers' expectations systematically respond to Fed monetary policy announcements. They use daily data from a private survey company (Gallup) between 2008 and 2017 that pools US consumers on current and future economic conditions. Through local projections, they find that monetary policy surprises do affect consumers' expectations on economic activity but only when these surprises relate to interest rate decisions. They find that the relationship is negative, as the standard macroeconomic theory suggests, contrasting with the response professional forecasters found e.g. in Nakamura & Steinsson (2018) or Campbell et al. (2012), which was previously mentioned. This result however relies on few observations encompassing interest rate changes, as the Fed reached its zero lower bound at the end of 2008. It is possible thus that the few interest rate changes in this period had specific characteristics that made them relevant to consumers, such as an extensive and consistent media coverage. Similar conclusions are reached by Claus & Nguyen (2020), with very different methods. The authors apply a latent factor model to monthly survey data in Australia, identifying monetary policy shocks from the variance of expectations data that occurs on months when the Reserve Bank of Australia changed its key interest rate. They find that consumers adjust expectations on economic activity immediately following a monetary policy shock, but not on inflation, which reacts only in the long run with a

sign opposite from what standard theories suggest.³

Overall, as Candia et al. (2021) summarize, "*available evidence shows that households and firms revise their inflation expectations once they are exposed to information about inflation or monetary policy*". That suggests in turn that the media treatment of monetary policy announcements is a key feature, if not the main one, in the relationship between expectations and regular monetary policy announcements.⁴ All the above-mentioned studies looking explicitly at this relationship however do not take into account the media treatment and (with the exception of Lamla & Vinogradov (2019)) simply use financial monetary policy surprises as a key variable, yielding dissonant conclusions. As the next section will show, doing so is likely to be particularly problematic.⁵

3 Monetary policy surprises and media report

3.1 Monetary policy surprises

A wide range of studies have used monetary policy surprises stemming from financial market indicators as exogenous measures of the changes in the monetary policy stance. The most popularized of such measures is perhaps the one used in Kuttner (2001), corresponding to the changes in the Fed Funds futures quote before and after the monetary policy event. The equivalent measure for the euro area is often considered to be the change in the OIS quote.

The advantage of such measures for researchers is quite straightforward. Fed funds futures or OIS mostly encompass information on what the future policy rate (the Fed funds rate for the former, the EONIA rate for the latter) is expected to be by market participants. Put moderately simply,⁶ the OIS 1-month can be seen for example as the average EAONIA rate expected on average for the next 30 days by market participants. If no change arises to such a financial measure between the beginning and end of a central bank event, researchers typically deduce that the market did not consider that the monetary policy stance changed as compared to their expectations. This can

³While the approach is clearly innovative, a drawback is that it relies on strong identification conditions for monetary policy surprises, namely that consumers' responses display greater variation in monetary policy months and that this additional variation can be attributed to policy surprises.

⁴That expectations depend primarily on monetary policy information conveyed in the media is the key assumption of Carroll (2003).

⁵Note that there is a wide range of research looking at the impact of monetary policy announcements on professional forecasters' expectations that we previously alluded to but do not discuss here. Early research has often concluded that monetary policy surprises were positively associated with professional forecasters' expectations, suggesting the presence of so-called "informational effects". These findings have recently been questioned; see Bauer & Swanson (2020) for a thorough review.

⁶Such financial instruments also naturally encompass risk premiums, though the consensus seems to be that these are relatively small (Bauer & Swanson 2020).

happen even if the central bank decided to change its interest rate, in the case when the move was totally expected by the market. If in contrast the financial measure changes with the central bank event, researchers typically deduce that the market got new information from it and revised its view on the monetary policy stance. The latter case is what researchers commonly associate with (financial) monetary policy surprises. These provide researchers with a measure of unexpected changes in the monetary policy stance and often allow them to bypass the endogeneity problem associated with the use of a simple measure of policy rate changes in empirical analysis. It is arguably mostly for this reason that financial monetary policy surprises are used extensively in empirical works, including in Lewis et al. (2019), Enders et al. (2019), and Kirchner (2020).

In this paper, in line with the majority of studies, we use the monetary policy surprise measure defined as the change in the OIS during the central bank event. We take the data from Altavilla et al. (2019) for the euro area. We dissociate between surprises in the immediate monetary policy stance, referred as "short-term surprises", and surprises in the future monetary policy stance ("long-term surprises"). The former are denoted MP^{short} and are measured as the change in the median quote for the OIS 1-month from a 10-minute window slightly before the ECB press release to a 10-minute window slightly after the press release. Because the ECB press release (usually available 45 minutes before the beginning of the press conference) only discusses details on the rate decision in our sample period,⁷ MP^{short} is used as a measure of the surprising change in the rate decision. "Long-term surprises" are denoted MP^{long} and are measured as the change in the median quote for the OIS 1-year from a 10-minute window slightly before the start of the press conference to a 10-minute window slightly after its end. Because the window considered to compute the OIS change does not overlap with the one considered for MP^{short} and because the press conferences usually contain all the relevant details for the future monetary policy stance, MP^{long} is used as a measure of the surprising change in the future monetary policy stance, purged of the impact of the potential surprise in the policy rate from the press statement released before the press conference. In essence, this dissociation is similar to the one used in the last section of Enders et al. (2019), when they want to better isolate the reaction to the monetary policy decision *per se* from the press conference communication.

3.2 Consistency of monetary policy surprises with media report

For each of the (157) monetary policy surprises considered in our study, we read all the articles reported by Le Monde on the day when the policy decision is announced and on any of the 3

⁷After 2015, the press release started to regularly encompass information on the decisions related to asset purchase programs, thus blurring the interpretation of OIS changes occurring in the press release window.

days afterwards that contain at least one mention of "European central bank". Because press conferences take place on Thursdays, the (1+3)-day window is chosen to match the end of the week. Le Monde is chosen as it is a general and well-reputed newspaper considered as relatively neutral in Europe. These three characteristics are particularly relevant for our context, given the empirical evidence related in the previous section. The fact that it is general makes it much more likely that major news reported in it will also be reported by other media, as compared with news reported in specialized financial newspapers.⁸ News reported in Le Monde should consequently reach a higher share of the population. The fact that it is general, well-reputed, and rather neutral makes it arguably more likely to treat news in a way that yields information close to the information received by the average firm or the average household, as compared with the treatment of information in a newspaper tailored for financial investors. In total, we have about 500 articles for our period under research.

We then code for each monetary policy surprise whether or not the report given by Le Monde on the monetary policy announcement is consistent with the financial monetary policy surprise. The general idea behind our coding is that a monetary policy surprise is consistently reported in the media if the media reports a *surprising* decision (for short-term surprises) or a *surprising tone* on the future monetary policy stance (for long-term surprises) in a direction consistent with the *sign* of the surprise. Specifically, after reading all media reports, we consider the following coding criteria. For surprises in the immediate monetary policy stance (short-term surprises), at least a remark that the decision mostly "surprised" has to be mentioned. In fact, for short-term surprises consistent with the media report, we find expressions such as: "to general surprise", "we didn't expect it", "exceptional move", "brutal U-turn", "surprise interest rate cut", etc. In all the short-term surprises we considered as consistently reported, we double-checked that Le Monde was consistent: for example if the ECB decreased rates and Le Monde reports a surprise, we checked that Le Monde did not report before the announcement that this move would very likely take place (it was never the case). For surprises in the future monetary policy stance (long-term surprises), the report has to convey the idea that a future policy move is likely. Expressions such as "prepares the minds for", "opened the door for" a rate decrease/increase, or simply references to the fact that the market expects a future move are non-inclusive examples of what we find in articles satisfying this criteria. Each time when we find the report from Le Monde to be consistent with the financial monetary policy surprise, we cross-check Le Monde's interpretation with that of The Financial Times to avoid capturing a potentially unilateral interpretation from Le Monde; we

⁸In fact, in our sample there are a few monetary policy announcements that Le Monde does not cover, where no particular monetary policy change occurred.

found none. On the other hand, as one may expect from a general newspaper, we found that Le Monde did not report some (long-term) surprises that The Financial Times did. The whole coding as well as all Le Monde articles considered are available on the corresponding author’s webpage for transparency.

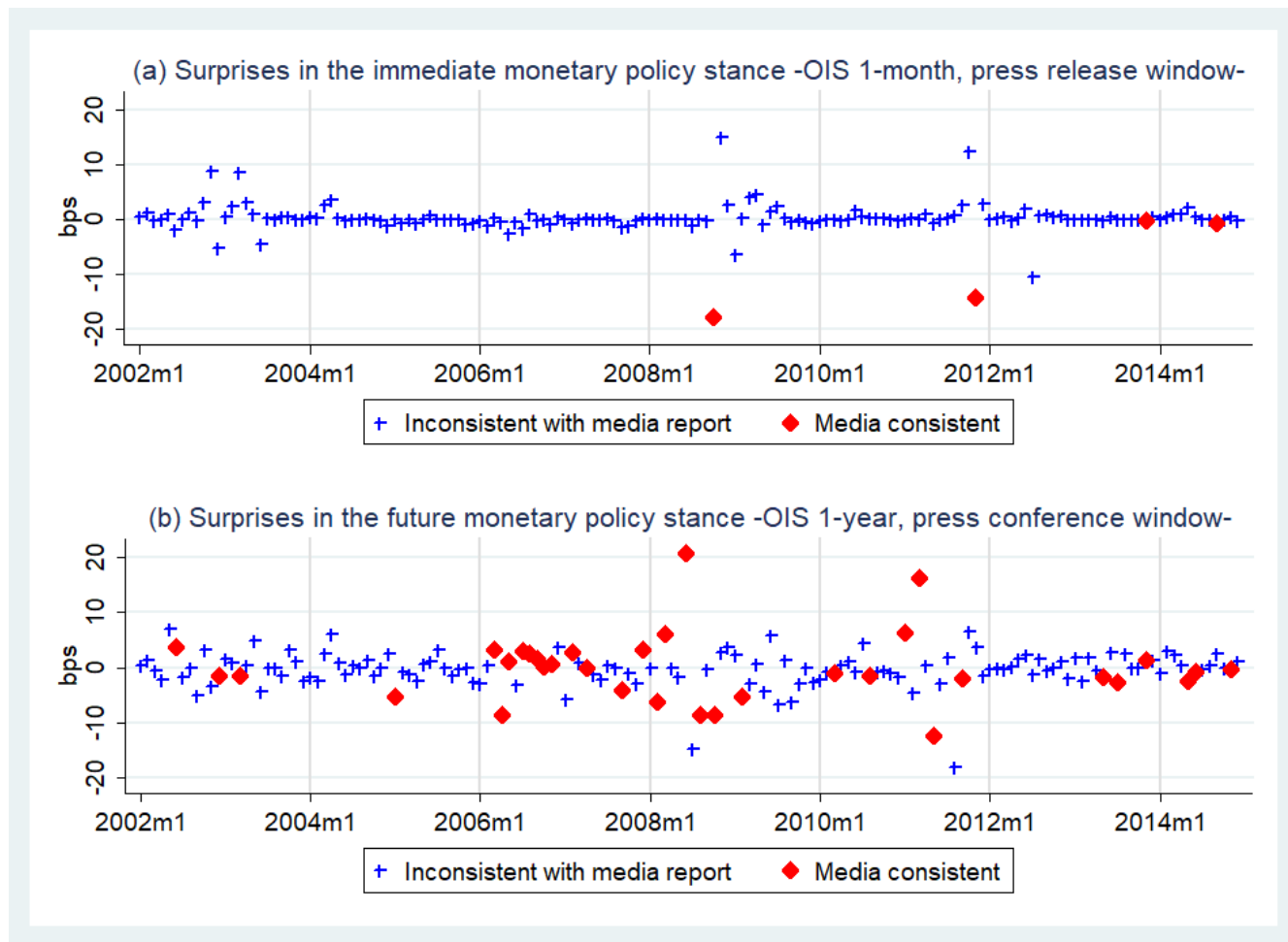


Figure 1: Financial monetary policy surprises, inconsistently (blue) versus consistently conveyed as such by Le Monde (red)

Notes: Data on OIS high-frequency changes are from Altavilla et al. (2019). Panel (a) shows the monetary policy surprises in the immediate monetary policy stance, taken as the change in the OIS 1-month around the press release window. Panel (b) shows the monetary policy surprises in the future monetary policy stance, taken as the change in the OIS 1-year around the press conference window. For each panel, the financial monetary policy surprises that appeared as consistent with the content of the reports from Le Monde (*i.e.* Le Monde reporting a surprising decision -for panel (a)- or a surprising tone -for panel (b)- in the direction indicated by the monetary policy surprise) appear in red, the others appear in blue. The sample period is 2002:m1 - 2014:m12.

In Figure 1 we plot all the short-term and long-term surprises (in panel (a) and panel (b), respectively), the ones consistent with the media report appearing in red. What we observe is that very few monetary policy surprises in the immediate monetary policy stance appear as such in the media. For example, the two biggest positive surprises are not consistently reported as tightening surprises in Le Monde. In November 2008, the ECB decreased its key interest rate from 50 bps, but the OIS surprise is positive at about +15 bps, suggesting an important surprising tightening. Le Monde refers to this interest rate decrease as *"an expected move, however a massive one"*. Furthermore, they note that *"Trichet says that other cuts are to be expected"*. Clearly, it is hard to say from this media content that the monetary policy stance has become much tighter, to the point of being the most important tightening of the period, as the monetary policy surprise suggests.

The second biggest surprise arises in October 2011 and is around +12 bps. Le Monde reports that day that *"the ECB maintained, without surprise, its key interest rate"*. The newspaper even notes, in reference to the newly announced unconventional monetary policies, that the stock markets were *"reassured by the measures announced"*. One can only find, if going through the second part of one of their 5 articles referring to the move that week, one sentence saying that the rate decision *"disappointed the markets"*. In none of Le Monde's articles in the week preceding the press conference could we find any mention of an upcoming decrease in interest rates. Again, it is overall hard to argue that a substantially tighter-than-expected monetary policy stance arose from these reports, as the financial surprise suggests. In contrast, we observe a clearly consistent report of monetary policy surprises in 2008, 2012, 2013, and 2014, each time when the central bank decreased its interest rate. All these times Le Monde reports a surprising decision. The first move is referred to as a *"brutal U-turn"*, the second and the third are communicated through an article for which the first sentence starts by *"to general surprise"*, while the last is communicated with articles stressing that *"nobody expected it"*. It is clear in all these cases also from The Financial Times that the move came as a surprise.

For long-term surprises, we find more coherence, probably owing to the fact that they come from the content of the press conferences, which are often extensively commented upon. For example, the two biggest positive surprises are consistently reported in the media. The first one, in June 2008, is positive at about +21 bps. That day, Le Monde reports that Trichet *"indicated"* that *"a rate increase is considered for July"*, while quoting after this sentence an analyst saying *"it will hurt"*. They put it even clearer right after the title of another article *"the ECB will increase its interest rate despite the expected growth slowdown"*. For the second one (March 2011), Le Monde's title is *"Trichet is preparing the minds to an increase in rates for as soon as April"* and explains that the ECB is *"shooting up the agenda of the markets and of the analysts"*. In contrast, the two

biggest negative surprises are not consistently conveyed as such in the media. For the biggest one, in the first week of August 2011, the contrast with the media report is striking. The long-term surprise is about -18 bps, indicating a very dovish shift. Three articles in Le Monde are titled that week respectively, "*The ECB powerless in reassuring markets*", "*the international stock markets drop, not convinced by the declarations of the ECB*", "*The markets were expecting more from the ECB*". There is no reference to any potential future monetary policy easing.⁹

4 Empirical strategy

4.1 Baseline estimates

Our baseline estimates consider two models, each corresponding to two potential data generating processes. The first model implicitly considers that all financial monetary policy surprises are surprises to non-financial agents, in line with the implicit assumption of the previous literature (Enders et al. (2019), Kirchner (2020), Lewis et al. (2019)). It is specified as:

$$\Delta Y_t = \alpha_1 + \beta_1 MP_t^{short} + \phi_1 MP_t^{long} + \gamma_1 X_t. \quad (1)$$

The second model takes media treatment into account and considers that only monetary policy surprises consistently reported in the media are surprises to non-financial agents. It is specified as:

$$\Delta Y_t = \alpha_2 + \beta_2 MP_t^{short} * MT_t^{short} + \phi_2 MP_t^{long} * MT_t^{short} + \gamma_2 X_t. \quad (2)$$

In both specifications the dependent variable Y represents a forward-looking component of either an economic or price level expectation index for the country and the sector considered. MP^{short} (MP^{long}) is the monetary policy surprise in the OIS 1-month (OIS 1-year) previously defined, and X_t is a vector of control variables. Finally, MT is a dummy variable taking a value of 1 if the monetary policy surprise is reported by both Le Monde and The Financial Times in a consistent way and 0 otherwise. In effect, the first specification considers all monetary policy surprises appearing in Figure 1, while the second considers only those appearing in red. All variables are detailed thereafter.

The general specification is inspired from the connected literature, in particular from the work of Enders et al. (2019) and Nakamura & Steinsson (2018). Similar to them, the change in the

⁹The move in the OIS is rather likely to be explained by technical factors related to the new Long-term Refinancing Operations decided at the policy meeting, which can be expected to mechanically lead to a decrease in the future EONIA rates through its liquidity effect.

expectations is considered rather than their level,¹⁰ and is related to monetary policy surprises in a linear fashion. The fact that we use monetary policy surprises as an independent variable arguably tackles natural estimation concerns. As the previous section has illustrated, some policy moves are clearly pre-announced by the monetary authority. In that context, taking the mere interest rate changes as our MP_t^{short} variable for example would result in straightforward estimation problems: we avoid them by focusing on the surprise component of the decision. As in the connected literature, the use of monetary policy surprises also limits the likelihood that a potential statistical relationship reflects unobserved heterogeneity. If one were to take a simple measure of interest rate changes for example, positive news on the economy could affect both this measure and non-financial agents' expectations if the central bank were to increase the interest rate in response to the news. However, if financial markets also respond to this news about the economy and price in the policy rate move, there will then be no or little monetary policy surprise in such a case.¹¹ Reverse causality issues are also ruled out insofar as the ECB press conference comes largely before the data on confidence are released. Finally, the use of such a monetary policy surprise variable has natural identification advantages: it makes sure that the key independent variable relates to monetary policy. This can be less obvious in related studies where the identification of the monetary policy shocks relies on specific assumptions.

The model is estimated as an OLS with Hubert-White standard errors. In the next sections we detail the data we use for expectations and explain how we select the control variables.

4.2 Sample choice and data on expectations

4.2.1 Sample

Insofar as we use *Le Monde*, a French newspaper, we chose to consistently focus mainly on the data for France. However, our baseline estimates will also be performed for Spain, Germany, and Italy, to see whether the key result differs for other large economies.

We use monthly data from January 2002 until the end of 2014. We use this period because press conferences were held at a monthly frequency during this time, at the beginning of each month,

¹⁰It is also justified by the fact that it is difficult to reject the presence of a unit root for most variables with standard tests, even if one takes only the post-crisis data.

¹¹An omitted variable bias could remain if the central bank has access to information on firms or consumers who would also use this information in setting their expectations, information that the market didn't know or value enough. Our underlying assumption is that this is not likely to be the case, but we later tackle this concern directly, using the work of Bauer & Swanson (2020). In addition, controlling for the change in the consumers' or firms' views on the past economic conditions as we will do here is likely to severely limit the relevance of such issues.

generally on the first Thursday of the month.¹² Data on firms' and consumers' expectations are collected in the first two to three weeks of each month. Therefore, for identification purposes, we cannot select data where the press conference would come after expectations are formed. Before 2002, there were two press conferences during a given month and from 2015 press conference timing became once every 6 weeks. Including these months would expose us to obvious estimation problems, adding to identification issues stemming from the fact that the ECB press release content changed after 2015.

Even though monthly data are often used in the context of expectations and monetary policy announcements (Nakamura & Steinsson (2018), Campbell et al. (2012), Claus & Nguyen (2020)), a natural disadvantage of adopting an estimation strategy with aggregate data is that we are not able to single out consumers or firms who are exposed to the monetary policy surprise a week after it arises from those who see it the day after, for example.¹³ This is a clear disadvantage as compared to Enders et al. (2019) for example, who analyze the monthly changes in expectations of firms answering the survey only a few days around the monetary policy event. However, this should play a limited role in our estimates if the proportion of those exposed to the surprise remains broadly the same over time. Furthermore, the great advantage this estimation strategy gives us is that we are able to compare the reactions of a very wide set of agents for different countries. This is usually not feasible with micro data as they are generally only available for a specific country.

4.2.2 Data on expectations

The data on expectations come from the database of the Directorate-General for Economic and Financial Affairs (DG ECFIN). Each month, a largely harmonized survey of consumers and firm managers is run in each participating country in the first two to three weeks. These are sent at least five working days before the end of the reference month and then published. We take data for consumers and for firms in the industrial, retail sales, services, and construction sectors, on both economic and price expectations.¹⁴ In what follows we refer for simplicity to a "sector" to denote either consumers or firms from a specific area, and to a "pair" to denote the particular economic or price expectation of a specific sector.

¹²From January 2002 till December 2014, all of the 157 monetary events arose before the 10th of the month. Only seven are exceptions, but these were almost all in January, shifted because of the holiday period.

¹³There is also a possibility that part of the respondents may not see the surprise. This is a standard problem of using monthly data with expectations surveys, also shared e.g. in Claus & Nguyen (2020) and Lamla & Lein (2014).

¹⁴We take several sectors as we naturally expect desegregated data to be more precise than aggregate data. Candia et al. (2021) shows that even for expectations on aggregate inflation, part of firms' disagreement is systematically related to the sector in which they operate.

For economic expectations, the question asked of firms relates to their expectations for activity in the next 3 months. For consumers, the survey asks about the "general economic conditions over the next 12 months". Questions about the assessment of the current situation relative to the past 3 months for firms and relative to the past 12 months for consumers are also asked, which we will later refer to as "backward-looking indexes" and use as control variables. For construction firms, the question doesn't relate to activity but to employment. The answers are qualitative: production for example may increase, not change, or decrease. We use the seasonally adjusted balance to these questions as a key variable. For price expectations, the question asked to firms relates to their expectations of future prices for the next 3 months. For consumers, the survey asks about the price trend over the next 12 months. The answers are also qualitative and we again use the seasonally adjusted balance as a key variable. For firms, all our data are in essence very similar to the data used by Enders et al. (2019). The main difference is that they focus solely on firms in the manufacturing sector, in Germany, and take their data from the Ifo Business Survey Industry. All data are showed in Figure 2.

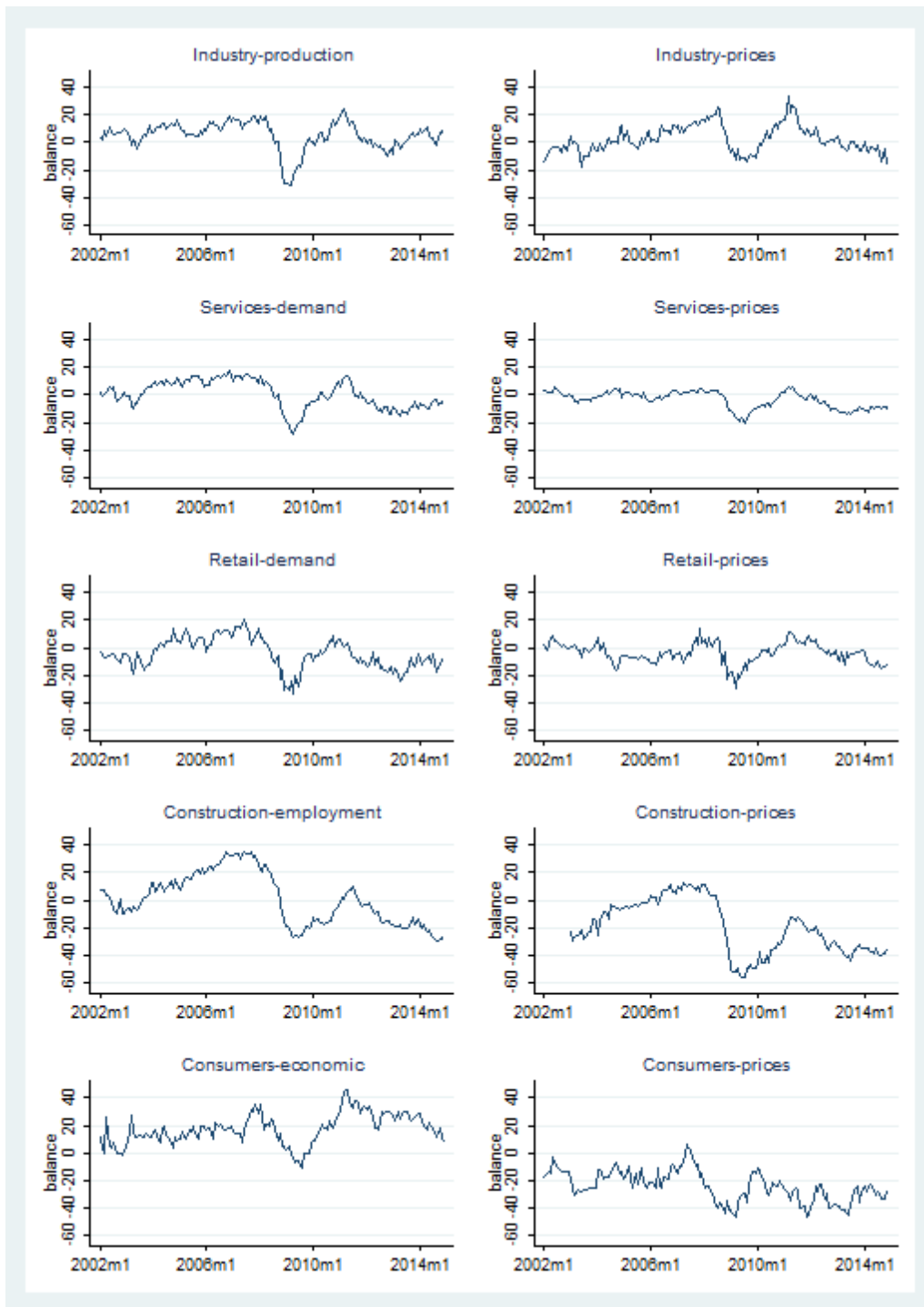


Figure 2: Economic and price expectations data for France (in level)

Notes: Data are from DG-ECFIN. For each sector, the data correspond to the seasonally adjusted balance of the answers to the questions of the survey related to economic activity (left graph) or prices (right graph) expectations.

4.3 Control variables

The issue we face in selecting the control variables is that, with a few exceptions, we do not have strong priors on which variables could be especially important to include as controls in our framework. It is indeed sometimes considered that the unpredictable nature of monetary policy surprises renders them exogenous in such frameworks, so that no control is needed. For example, neither Nakamura & Steinsson (2018) nor Campbell et al. (2012) add control variables in their baseline specification when studying the link between monetary policy surprises and the changes in professional forecasters' expectations. We still decide to add control variables in order to make sure our results are not driven by other important variables affecting expectations that would happen to be also correlated with the monetary policy surprises in our sample. We consider two subsets of control variables, X_t^1 and X_t^2 ($X_t = (X_t^1, X_t^2)$).

The first subset (X_t^1) consists of variables that we judge to be particularly at risk of being correlated both with the monetary policy surprise and the dependent variable. These are the following variables: the change in the backward-looking index on economic expectations (for each sector considered)¹⁵ and three dummy variables for October, November, and December 2008, each taking a value of 1 for the corresponding month and 0 otherwise. The latter variables are included given that graphical observation (Figure 2) clearly suggests a substantial drop in expectations at the time of the 2008 financial crisis for all sectors, while important policy surprises arise during this period. The former variable is included to diminish the risk of spurious correlation, in case for example the economic environment recently improved or deteriorated and the central bank still managed to surprise financial markets with its decision. Its inclusion has also another useful purpose: it allows us to make sure that we measure the impact of monetary policy surprises on future expectations, conditional on the current perceived improvement/deterioration of the economic situation for the sector considered. This can be particularly important as backcasts and forecasts are usually very correlated.¹⁶ Its inclusion is thereby expected to also allow us to get a better identification of any potential effect of monetary policy surprises on expectations.¹⁷

The second subset (X_t^2) consists of other control variables that we select with LASSO techniques from a pool of candidates. The variables in the pool of candidates are judged as less likely to affect

¹⁵Except for households' price expectations, where we have a backward-looking index related to price expectations that we therefore directly use.

¹⁶Our choice to include this control variable can also be partly grounded in Candia et al. (2021) and Coibion et al. (2018), who find, mostly based on a cross-section dimension, that the perception of the recent inflation dynamic is an important determinant of firms' short-run inflation expectations and that firms' macroeconomic backcasts are very correlated with their forecasts.

¹⁷Such a control is present in Enders et al. (2019) but not in Lewis et al. (2019).

the estimates of our coefficients of interest as compared to the ones included in X_t^1 , and share a strong correlation between each other, so that we cannot include them all. The advantage of the LASSO technique is that it should select only the most important variables explaining the variations from expectations. The disadvantage is that the selection is not related to our research question. It is only based on how relevant the control is to explain the dependent variable. We select our controls from the pool of variables that characterize various aspects of economic and financial development, detailed in Table 6 in Appendix 8.1.1.

For each pair considered, we implement the selection algorithm as follows. We estimate equation 1 using all the potential control variables with the LASSO estimator. Variables in X_t^1 are partialled out prior to estimation to select among the variables in X_t^2 . We estimate the LASSO for 100 different penalization parameters λ , and use the BIC to choose the one with minimum loss. These penalized regressions thus allow us to select among the candidate pool of controls.

We then run our OLS regression on the dependent variable, including the monetary-policy-surprise variable X_t^1 and the set of control variables selected in the LASSO step. The variable selection is done based on model (1) estimates for each sector, and because our goal is to compare model (1) with model (2), the same controls are used in both corresponding regressions.

5 Baseline results

5.1 France

In Table 1 we show the result for each sector in France, for expectations related to future production and future prices. For each of these pairs (sector-expectation index), the first column presents the coefficients for the estimates of equation 1 (all surprises) and the second the coefficients for the estimates of equation 2 (only media-consistent surprises).

Table 1: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*first part*)

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
1-month surprise, all	0.027 (0.096)		-0.150 (0.094)		0.041 (0.154)		-0.104 (0.115)		0.078 (0.114)	
1-year surprise, all	0.143*** (0.047)		0.018 (0.097)		0.020 (0.063)		-0.011 (0.080)		0.091** (0.043)	
1-month surprise, media		0.243*** (0.051)		-0.147** (0.075)		0.123*** (0.036)		-0.332*** (0.045)		0.311*** (0.051)
1-year surprise, media		0.153*** (0.050)		0.090 (0.129)		0.065 (0.069)		0.129 (0.085)		0.070 (0.045)
Dummy oct 2008	-8.006*** (1.815)	-4.023*** (1.066)	-8.043*** (2.393)	-7.531*** (2.017)	-9.745*** (3.021)	-7.900*** (0.849)	2.076 (2.707)	-0.513 (1.575)	-2.980 (2.113)	0.861 (1.023)
Dummy nov 2008	-6.454*** (1.614)	-5.468*** (0.934)	0.080 (2.267)	-2.226 (1.788)	0.905 (2.317)	1.549*** (0.572)	-11.742*** (2.560)	-13.333*** (1.883)	-1.737 (1.881)	-0.345 (0.881)
Dummy dec 2008	-7.680*** (0.582)	-6.962*** (0.509)	-1.610 (1.493)	-2.013 (1.427)	-8.263*** (0.891)	-8.080*** (0.850)	0.584 (2.039)	0.568 (1.990)	-0.633 (0.849)	-0.166 (0.777)
Ind. prod. FR, backw.	0.045 (0.055)	0.050 (0.056)	0.049 (0.076)	0.051 (0.076)						
Retail dem. FR, backw.					0.296*** (0.037)	0.297*** (0.037)	-0.052 (0.049)	-0.046 (0.050)		
Serv. dem. FR, backw.									0.198** (0.077)	0.208*** (0.080)
<i>Lasso selected controls:</i>										
Eurostoxx change	14.470*** (5.057)	15.339*** (5.108)							13.649*** (4.252)	14.584*** (4.400)
CPI FR, lag chge	-0.955** (0.384)	-0.939** (0.397)								
Constr. FR, lag chge			0.199*** (0.075)	0.202*** (0.077)						
Oil price change			11.616*** (4.100)	11.291*** (4.061)						
Lag dependent			-0.236*** (0.089)	-0.248*** (0.090)			-0.322*** (0.089)	-0.319*** (0.090)		
Ind. prod. EA, backw.							0.288** (0.115)	0.293** (0.114)		
CEPR eco index, lag chge									5.740** (2.477)	4.664* (2.574)
constant	1.795*** (0.657)	1.756*** (0.666)	0.062 (0.347)	0.025 (0.344)	0.106 (0.312)	0.117 (0.314)	-0.060 (0.328)	-0.114 (0.325)	0.008 (0.217)	0.030 (0.219)
R^2	0.255	0.251	0.183	0.181	0.382	0.384	0.305	0.316	0.276	0.274
N	156	156	156	156	156	156	156	156	156	156

Notes: OLS estimates of the coefficients of equation 1 in columns "all surp." and of equation 2 in columns "media surp.". *1-month surprise, all* (*1-year surprise, all*) correspond to all financial monetary policy surprises as measured by the high-frequency change in the OIS 1-month (OIS 1-year) around the press release (press conference) window. *1-month surprise, media* and *1-year surprise, media* are only those surprises appearing as consistent Le Monde's report. (Continued on the second part of the table.)

Table 1: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*second part*)

Variable	Services-prices		Constr.-employment		Constr.-prices		Consumers-prices		Consumers-eco	
	all surp. (11)	media surp. (12)	all surp. (13)	media surp. (14)	all surp. (15)	media surp. (16)	all surp. (17)	media surp. (18)	all surp. (19)	media surp. (20)
1-month surprise, all	-0.071 (0.055)		0.035 (0.117)		0.124 (0.148)		-0.170 (0.199)		0.162 (0.136)	
1-year surprise, all	0.040 (0.028)		0.083 (0.054)		0.160*** (0.059)		-0.117 (0.127)		-0.028 (0.079)	
1-month surprise, media		0.066*** (0.023)		0.105*** (0.022)		-0.098* (0.055)		-0.003 (0.103)		0.276*** (0.033)
1-year surprise, media		0.032 (0.033)		0.067 (0.083)		0.213** (0.091)		0.111 (0.133)		-0.191*** (0.069)
Dummy oct 2008	-2.817*** (1.012)	-0.356 (0.586)	-3.768* (2.087)	-2.600*** (0.973)	-5.626** (2.779)	-9.015*** (1.274)	2.602 (3.990)	7.359*** (2.113)	2.407 (2.642)	2.870*** (0.680)
Dummy nov 2008	-1.916** (0.852)	-2.661*** (0.516)	-8.637*** (1.794)	-7.885*** (0.294)	-6.786*** (2.241)	-4.615*** (0.800)	3.659 (3.951)	0.619 (3.460)	2.062 (2.224)	4.423*** (0.645)
Dummy dec 2008	-3.336*** (0.442)	-3.275*** (0.433)	-1.159* (0.659)	-0.730 (0.545)	-4.587*** (1.122)	-3.741*** (1.134)	4.142** (1.680)	3.103* (1.796)	-4.142*** (0.719)	-3.954*** (0.561)
Serv. dem. FR, backw.	0.085* (0.051)	0.086* (0.051)								
Const. emp. FR, backw.			0.291*** (0.045)	0.296*** (0.046)	0.205*** (0.057)	0.219*** (0.061)				
Cons. price FR, backw.							0.221 (0.175)	0.203 (0.176)		
Cons. eco. FR, backw.									0.956*** (0.082)	0.943*** (0.081)
<i>Lasso selected controls:</i>										
Eurostoxx change	7.095*** (2.642)	8.093*** (2.710)								
Unemp. EA, lag chge			-6.659*** (2.143)	-6.567*** (2.209)						
CEPR eco index, lag chge					7.514** (3.243)	6.762** (3.409)				
Unemp. FR, lag chge					-7.646** (3.861)	-7.214* (3.967)				
Lag dependent							-0.185 (0.139)	-0.191 (0.144)	-0.145** (0.057)	-0.140** (0.057)
Oil price change							15.348*** (5.738)	15.288*** (5.836)		
constant	-0.001 (0.145)	-0.017 (0.146)	0.034 (0.237)	0.027 (0.239)	0.181 (0.293)	0.130 (0.294)	-0.273 (0.395)	-0.274 (0.405)	0.078 (0.282)	0.141 (0.283)
R^2	0.175	0.166	0.322	0.316	0.307	0.298	0.145	0.135	0.591	0.599
N	156	156	156	156	143	143	156	156	156	156

Notes (continued): Control variables indicated after "*Lasso selected controls*" are selected each time with a Lasso procedure and are detailed in Table 6. Other variables are defined in Table 7. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

The following five points summarize the key results (which are later subjected to a series of robustness checks):

- (1) When all monetary policy surprises are used for the surprises in the immediate monetary policy stance (**1-month surprise, all**), the coefficient associated to the corresponding variable is never statistically significant (columns (1), (3), (5), (7), (9), (11), (13), (15), (17), (19)).
- (2) In contrast, the above-mentioned coefficient is statistically significant each time we select those monetary policy surprises that are consistent with the media report (**1-month surprise, media**), as can be seen in each second column of the estimates for each sector (except for consumers' price expectations).
- (3) There is not much of an effect of media-consistent surprises in the future monetary policy stance (**1-year surprise, media**). Only for three pairs (out of 10) do these appear linked to expectations in a statistically significant way (industry-production in column (2), construction-prices in column (16), consumers-economic in column (20)). For all of these but consumers, the consistency of the media report is not key for the link to statistically arise, although the coefficient is of stronger magnitude each time in the case of a consistent media report.
- (4) Surprising loosening of the immediate monetary policy stance (negative surprises) are always found to decrease economic expectations, with a strongly statistically significant coefficient.
- (5) For price expectations, we also mostly find that a surprising loosening increases price expectations. This is the case for all sectors, except for services where the effect is opposite (column (12)). We note also that the statistical significance of the coefficient of our variable of interest is usually lower when we deal with price expectations, as compared to when we deal with economic expectations.

These results can be put in perspective with the conclusions of previous studies. The fact that we do not find any effect of monetary policy surprises broadly defined (point (1)) is in itself consistent with the observation of Coibion et al. (2019) that *"firms and households seem unresponsive to central bank announcements"* and with the conclusions of Lamla & Vinogradov (2019) for households or Enders et al. (2019) and Kirchner (2020) for firms in their baseline estimates.

However, point (2) suggests that the absence of response is simply due to the fact that not all monetary policy surprises are monetary policy surprises for households and firms: media-consistent monetary policy surprises do affect households' and firms' expectations. One may draw two relevant conclusions from this result. The first is that the media treatment of monetary policy announcements is key. The second is that firms and consumers do respond to monetary policy announcements in a linear way. This latter result is truly new to the literature dealing with firms' expectations: to our knowledge no such highly statistically significant linear effect has been found in past studies for firms. For households, the results may seem to corroborate those of Lewis et al. (2019) who find an effect of interest rate surprises on households' economic expectations. However, as we pointed out before, one cannot preclude that the few interest rate surprises identified by Lewis et al. (2019) in their sample period share similar characteristics with respect to media coverage to the surprises that appear to matter in our estimates.¹⁸

The absence of a clear response to surprises in the future monetary policy stance (point (3)) may simply mean that households and firms are generally more responsive to acts than to words. In other words, actual interest rate decisions may matter more than communications on hypothetical future changes. There is however a nuance to put to this proposition, in that consumers' economic expectations do seem to react to long-term surprises, with a sign consistent with standard macroeconomic theory. That in turn suggests that consumers respond in different ways to different kinds of monetary policy communications.

The positive relationship between short-term monetary policy surprises and economic expectations (point (4)) is in line with the results found in Nakamura & Steinsson (2018) or Campbell et al. (2012) for professional forecasters' expectations and with the sign obtained in Enders et al. (2019) or Kirchner (2020) for firms. For price expectations, we mostly find a sign in link with standard macroeconomic theory, though not always. Note also that the absence of a contemporaneous response of households' price expectations to monetary policy announcements (columns (17) and (18)) is similar to what is found in all studies we previously mentioned, namely Claus & Nguyen (2020) and Lamla & Vinogradov (2019).

¹⁸Investigating more deeply this possibility, we could find general newspapers consistently reporting Lewis et al. (2019)'s biggest negative surprise (December 2008) as a "surprising cut" and some general media consistently reporting their second biggest surprise. The latter arose in September 2008, two days after Lehman Brothers' collapse, when the Fed refused to decrease rates in a context of high financial stress. Taking the general-media CNBC, we could find two articles focusing on the Fed decision, both clearly conveying disappointment about the rate decision. One quotes an analyst saying that "*some Fed governors are on another planet*" while the other starts by saying that the Fed decision on interest rates was a "*disappointment to investors*". Many media reports that day however seem to focus on the financial stability measures of the Fed and the financial risks stemming from Lehman's bankruptcy.

5.2 Other countries

In appendix 8.2 on Tables 8, 9 and 10, we repeated our baseline estimates respectively for Germany, Italy, and Spain. Such an exercise implicitly assumes that media-consistent monetary policy surprises identified using Le Monde are also surprises in the general newspapers of these other countries. That may arguably be a strong assumption that should warrant some degree of caution in interpreting the results, though the reader may recall that we took precautions to avoid capturing a potential unilateral interpretation from Le Monde.¹⁹

We see on the relevant tables that the above-mentioned points (1), (2), and (3) mostly hold also for other countries. Monetary policy surprises broadly defined do not appear to be significantly linked to expectations for all sectors and expectation indexes in all countries (point (1)), except in three cases.²⁰ Given that in total this makes three cases out of 40 pairs tested, this clearly appears as an exception rather than the rule. Point (2) also holds for almost all sectors in all countries: media-consistent short-term monetary policy surprises are almost always significantly linked to expectations. In our 30 new estimates, there are only four pairs for which this is an exception.²¹ For each country, firms in the industrial sector and consumers are always found to respond to monetary policy announcements with a highly statistically significant coefficient, with no exception. Point (3) is also confirmed: once again surprises in the future monetary policy stance are rarely found to matter. They matter only in four of our 30 new estimates, for firms only (services prices in Germany, industry prices in Italy and Spain, and construction prices in Spain). Each time the coefficient is always with the same sign as the one found for firms' expectations

¹⁹One may indeed argue that media reports on monetary policy announcements in these countries may differ from media reports in France because of country-specific concerns. For example, one may argue that the media treatment of monetary policy events may differ in Germany or in Italy in our sample period, on the grounds that unconventional monetary policies were often criticized in Germany and often eagerly awaited in Italy. It remains an open question however whether this should also apply to the treatment of monetary policy surprises. While we cannot completely eliminate such concerns, we recall that we previously systematically checked that Le Monde's interpretation in the case of a media-consistent surprise was consistent with the one of The Financial Times. That aimed to remove any potential unilateral interpretation from Le Monde.

²⁰There are only two exceptions for firms: services demand in Italy (Table 9, column (9)) and in Spain (Table 10, column (9)). In these two cases however the coefficient associated with media-consistent surprises is also significant and extremely close from the one associated with the variable taking into account all surprises. For consumers, the only exception is Italy, where consumers' economic expectations seem to respond to monetary policy surprises broadly defined (Table 9, column (19)). The related coefficient has however a magnitude about two times smaller than the coefficient associated with media-consistent monetary policy surprises and is less statistically significant, still suggesting an important role of the media report.

²¹These are retail demand and construction prices in Germany (Table 8, columns (6) and (16)), services prices in Italy (Table 9, columns (12)), and construction employment in Spain (Table 10, column (14)). The expectations of the construction sector seemed also to be less responsive in France, having either the lowest response in magnitude (for economic expectations) or the lowest degree of statistical significance (for price expectations): it may thus be that these results indicate that the construction sector is less responsive in general to monetary policy surprises.

in France when we did find a statistically significant relationship (positive). That suggests that firms do not all respond to surprises on the future monetary policy stance, but that those doing so respond homogeneously in terms of direction.

In terms of the sign of the coefficient of our key variable (point (4) and (5)), some heterogeneity clearly appears across countries and across sectors. For example, consumers now strongly respond to positive monetary policy surprises in Spain and Italy by decreasing their economic expectations (column (20) of tables 10 and 9).²² Firms in Italy and Germany almost systematically increase their economic expectations following a negative monetary policy surprise, while the opposite is observed in Spain, which is closer to France in this respect. Regarding price expectations, when the coefficient is statistically significant for firms, it is most of the time positive. As for France, we observe that the statistical significance of the coefficient of our variable of interest is usually lower when we deal with price expectations compared to when we deal with economic expectations. In Germany for example, none of the coefficients is statistically significant at the 1% level when the dependent variable relates to firms' price expectations.

These estimates for different countries also allow us to make interesting observations based on the magnitude of the coefficients. We can see for example that for the same monetary policy surprises, economic expectations of consumers in Germany react with a magnitude that is about 22 times smaller than the magnitude observed for Italy and about six times smaller than the magnitude observed for Spain (column (20) of each corresponding table). We see also that firms in Italy tend to respond much more strongly to immediate monetary policy surprises than firms in Germany. The magnitude of the relevant coefficient is also always substantially higher in Spain as compared to Germany for price expectations. This may suggest that monetary policy announcements are perceived as much less important by households and firms in Germany than they are in Italy and Spain.

Overall, the results confirm the key result we obtained for France, namely that media-consistent monetary policy surprises in the immediate monetary surprises do matter for consumers' and firms' expectations. In what follows, we will test the robustness of this result. The results also suggest that the sign of the response to monetary policy surprises is sector- and country-dependent. It is thus likely that particular economic and cultural contexts matter more for the response of expectations to monetary policy announcements than what a mere economic textbook interpretation may induce one to posit. In what follows, we will still consider and test for other potential advanced economic explanations that could explain the positive coefficient recurrently found for France.

²²The same response is observed in Germany, though the statistical significance observed for the coefficient is lower and its magnitude is extremely small as compared to Spain and Italy.

6 Robustness and interpretation

6.1 Does our key result reflect news not taken into account by market participants?

The recent analysis of Bauer & Swanson (2020) questions the exogeneity of the monetary policy surprise measure in related frameworks. The authors argue that monetary policy surprises can be correlated with economic news available prior to the monetary policy announcements, in the case when financial markets have a wrong view of the reaction function of the central bank to news. In that case, financial markets may for example expect an interest rate that is lower than the one later decided by the central bank, in response to positive news. One may thus see both a positive monetary policy surprise as we measured it here and an increase in economic expectations, exactly as what we always find here for France. The authors convincingly show that, once the latest news are taken into account, the monthly positive statistical relationship between monetary policy surprises and professionals' economic forecasts revisions that has been documented in Nakamura & Steinsson (2018) and Campbell et al. (2012) completely disappears: it either becomes insignificant or it changes sign. Though we are not dealing with professional forecasts, and despite the fact that all our estimates included controls for the perceived change in the economic situation as compared with the previous months (in contrast with Campbell et al. (2012) or Nakamura & Steinsson (2018)) that may already take into account such concerns, one may question whether this also applies to our analysis. We thus adapt the specification of Bauer & Swanson (2020) to our analysis. In particular, we re-estimate our model for each variable of interest, by considering each time the following control variables:

- the unemployment figures or CPI inflation flash estimates release for the euro area (change with respect to the previous release)
- the change in the CEPR / Banca d'Italia real time economic activity index for the euro area (*e-coin*).
- the change in the (log of the) Eurostoxx 50 from one quarter prior to the monetary policy announcement to the day before the announcement.

Unemployment figures are taken as a euro area equivalent to the non-farm payroll figures used in Bauer & Swanson (2020) for the US. We use it for economic expectations, and we use the CPI inflation flash estimates release for price expectations. These two have the important advantage

of usually coming at the beginning of the month, often during the week of the press conference.²³ The second variable intends to substitute Bauer & Swanson (2020)'s business cycle indicator for the US, which has no exact equivalent in the euro area to our knowledge. As the index used in Bauer & Swanson (2020), the CEPR / Banca d'Italia economic activity index incorporates information from a wide range of macroeconomic data to come up with a single measure of current economic activity, preceding official GDP releases. Insofar as we only considered in our sample press conferences arising at the beginning of the month, the lag for this variable is taken.²⁴ The third variable is taken as an equivalent to Bauer & Swanson (2020)'s US stock market index.²⁵

The results in Table 2 show that our baseline result does not disappear when we account for the arguments raised by Bauer & Swanson (2020). In fact, none of our coefficients sees its sign change, while Bauer & Swanson (2020) show sign changes for about half of the estimates they performed. Few coefficients lose their significance: for coefficients related to expectations about economic activity, it's only the case for retail demand expectations, and for coefficients related to price expectations, it is the case for services and construction-price expectations (which was significant at the 10% level beforehand). The others all remain highly significant. The new controls usually do not appear significant, confirming our initial choice for control variables. It is worth noting that their inclusion despite the fact that they are not significant potentially also affected the standard errors of the other coefficients.

Overall, this analysis confirms our baseline results. The fact that monetary policy surprises and economic expectations remain positively linked suggests that the presence of informational effects cannot be ruled out in our case, which we will investigate deeper in what follows.

²³Several times, the CPI inflation flash estimate comes at the very end of the month: in these cases we just consider this value as if it belonged to the next month. In some rare cases (four times for the unemployment surprises, two times for the flash estimates), the data release comes a few days after the press conference. We still keep that data in our regression.

²⁴This is also relevant in that firms' and consumers' expectations are also used to build this index, so that including its contemporaneous value would be problematic for our estimates.

²⁵Bauer & Swanson (2020) take the percentage change in the S&P 500 from one quarter (13 weeks) prior to the monetary policy announcement to the day before the announcement, claiming that this measure helps better explain professional forecasts. For the sake of consistency, we thus chose the same specification.

Table 2: Estimates, Bauer-Swanson controls

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	prices (9)	eco (10)
1-month surprise, media	0.155*** (0.057)	-0.341*** (0.070)	0.040 (0.059)	-0.365*** (0.062)	0.252*** (0.039)	0.017 (0.024)	0.065** (0.032)	-0.037 (0.051)	-0.267*** (0.085)	0.251*** (0.065)
1-year surprise, media	0.132** (0.058)	0.040 (0.135)	0.032 (0.062)	0.087 (0.083)	0.069 (0.049)	0.023 (0.035)	0.058 (0.082)	0.237** (0.093)	0.133 (0.122)	-0.229*** (0.080)
Dummy oct 2008	-7.289*** (0.752)	-7.415*** (1.451)	-7.903*** (0.973)	4.118*** (1.392)	-0.820 (0.632)	-1.267*** (0.375)	-2.700*** (0.923)	-7.530*** (1.212)	4.024*** (1.476)	2.463*** (0.913)
Dummy nov 2008	-6.961*** (0.901)	-3.674** (1.423)	3.724*** (1.088)	-16.899*** (1.813)	-0.688 (0.833)	-2.423*** (0.488)	-7.138*** (0.994)	-5.503*** (1.268)	-3.717* (2.072)	5.963*** (0.980)
Dummy dec 2008	-6.118*** (1.029)	0.586 (2.354)	-5.601*** (1.217)	6.062** (2.795)	1.062 (1.027)	-1.723** (0.871)	-0.256 (1.002)	-5.698*** (1.999)	8.117*** (2.630)	-4.914*** (1.225)
Ind. prod. FR, backw.	0.068 (0.056)	0.033 (0.083)								
Retail dem. FR, backw.			0.290*** (0.038)	-0.078 (0.053)						
Serv. dem. FR, backw.					0.225*** (0.081)	0.086 (0.055)				
Const. emp. FR, backw.							0.281*** (0.047)	0.248*** (0.063)		
Cons. price FR, backw.									0.128 (0.161)	
Cons. eco. FR, backw.										0.907*** (0.084)
<i>Bauer & Swanson (2020) controls:</i>										
Unemp. release, chge	219.590 (175.740)		-246.216 (210.063)		88.791 (127.277)		-206.526 (137.180)			-1.421 (195.335)
Flash CPI release, chge		373.779** (167.314)		55.097 (189.422)		53.796 (71.282)		-70.512 (124.068)	524.865*** (189.943)	
CEPR eco index, lag chge	4.788 (4.144)	7.542 (4.646)	4.338 (4.064)	7.171 (4.927)	1.731 (2.459)	-0.745 (2.182)	3.968* (2.312)	5.346 (4.221)	2.486 (6.616)	4.571 (3.912)
Eurostoxx change, B-S	4.276 (3.681)	1.119 (4.261)	4.448 (3.702)	2.548 (4.161)	9.536*** (2.734)	5.589*** (1.796)	2.073 (3.624)	0.827 (3.678)	4.974 (6.900)	-1.652 (3.643)
constant	0.191 (0.299)	0.001 (0.366)	0.127 (0.319)	-0.108 (0.342)	0.024 (0.221)	-0.014 (0.144)	-0.079 (0.242)	0.042 (0.299)	-0.096 (0.428)	0.125 (0.296)
R^2	0.206	0.100	0.408	0.223	0.284	0.186	0.309	0.273	0.108	0.585
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 2, where the set of controls X_2 now corresponds to controls inspired from Bauer & Swanson (2020). "Unemp. release, chge" is the change in the unemployment figures released for the euro area with respect to the last month, "Flash CPI release, chge" is the change in the Flash CPI figures released for the euro area with respect to the last month, "Eurostoxx change, B-S" is the change in the Eurostoxx index between the day before the monetary policy announcement and three months before. For the definition of the other variables see Table 1. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

6.2 Do our results reflect unobserved heterogeneity?

Another possibility is that our results could reflect the omission of variables neither selected by the LASSO procedure nor present in Bauer & Swanson (2020)'s specification, which would appear to particularly weigh on expectations for the dates when we have monetary policy surprises. It is difficult to see which variables could have been omitted since in the specifications tested until now several variables accounting for the latest news were included (e.g. the change in the stock market index and the CEPR real time activity index). Still, one may suspect that unobserved heterogeneity could be at work. We address the above concern in two different ways.

First, we estimate equation (2) taking as a dependent variable investors' sentiment on future economic activity in the euro area taken from Sentix, accessed from Reuters Eikon. This index is built from a survey of a large panel of private and institutional investors, reporting their views on the development of economic activity in the euro area for the next six months, with higher values expressing more optimism.²⁶ Our assumption is the following: if substantial unobserved heterogeneity stemming from influential factors would be the main reason for our results, this unobserved heterogeneity would arguably be also present for investors' expectations. In that case, we would obtain a similar positive and statistically significant relationship between media-consistent surprises and economic expectations for investors. If we were to find such a positive relationship, we would still be unable to conclude whether this relationship would reflect the impact of monetary policy surprises or the impact of unobserved heterogeneity. However, if we were to find a negative coefficient, it would be difficult to understand why unobserved factors would weigh in one direction for firms' and consumers' expectations and in another direction for investors' expectations.

In column (1) of Table 3, we present estimates from specification 2 with our basic set of controls X_1 , and in column (2) we present the estimates from the same specification adding the controls suggested by Bauer & Swanson (2020) when dealing with well-informed agents. In each case, we find that investors' economic expectations are negatively associated with the media-consistent monetary policy surprises in the immediate monetary policy stance. This completely contrasts with what was found in France for firms and consumers, and is now in line with what would be expected from standard macroeconomic theory. Interestingly too, the results suggest that financial investors also do respond to surprises in the future monetary policy stance, also in the way that would be

²⁶In the absence of a known alternative, this index is particularly attractive to us in that it is the only one we are aware of that directly surveys financial investors on the economic situation in the euro area. Another relevant feature for our case is that it shares a high correlation with the data on economic expectations for firms in the euro area (for most sectors, the correlation is at least 50%).

expected from standard macroeconomic theory, the associated coefficient being negative. Overall, this first result supports that our initial results are not plagued by unobserved heterogeneity.

Second, we repeat the same estimates but further include a dummy variable taking a value of 1 for each month where we identified a media-consistent monetary policy surprise in the immediate monetary policy stance. In effect, we thus separately add the variable MT_t^{short} to the regression in specification 2. Our underlying assumption in specification 2 was that there was no specific information present from MT_t^{short} in itself, meaning that what was relevant was the monetary policy surprise only. However, if a negative factor that we omitted would weigh on expectations at the same time as a monetary policy surprise and be responsible for our effect instead of the surprise, the inclusion of the dummy MT_t^{short} would likely make the statistical significance of our monetary policy surprises vanish, while only the coefficient of MT_t^{short} would be significant. By including the MT_t^{short} variable into the regression, we scrutinize such a case. A drawback of this approach is that the correlation between the MT_t^{short} dummy and our initial variable by construction may lead to unobserved statistical significance for both variables. To avoid drawing the wrong conclusions, we perform Wald tests of joint significance and also run such a regression for our investor-economic-sentiment variable. The results are reported in Tables 3 (the last five columns of the first part of the table).

As can be seen, there is no case in which only the coefficient associated with the dummy variable is statistically significant while the coefficient associated with the monetary policy surprise is not. That suggests that the dummy variable is never statistically seen as more relevant than the monetary policy surprise variable. As one can expect with the high correlation between the two variables, in five cases the coefficient associated with the monetary policy surprise loses its significance, but in all these cases the coefficient associated with the dummy variable does similarly. Wald tests of joint significance performed separately suggest that in all of these cases, the hypothesis that the coefficients are jointly equal to zero can clearly be rejected, except for the case of construction prices expectations (which was previously not found to be robust). The coefficient associated with media-consistent monetary policy surprises sees its significance remain for industry price expectations, retail demand expectations, retail prices expectations, and consumers' price and economic expectations, despite the presence of the dummy variable, indicating that it contains more relevance than the dummy variables. We note also that for investors, the dummy variable is not significantly related to expectations (column (3)).

Overall, these findings provide support that our results do not reflect the effect of omitted variables.

Table 3: Estimates, investor sentiment, and dummy variable specification (*first part*)

Variable	Investor sentiment eco			Industry		Retail	
	baseline (1)	bauer-swanson (2)	dummy included (3)	demand (4)	prices (5)	demand (6)	prices (7)
1-month surprise, media	-0.308*** (0.064)	-0.037 (0.111)	-0.035 (0.218)	0.143 (0.236)	-0.579*** (0.113)	0.280*** (0.071)	-0.557*** (0.061)
1-year surprise, media	-0.305** (0.149)	-0.262** (0.117)	-0.262** (0.117)	0.154*** (0.049)	0.099 (0.129)	0.064 (0.069)	0.132 (0.084)
Dummy oct 2008	-20.045*** (1.291)	-18.540*** (1.372)	-18.533*** (1.450)	-4.411*** (1.314)	-9.549*** (1.942)	-7.203*** (0.845)	-1.544 (1.556)
Dummy nov 2008	9.059*** (1.603)	9.226*** (2.159)	9.226*** (2.173)	-5.429*** (0.932)	-2.657 (1.803)	1.549*** (0.573)	-13.238*** (1.889)
Dummy dec 2008	9.232*** (1.321)	6.868*** (2.170)	6.868*** (2.187)	-6.960*** (0.510)	-2.361* (1.421)	-8.018*** (0.859)	0.501 (1.990)
Investors eco, bacw.	0.665*** (0.085)	0.712*** (0.082)	0.712*** (0.084)				
Ind. prod. FR, backw.				0.052 (0.056)	0.067 (0.077)		
Retail dem. FR, backw.						0.299*** (0.037)	-0.049 (0.050)
<i>Additional controls:</i>							
Dummy	-	-	0.028 (3.043)	-1.342 (3.291)	-5.750*** (1.339)	2.129* (1.082)	-3.033*** (0.725)
<i>Bauer & Swanson (2020) controls</i>	NO	YES	YES	NO	NO	NO	NO
<i>Lasso selected controls</i>	NO	NO	NO	YES	YES	YES	YES
constant	-0.004 (0.481)	-0.222 (0.452)	-0.222 (0.458)	1.817*** (0.672)	0.101 (0.347)	0.091 (0.319)	-0.078 (0.327)
R^2	0.397	0.460	0.529	0.252	0.200	0.386	0.321
N	143	143	143	156	156	156	156

Notes: OLS estimates of the coefficients of equation 2, where in column (1) only the set of controls X_1 is considered, in columns (2) and (3) the set of controls X_2 is added and corresponds to controls inspired from Bauer & Swanson (2020), in columns (4), (5), (6), and (7) the set of controls X_2 corresponds to the controls selected through the Lasso Procedure. "Investors eco, bacw." is the change in the backward-looking index for investors, proxied by the Sentix index for investors' perceptions on the current economic situation. "Dummy" is a dummy variable taking a value of 1 for each month where we identified a media-consistent short-term monetary policy surprise. For the definition of the other variables see Table 1. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

Table 3: Estimates, dummy variable specification (*second part*)

Variable	Services		Construction		Consumers	
	demand (8)	prices (9)	empl. (10)	prices (11)	prices (12)	eco (13)
1-month surprise, media	0.281 (0.181)	0.064 (0.077)	-0.096 (0.188)	-0.053 (0.108)	0.206* (0.113)	0.300** (0.116)
1-year surprise, media	0.070 (0.045)	0.032 (0.033)	0.069 (0.084)	0.212** (0.091)	0.106 (0.134)	-0.191*** (0.069)
Dummy oct 2008	0.744 (1.137)	-0.363 (0.614)	-3.505*** (1.193)	-8.806*** (1.321)	8.351*** (2.162)	2.980*** (0.876)
Dummy nov 2008	-0.340 (0.884)	-2.661*** (0.518)	-7.898*** (0.295)	-4.610*** (0.803)	0.867 (3.500)	4.417*** (0.651)
Dummy dec 2008	-0.167 (0.779)	-3.275*** (0.434)	-0.731 (0.548)	-3.734*** (1.137)	3.283* (1.825)	-3.945*** (0.568)
Serv. dem. FR, backw.	0.209*** (0.080)	0.086* (0.052)				
Const. emp. FR, backw.			0.293*** (0.046)	0.220*** (0.061)		
Cons. price FR, backw.					0.207 (0.177)	
Cons. eco. FR, backw.						0.945*** (0.086)
<i>Additional controls:</i>						
Dummy	-0.409 (2.528)	-0.026 (1.094)	-2.687 (2.677)	0.608 (1.371)	2.804*** (0.772)	0.330 (1.791)
<i>Lasso selected controls</i>	YES	YES	YES	YES	YES	YES
constant	0.035 (0.220)	-0.017 (0.148)	0.064 (0.240)	0.122 (0.298)	-0.314 (0.410)	0.138 (0.286)
R^2	0.275	0.166	0.323	0.299	0.138	0.599
N	156	156	156	143	156	156

Notes: Estimates of the coefficients of equation 2, where the set of controls X_2 corresponds to the controls selected through the Lasso Procedure and is thus similar to the ones present in Table 1. "Dummy" is a dummy variable taking a value of 1 for each month where we identified a media-consistent short-term monetary policy surprise. For the definition of the other variables see Table 1. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

6.3 Direction of the effect: do we capture an informational effect?

Until now we have focused on the statistical significance of the media-consistent monetary policy surprises variables in the corresponding regressions. We now focus on the direction of the effect. In many of our previous estimates, the results indicate an association between monetary policy surprises and agents' expectations, which is typical of so-called "*information shocks*": a positive monetary policy surprise is associated with higher economic expectations.²⁷ The previous estimates have furthermore ruled out any "ECB response to news" explanation advanced in Bauer & Swanson (2020) to explain such a positive coefficient. Do our results then reflect an impact of central bank "*information shocks*" on agents' expectations?

To answer that question, we distinguish between "*pure monetary policy shocks*" and "*information shocks*", as done in Jarociński & Karadi (2020). The authors classify monetary policy surprises that are accompanied by movements in the stock market index in the same direction as "*information shocks*", while "*pure monetary policy shocks*" refer to those co-moving negatively with the stock market index. They build two measures: (i) the so-called "poorman proxy" is obtained from a simple classification based on the sign of the correlation and (ii) the second one is obtained from the posterior mean of their shocks in the Bayesian VAR they estimate.

Using their data, a first observation that arises is that only one of the dates in which we identified media-consistent monetary policy surprises in the immediate monetary policy stance is classified as an "*information shock*" by the "poorman proxy" measure. Furthermore, this data corresponds to a monetary policy surprise happening during the 2008 crisis, for which we added a dummy in the initial regression in order to avoid our results being driven by this external event. All other dates in which we identified media-consistent monetary policy surprises in the immediate monetary policy stance do not correspond to "*information shocks*" from Jarociński & Karadi (2020)'s "poorman proxy" measure. The second measure of the authors also comes with a sign opposite of the sign of our monetary policy surprise in all these latter cases, suggesting an effect inverse to the one we measure. Overall, these observations cast doubt that our results would reflect an "informational effect".

We still chose to dig deeper into this potential information channel by repeating our baseline estimates, considering the following model:

$$\Delta Y_t = \alpha_3 + \beta_3 MP_t^{monopol} * MT_t^{monopol} + \phi_3 MP_t^{information} * MT_t^{information} + \gamma_3 X_t \quad (3)$$

²⁷The advocated reason is that agents react primarily to the information on the economy conveyed through the central bank meeting and decision (in case of tightening, that the economy is getting stronger).

The new key variables here are MP_t^{monpol} , the "*pure monetary policy shocks*", and $MP_t^{information}$, the "*information shocks*", taken from Jarociński & Karadi (2020). We use their measure computed from posterior means, as it is arguably more precise and captures the fact that monetary policy surprises can contain both a "pure monetary policy" and an "informational" component. Note that these are built from the surprise in the 3-month OIS, as the authors do not distinguish between surprising changes in the immediate monetary policy stance from those in the future stance, probably based on the fact that both can contain information on the future economic outlook relevant to build their "information shocks". For each of these shocks, we repeat the methodology that we implemented previously. That is, we code for each "*pure monetary policy*" shock whether or not they are consistently reported as monetary policy surprises by the media, and for each "*information shock*" whether or not they are consistently reported as information surprises in the media.

For that, we consider that the media consistently reports an "information surprise" when a substantial part of one of the media articles refers to changes in economic forecasts or to more optimism/pessimism on the economic outlook stemming from the central bank communication.²⁸ In that case, we assign a value of 1 to the dummy variable $MT_t^{information}$. Reading from media reports, many important information shocks reported by Jarociński & Karadi (2020) are associated with surprises in the ECB communication on whether or not to consider or modify asset purchases programs in the period 2010-2014, triggering worry or optimism. We show them as "media-consistent surprises" in the below figure when they appear as such, but do not consider them in $MT_t^{information}$ in the below estimates because of their specific nature.²⁹

In Figure 3 we present the "information" and "pure monetary policy" shocks; the shocks consistently reported in the media appearing in red. Once again, we observe that most surprises identified by the financial measure do not appear as consistent with the media report. In total, only about 16% of the "information shocks" appear consistently reported as such in the media. In several cases, the "information shocks" appear to be totally inconsistent with Le Monde's report. For the sake of brevity we provide a detailed discussion on these inconsistencies in Appendix 8.3.

²⁸In further estimates, we considered a wider coding criteria: each time we could see that the overall economic outlook information present in the media article was consistent with the sign of the information shock, we attached a value of 1 to $MT_t^{information}$, even if this was just a single sentence at the end of the article. Coding this way led us to the same conclusions (results available on request).

²⁹Their inclusion only made the picture worsen: ϕ_3 was statistically significant at the 10% level only twice, coming only once with the expected sign (for the pair construction-prices). The results are available on request.

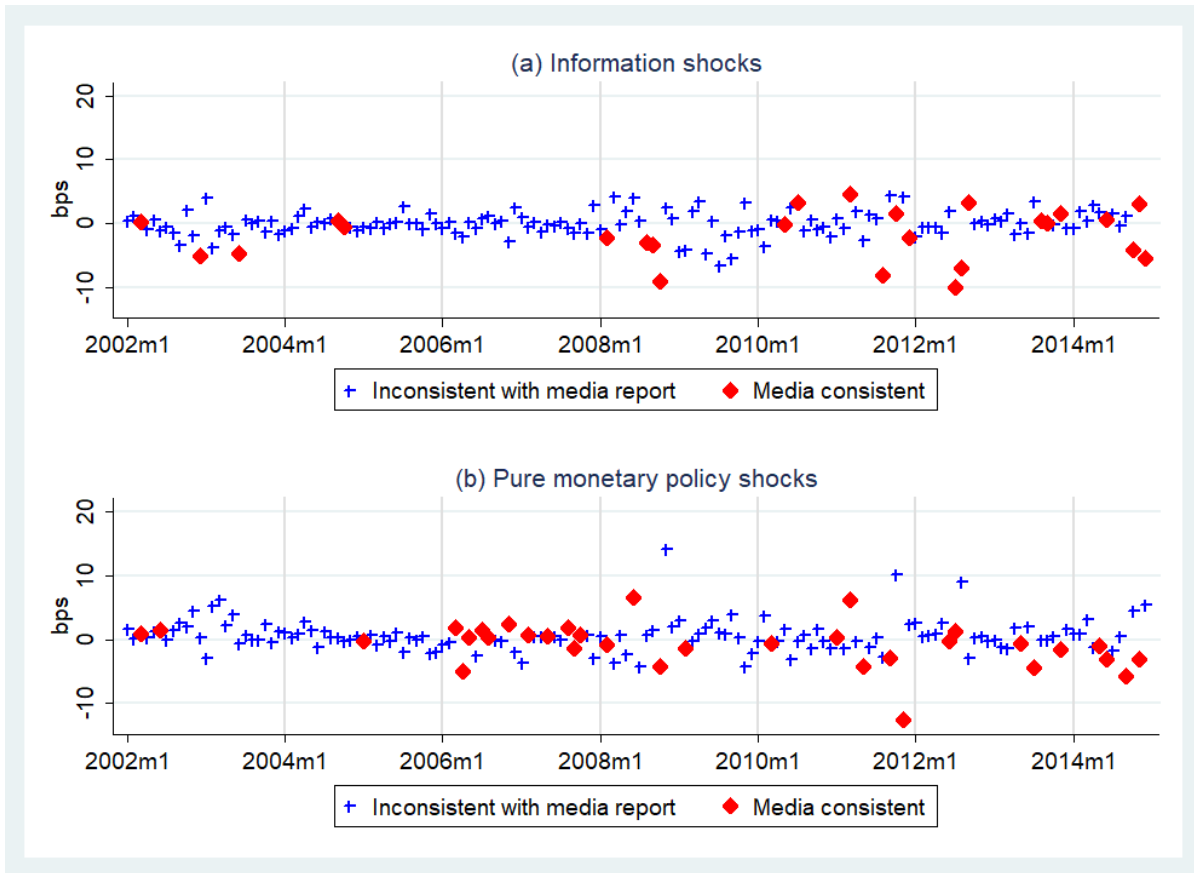


Figure 3: Information and monetary policy shocks from Jarociński & Karadi (2020), inconsistently (blue) versus consistently conveyed as such by Le Monde (red)

Notes: Panel (a) shows the "information shocks" from Jarociński & Karadi (2020), computed from the posterior mean of their shocks; panel (b) shows the "pure monetary policy shocks" from the same paper. For each panel, the shocks that appeared as consistent with the content of the reports from Le Monde (i.e. Le Monde reporting a change in economic forecasts or conveying optimism/pessimism on the economic outlook as a result of the central bank communication -for panel (a)-, or reporting a surprising decision/tone on the monetary policy stance -for panel (b)-, in the direction indicated by the shock) appear in red, the others appear in blue. The sample period is 2002:m1 - 2014:m12.

Results are presented in Table 4. The set of control variables (X_t) used corresponds to X_1 as well as the controls suggested by Bauer & Swanson (2020) in the specific context of information shocks. We observe that only in three cases out of ten do the media-consistent information shocks appear significantly related to expectations. It is the case for industrial production (column (1)), retail prices (column (4)) and construction prices (column (8)). In all of these, the coefficient appears with the expected sign: positive information surprises lead agents to increase their economic or

price expectations. The statistical significance is however relatively low.³⁰ Overall, these results show at best weak evidence that informational effects matter in our context of non-financial agents' expectations.

³⁰Media-consistent "pure monetary policy shocks" from Jarociński & Karadi (2020)'s measure are not found to matter, except in the case of services, but not with the expected sign. This is not surprising given that the measure mostly encompasses surprises related to the communication on the future monetary policy stance, which we mostly found not to matter.

Table 4: Estimates, information versus pure monetary policy shocks

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	demand (7)	prices (8)	prices (9)	eco (10)
Information shocks, media	0.412* (0.246)	0.472 (0.500)	-0.387 (0.396)	0.768* (0.422)	-0.045 (0.205)	0.043 (0.105)	0.103 (0.165)	0.489* (0.252)	0.438 (0.345)	-0.211 (0.162)
Pure MP shocks, media	0.139 (0.119)	0.061 (0.272)	-0.044 (0.135)	-0.218 (0.178)	0.252*** (0.080)	0.068 (0.052)	0.023 (0.109)	0.086 (0.139)	0.162 (0.240)	-0.296 (0.275)
Dummy oct 2008	-6.924*** (2.173)	2.482 (4.604)	-12.373*** (3.519)	15.599*** (3.862)	-5.193*** (1.831)	-1.129 (0.888)	-3.347** (1.639)	-4.396* (2.241)	11.951*** (2.972)	-2.761* (1.619)
Dummy nov 2008	-6.975*** (0.893)	-3.892*** (1.371)	3.944*** (1.114)	-16.964*** (1.643)	-0.697 (0.841)	-2.454*** (0.491)	-7.109*** (0.995)	-5.330*** (1.301)	-4.036* (2.087)	5.891*** (0.988)
Dummy dec 2008	-6.158*** (1.019)	0.229 (2.273)	-5.416*** (1.243)	5.857** (2.723)	1.091 (1.035)	-1.763** (0.871)	-0.231 (1.004)	-5.587*** (2.078)	7.874*** (2.558)	-4.762*** (1.222)
Ind. prod. FR, backw.	0.078 (0.059)	0.046 (0.085)								
Retail dem. FR, backw.			0.286*** (0.038)	-0.082 (0.050)						
Serv. dem. FR, backw.					0.230*** (0.082)	0.087 (0.055)				
Const. emp. FR, backw.							0.276*** (0.047)	0.226*** (0.061)		
Cons. price FR, backw.									0.112 (0.165)	
Cons. eco FR, backw.										0.932*** (0.083)
<i>Additional controls:</i>										
<i>Bauer & Swanson (2020) controls</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	
constant	0.245 (0.295)	0.100 (0.360)	0.082 (0.316)	-0.016 (0.339)	0.036 (0.220)	0.000 (0.145)	-0.067 (0.246)	0.099 (0.302)	0.014 (0.423)	0.029 (0.293)
R^2	0.208	0.102	0.414	0.240	0.287	0.188	0.308	0.255	0.108	0.577
N	156	156	156	156	156	156	156	143	156	156

Notes: Estimates of the coefficients of equation 3, where the set of controls X_2 corresponds to controls inspired from Bauer & Swanson (2020). "Information shocks, media" are "information shocks" from Jarociński & Karadi (2020), which appear as consistent with the media report, while "Pure MP shocks, media" are the "pure monetary policy shocks" from Jarociński & Karadi (2020), related to either the immediate or future monetary policy stance, which appear as consistent with the media report. For the definition of the other variables see Table 1. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

6.4 Do we capture priming / narrative shocks effects?

Another potential explanation for the positive coefficient we found is that our results simply reflect the "priming" of actors through the media content. Put simply, the tone of the media may

matter more than the exact informational content. If surprise monetary policy easing is associated with a negative tone, that may in itself lead to more pessimistic expectations. The fact that the tone of the media can matter for the economic response to a central bank announcement has been investigated in ter Ellen et al. (2021). The authors show that what they call "narrative shocks" generate reactions in the economy following a central bank announcement similar to the ones of "information shocks", for Norway.³¹ "Narrative shocks" could thus be the underlying channel of our results, explaining the positive response we find.

A problem we face when investigating the "narrative shock" channel is finding a suitable measure. We choose to use the media sentiment index of Picault et al. (2021) for the euro area, which has the great advantage of focusing on media content specifically related to ECB monetary policy. It is built from five international newspapers. Their media sentiment index measures the overall tone (positive versus negative) of the media content on the central bank policy and environment each day from 2004 to 2016. It is extracted from the re-transcription of central bank communications, to focus solely on the sentiment conveyed through journalists' analyses. We use this index and compute the change in the media sentiment on ECB policy between the four days after the press conference (press conference day included) and the four days before the press conference. The resulting series appear in Figure 4.

The key piece of information from Figure 4 is that all but one of our short-term monetary policy surprises are associated with a decrease in media sentiment. This would in itself be rather indicative that the narrative shock channel explanation cannot be ruled out. However, when we repeat our baseline estimates with this indicator instead of the financial surprises (considering the same dummy variables for media-consistency), we do not get conclusive results (Table 5). Only in two cases do we find a positive and strongly significant effect: for the cases of industrial production and consumers' economic expectations. For these two indeed, the interaction of our sentiment shock variable and our dummy for short-term media-consistent monetary policy shock appears positively and very significantly related to expectations (columns (1) and (10)).

³¹The study of Lamla & Lein (2014) also provides informative evidence on this aspect that ought to be mentioned: the authors find that the tone of media reports in Germany matters for inflation expectations, with negatively-toned news deteriorating the accuracy of consumers' expectations.

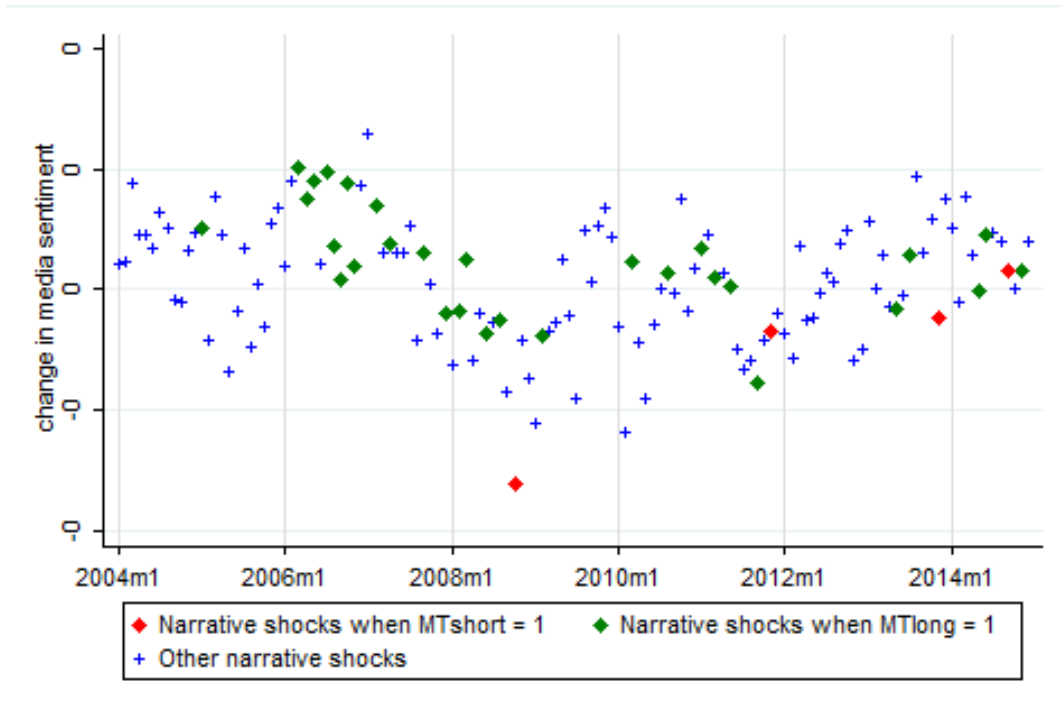


Figure 4: Narrative shocks on ECB-related media content, computed from Picault et al. (2021)

Notes: The graph shows the "narrative shocks" on ECB monetary policy, as proxied by the change in the media sentiment on monetary policy between the four days after the ECB press conference (press conference day included) and the four days before the press conference, using the daily index of Picault et al. (2021). The red diamonds correspond to values when media-consistent short-term surprises occur ($MT^{short} = 1$), while the green diamonds correspond to values when media-consistent long-term surprises occur ($MT^{long} = 1$).

Table 5: Estimates, narrative shocks

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	prices (9)	eco (10)
Narrative shocks * MT_{short}	1535.4*** (410.3)	-487.1 (812.7)	76.8 (853.5)	-188.3 (318.4)	521.2 (318.1)	-1015.8** (510.1)	1022.7* (575.4)	43.0 (370.4)	2.1 (449.7)	1146.0*** (153.0)
Narrative shocks * MT_{long}	-41.8 (106.4)	-147.6 (147.4)	12.4 (102.0)	115.5* (62.8)	-1.9 (109.5)	229.7 (157.4)	47.6 (108.2)	7.1 (126.5)	57.5 (177.7)	-83.5 (202.8)
Dummy oct 2008	14.498** (6.680)	-15.762 (13.421)	-3.710 (13.763)	-3.014 (5.199)	-2.311 (5.107)	-8.467 (8.572)	12.189 (9.504)	-8.410 (6.051)	7.536 (7.687)	16.855*** (2.869)
Dummy nov 2008	-5.267*** (0.928)	-1.998 (1.810)	-0.379 (0.880)	-2.819*** (0.538)	1.579*** (0.580)	-13.349*** (1.839)	-7.917*** (0.290)	-4.523*** (0.766)	0.877 (3.432)	4.272*** (0.672)
Dummy dec 2008	-6.845*** (0.506)	-1.832 (1.443)	-0.051 (0.781)	-3.287*** (0.434)	-8.134*** (0.843)	0.452 (1.983)	-0.807 (0.542)	-3.667*** (1.102)	3.261* (1.787)	-3.892*** (0.539)
Ind. prod. FR, backw.	0.061 (0.056)	0.056 (0.076)								
Retail dem. FR, backw.					0.294*** (0.037)	-0.059 (0.052)				
Serv. dem. FR, backw.			0.208*** (0.080)	0.088* (0.049)						
Const. emp. FR, backw.							0.294*** (0.046)	0.204*** (0.064)		
Cons. price FR, backw.									0.207 (0.177)	
Cons. eco. FR, backw.										0.960*** (0.080)
<i>Lasso selected controls:</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	1.678** (0.659)	0.084 (0.347)	-0.004 (0.226)	-0.075 (0.149)	0.123 (0.319)	-0.196 (0.329)	0.020 (0.240)	0.151 (0.304)	-0.300 (0.411)	0.175 (0.293)
R^2	0.252	0.183	0.257	0.178	0.383	0.318	0.324	0.271	0.132	0.592
N	156	156	156	156	156	156	156	143	156	156

Notes: Estimates of the coefficients of equation 2, considering the "narrative shocks" variable instead of the financial monetary policy surprise variable. The "narrative shocks" variable is built as the change in the media sentiment index on monetary policy (from Picault et al. (2021)) between the four days after the ECB press conference (including the day of the press conference) and the four days before the press conference. It is interacted with MT_{short} (MT_{long}), a dummy variable equal to 1 when a short-term (long-term) monetary policy surprise is consistent with the media report and 0 otherwise. Control variables are the same as in Table 1.

7 Conclusion

In this paper, we have asked whether monetary policy announcements affect firms' and consumers' expectations. This issue is of particular importance for monetary policy effectiveness: for

policy announcements to be effective, theory requires them to impact expectations. However, there is dissonant evidence on the question. The key feature that we incorporated in the analysis of this paper and that distinguishes our analysis from the previous literature is that we have accounted for the media treatment of the monetary policy decision. In line with recent evidence showing that firms and households are largely uninformed on monetary policy, we have chosen a general newspaper, *Le Monde*. We showed that accounting for the media treatment is of key importance, in that very few of the monetary policy surprises stemming from financial market measures appeared as consistent with the media report. In our sample, only about 13% of all monetary policy surprises appeared as consistent with the media report of *Le Monde* on the central bank announcement, and only 16% of the "information shocks" we considered were consistently conveyed as such in the media.

Our results showed that monetary policy surprises do affect firms' and households' expectations, but that the media treatment is key. Only monetary policy surprises consistently appearing as such in the general media were found to affect firms' and consumers' expectations in France. When a general specification not accounting for the media treatment of the monetary policy surprise was used, in line with several previous studies we did not find any effect of monetary policy announcements on firms' or households' expectations. This overall assessment was globally confirmed when repeating the same estimates for Germany, Italy, and Spain, making use of harmonized European survey data. We further tested for the robustness of this result using alternative controls, including the ones suggested by Bauer & Swanson (2020) in the context of monthly regressions involving monetary policy surprises and professional forecasters' expectations and repeated our methodology for investors' expectations. The results appeared overall robust to all specifications tested and confirmed our interpretation that media-consistent monetary policy surprises matter for households and firms. In itself, such a finding is consistent with rational inattention theories.

We found in our initial estimates that media-consistent monetary policy surprises were positively linked to firms' and households' economic expectations, as widely found in the case of professional forecasters' expectations. We therefore tried to test whether this positive coefficient could reflect "information shocks" (Jarociński & Karadi 2020) or "narrative shocks" (ter Ellen et al. 2021) but could not find conclusive evidence on either. Overall, this may suggest the need to go beyond standard economic explanations to understand the reaction of households and firms to monetary policy announcements. The heterogeneity found across countries is also suggestive of the need for further research.

Our results also highlight the need for caution in the use of standard monetary-policy-surprise measures for macroeconomic investigation. Such measures are increasingly used in economic re-

search mostly due to their exogeneity properties. However, as we show in this paper, the information in these financial market measures can be totally different from the information appearing in general newspapers, affecting firms and consumers. The latter observation also clearly emphasizes the need for media indexes of monetary policy surprises that are better suited to households and firms, as recent works have started to do, e.g. ter Ellen et al. (2021) and Picault et al. (2021). Further research could greatly benefit from such indexes.

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8 Appendix

8.1 Control variables

8.1.1 LASSO selected controls

Table 6: List of the pool of candidate control variables, LASSO selected

<i>Variable</i>	<i>Definition</i>
Financial variables	
EUR / USD change	change* in the log of the EUR / USD
Vstoxx change	change* in the log of the Vstoxx
Eurostoxx change	change* in the log of the Eurostoxx index
Oil prices change	change* in the log of the oil prices
PIGS-spread change	change* in the spread between the average yield on PIGS (Portugal-Italy-Greece-Spain) and German 10-year bonds, aimed at capturing Euro Area fiscal stress
Country-spread change	change* in the spread between the yield on 10-year bonds for the country considered in the estimate and the German one
Economic variables	
Ind. prod. EA, backw.	change in the production backward-looking index of the industrial sector (arguably one of the most important sectors) in the euro area
Economic uncertainty	lagged** change in the Economic Policy Uncertainty index of Baker et al. (2016) for the euro area
CEPR eco index, lag chge	lagged** change in the CEPR / Banca d'Italia real time economic activity index (€-coin)
Constr. EA (and country), lag chge	lagged** change in construction activity (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Manuf. EA (and country), lag chge	lagged** change in manufacturing activity (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).

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Table 6 – continued from previous page

<i>Variable</i>	<i>Definition</i>
Ind. prod. EA (and country), lag chge	lagged** change in industrial production (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Ret. sales EA (and country), lag chge	lagged** change in retail sales (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Exports EA (and country), lag chge	lagged** change in the volume of free on board exports (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
CPI EA (and country), lag chge	lagged** change in the Consumer Price Index (with respect to the last year) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Unemp. EA (and country), lag chge	lagged** change in seasonally adjusted unemployment rate (with respect to the last month) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Ind. prod. EA (and country), lag month chge	lagged** change in seasonally adjusted industrial production (with respect to the last month) for the euro area (EA) and for the country considered (FR/GE/IT/SP).
Lag dependent	Lag of the dependent variable in the regression

Notes: * The change is taken as the difference between the average value over the 10 days before the ECB press conference of the corresponding month and the average value over the 10 days before the ECB press conference of the previous month. If we were to take the monthly change from average monthly values, we would face two problems. First, some data particularly affected by end-of-month values would be irrelevant as consumers and firms answer the expectation survey in the first three weeks of the month. Second, financial variables could be directly impacted by monetary policy surprises, thereby leading to the so-called "bad control" problem. By making use of the daily data as we do here, we are able to bypass these problems. ** We take the lag insofar as it is judged as more relevant than the contemporaneous value: contemporaneous data values are not known (and not realized) when consumers and firms fill in the expectation survey.

8.1.2 Baseline controls

Table 7: List of the other control variables mentioned in the tables of estimates (set X_1)

<i>Variable</i>	<i>Definition</i>
Dummy oct 2008	Dummy variable equal to 1 in October 2008, 0 otherwise.
Dummy nov 2008	Dummy variable equal to 1 in November 2008, 0 otherwise.
Dummy dec 2008	Dummy variable equal to 1 in December 2008, 0 otherwise.
Ind. prod. FR (GE,IT,SP), backw.	change in the production backward-looking index of the industrial sector for the country considered (FR, GE, IT or SP).
Retail dem. FR (GE,IT,SP), backw.	change in the demand backward-looking index of the retail sector for the country considered (FR, GE, IT or SP).
Serv. dem. FR (GE,IT,SP), backw.	change in the demand backward-looking index of the services sector for the country considered (FR, GE, IT or SP).
Const. emp. FR (GE,IT,SP), backw.	change in the employment backward-looking index of the construction sector for the country considered (FR, GE, IT or SP).
Cons. price FR (GE,IT,SP), backw.	change in the prices backward-looking index of the consumers sector for the country considered (FR, GE, IT or SP).
Cons. eco FR (GE,IT,SP), backw.	change in the economic backward-looking index of the consumers sector for the country considered (FR, GE, IT or SP).

8.2 Results for Germany, Italy and Spain

8.2.1 Results for Germany

Table 8: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*first part*)

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
1-month surprise, all	0.033 (0.104)		0.056 (0.054)		0.052 (0.078)		-0.081 (0.088)		-0.095 (0.108)	
1-year surprise, all	0.010 (0.059)		0.059 (0.047)		0.065 (0.088)		0.045 (0.058)		0.058 (0.072)	
1-month surprise, media		-0.263*** (0.033)		0.061** (0.029)		0.010 (0.047)		0.068* (0.041)		-0.205*** (0.051)
1-year surprise, media		-0.055 (0.072)		0.096 (0.066)		-0.115 (0.072)		0.107 (0.070)		0.065 (0.055)
Dummy oct 2008	-9.013*** (2.048)	-14.651*** (0.646)	-0.606 (1.158)	-0.228 (0.895)	-1.995 (1.753)	-4.231*** (1.187)	-5.659*** (1.769)	-2.525** (1.218)	-11.735*** (2.118)	-13.543*** (0.479)
Dummy nov 2008	-11.405*** (1.612)	-10.701*** (0.705)	-4.124*** (1.274)	-3.249*** (1.007)	-2.707** (1.181)	-1.755* (1.010)	0.350 (1.977)	-0.685 (1.730)	-6.215*** (2.318)	-7.352*** (1.479)
Dummy dec 2008	-5.579*** (0.881)	-5.221*** (0.871)	-0.794 (0.999)	-0.466 (0.975)	-0.694 (0.499)	-0.297 (0.397)	-3.550*** (1.071)	-3.589*** (1.069)	2.360 (1.997)	2.447 (1.937)
Ind. prod. GE, backw.	0.073 (0.044)	0.073 (0.044)	0.059* (0.030)	0.062** (0.030)						
Ret. sales GE, backw.					0.320*** (0.049)	0.316*** (0.051)	0.175*** (0.054)	0.183*** (0.054)		
Serv. dem. GE, backw.									0.362*** (0.134)	0.362*** (0.136)
<i>Lasso selected controls:</i>										
Ind. prod. EA, backw.									-0.360*** (0.118)	-0.354*** (0.118)
CEPR eco index, lag chge	11.175*** (2.699)	11.939*** (2.641)								
Ind. prod. GE, lag chge	-0.091*** (0.027)	-0.086*** (0.026)								
Lag dependent			0.237*** (0.084)	0.239*** (0.086)						
Oil price change			7.608*** (2.037)	7.243*** (2.051)			8.225** (3.616)	8.156** (3.690)		
Eurostoxx change					19.573*** (4.626)	19.765*** (4.663)				
constant	0.401* (0.224)	0.367* (0.221)	-0.014 (0.171)	-0.013 (0.172)	0.091 (0.282)	0.090 (0.285)	-0.086 (0.301)	-0.107 (0.300)	0.305 (0.409)	0.253 (0.413)
R^2	0.415	0.424	0.304	0.305	0.301	0.303	0.151	0.153	0.153	0.153
N	156	156	156	156	156	156	156	156	156	156

Notes: See Table 1.

Table 8: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*second part*)

Variable	Services-prices		Constr.-employment		Constr.-prices		Consumers-prices		Consumers-eco	
	all surp. (11)	media surp. (12)	all surp. (13)	media surp. (14)	all surp. (15)	media surp. (16)	all surp. (17)	media surp. (18)	all surp. (19)	media surp. (20)
1-month surprise, all	0.023 (0.071)		-0.003 (0.122)		0.035 (0.087)		-0.021 (0.104)		-0.040 (0.068)	
1-year surprise, all	0.086* (0.049)		0.006 (0.042)		-0.037 (0.052)		0.060 (0.071)		0.010 (0.037)	
1-month surprise, media		-0.064* (0.033)		-0.187*** (0.023)		0.037 (0.033)		-0.141*** (0.030)		-0.038** (0.017)
1-year surprise, media		0.135** (0.054)		0.044 (0.063)		0.030 (0.057)		0.101 (0.110)		-0.044 (0.028)
Dummy oct 2008	-2.478 (1.504)	-3.643*** (0.910)	-0.286 (2.196)	-3.206*** (0.578)	-4.961*** (1.714)	-4.384*** (0.889)	3.983** (1.948)	2.234** (1.007)	-8.214*** (1.226)	-8.596*** (0.289)
Dummy nov 2008	-3.040** (1.352)	-2.687** (1.186)	0.524 (1.814)	0.516* (0.266)	-0.096 (1.537)	0.226 (1.115)	-9.427*** (1.644)	-9.580*** (0.909)	1.844 (1.130)	1.320*** (0.418)
Dummy dec 2008	-1.971* (1.011)	-1.634* (0.983)	-2.704*** (0.444)	-2.656*** (0.296)	-2.265*** (0.708)	-2.370*** (0.725)	2.095* (1.158)	2.252** (1.138)	-7.306*** (0.660)	-7.309*** (0.621)
Serv. dem. GE, backw.	0.046 (0.055)	0.054 (0.056)								
Constr. GE, backw.			-0.029 (0.038)	-0.027 (0.038)	0.009 (0.029)	0.011 (0.030)				
Cons. price GE, backw.							0.401*** (0.113)	0.396*** (0.114)		
Cons. eco GE, backw.									0.836*** (0.057)	0.840*** (0.058)
<i>Lasso selected controls:</i>										
Lag dependent	-0.261*** (0.092)	-0.263*** (0.091)								
Oil price change	10.430*** (2.651)	9.777*** (2.589)			7.275*** (2.409)	7.102*** (2.497)				
Exports GE, lag chge	0.045* (0.025)	0.046* (0.024)								
Ind. prod. EA, lag chge									-0.279*** (0.041)	-0.277*** (0.041)
constant	0.040 (0.210)	0.003 (0.209)	0.253 (0.252)	0.231 (0.253)	0.027 (0.204)	0.046 (0.205)	-0.117 (0.322)	-0.152 (0.321)	0.112 (0.190)	0.100 (0.192)
R^2	0.243	0.248	0.011	0.018	0.121	0.118	0.232	0.235	0.694	0.694
N	139	139	156	156	156	156	156	156	156	156

Notes: See Table 1.

8.2.2 Results for Italy

Table 9: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*first part*)

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
1-month surprise, all	-0.096 (0.122)		0.004 (0.056)		0.281 (0.277)		-0.124 (0.116)		-0.560*** (0.150)	
1-year surprise, all	0.024 (0.056)		0.089 (0.063)		0.086 (0.148)		0.091 (0.084)		0.036 (0.093)	
1-month surprise, media		-0.448*** (0.044)		0.065*** (0.018)		0.409*** (0.113)		-0.149* (0.082)		-0.459*** (0.064)
1-year surprise, media		0.006 (0.062)		0.237*** (0.055)		0.149 (0.123)		0.082 (0.111)		0.070 (0.149)
Dummy oct 2008	-5.683** (2.261)	-11.838*** (0.833)	-4.579*** (1.111)	-2.260*** (0.573)	3.904 (4.893)	6.627*** (1.410)	-5.914*** (2.136)	-6.384*** (1.225)	-14.777*** (2.661)	-12.662*** (1.378)
Dummy nov 2008	-6.455*** (2.050)	-7.593*** (0.806)	-4.594*** (1.108)	-4.300*** (0.517)	-10.412** (4.698)	-6.091*** (1.142)	-6.282*** (2.113)	-7.842*** (0.794)	6.593*** (2.249)	-1.266* (0.729)
Dummy dec 2008	-4.871*** (0.825)	-4.802*** (0.705)	-9.349*** (0.573)	-9.000*** (0.393)	-11.534*** (2.090)	-10.604*** (1.689)	-9.292*** (1.372)	-9.228*** (1.297)	2.138*** (0.813)	0.843 (0.585)
Ind. prod. IT, backw.	0.132 (0.103)	0.135 (0.102)	0.178*** (0.061)	0.174*** (0.059)						
Ret. sales IT, backw.					0.307*** (0.115)	0.299** (0.116)	0.081 (0.070)	0.082 (0.071)		
Serv. dem. IT, backw.									0.311*** (0.073)	0.291*** (0.076)
<i>Lasso selected controls:</i>										
CEPR eco index, lag chge	8.749** (3.502)	9.488*** (3.453)								
Lag dependent					-0.368*** (0.111)	-0.366*** (0.111)	-0.192** (0.093)	-0.194** (0.094)	-0.246*** (0.082)	-0.212** (0.085)
constant	0.093 (0.264)	0.024 (0.266)	0.084 (0.188)	0.062 (0.181)	0.431 (0.761)	0.488 (0.785)	-0.032 (0.476)	-0.083 (0.481)	-0.049 (0.404)	-0.185 (0.419)
R^2	0.195	0.210	0.257	0.307	0.212	0.210	0.096	0.092	0.245	0.202
N	156	156	156	156	156	156	132	132	156	156

Notes: See Table 1.

Table 9: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*second part*)

Variable	Services-prices		Constr.-employment		Constr.-prices		Consumers-prices		Consumers-eco	
	all surp. (11)	media surp. (12)	all surp. (13)	media surp. (14)	all surp. (15)	media surp. (16)	all surp. (17)	media surp. (18)	all surp. (19)	media surp. (20)
1-month surprise, all	0.052 (0.101)		-0.025 (0.158)		0.006 (0.109)		0.124 (0.116)		-0.376** (0.170)	
1-year surprise, all	0.016 (0.066)		-0.031 (0.059)		-0.017 (0.063)		0.005 (0.081)		0.033 (0.082)	
1-month surprise, media		0.084 (0.051)		-0.289*** (0.041)		0.155** (0.061)		0.371*** (0.039)		-0.846*** (0.026)
1-year surprise, media		0.108 (0.080)		0.036 (0.057)		0.064 (0.092)		0.109 (0.117)		-0.072 (0.047)
Dummy oct 2008	-0.232 (1.875)	1.132 (0.746)	0.922 (2.981)	-3.193*** (1.014)	-0.234 (1.995)	3.064*** (1.163)	2.525 (2.144)	7.704*** (1.135)	-4.241 (3.104)	-13.241*** (0.467)
Dummy nov 2008	-9.492*** (1.544)	-8.690*** (0.336)	-5.807** (2.423)	-6.217*** (0.784)	-3.945* (2.217)	-3.956*** (1.120)	-0.763 (1.773)	1.031** (0.416)	3.456 (2.460)	-1.764*** (0.597)
Dummy dec 2008	-3.909*** (0.885)	-3.807*** (0.809)	3.054*** (0.948)	3.008*** (0.821)	0.307 (1.271)	0.152 (1.130)	0.805 (0.806)	1.053 (0.707)	-5.954*** (0.787)	-6.586*** (0.650)
Serv. dem. IT, backw.	0.044 (0.059)	0.050 (0.058)								
Constr. IT, backw.			0.439*** (0.072)	0.439*** (0.072)	-0.026 (0.059)	-0.024 (0.059)				
Cons. price IT, backw.							0.450*** (0.098)	0.444*** (0.100)		
Cons. eco IT, backw.									0.562*** (0.086)	0.579*** (0.088)
<i>Lasso selected controls:</i>										
Lag dependent	-0.267*** (0.092)	-0.282*** (0.092)	-0.301*** (0.070)	-0.290*** (0.068)	-0.485*** (0.095)	-0.489*** (0.096)				
Ind. prod. EA, backw.					0.189** (0.079)	0.184** (0.078)				
Ind. prod. EA, lag chge									-0.071 (0.052)	-0.059 (0.054)
constant	0.120 (0.344)	0.126 (0.345)	-0.200 (0.347)	-0.226 (0.345)	-0.322 (0.291)	-0.303 (0.296)	-0.214 (0.384)	-0.164 (0.389)	0.202 (0.316)	0.055 (0.312)
R^2	0.100	0.105	0.393	0.396	0.277	0.280	0.162	0.169	0.331	0.341
N	142	142	156	156	156	156	156	156	156	156

Notes: See Table 1.

8.2.3 Results for Spain

Table 10: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*first part*)

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
1-month surprise, all	0.056 (0.114)		0.035 (0.134)		0.101 (0.161)		-0.217 (0.285)		0.286*** (0.100)	
1-year surprise, all	-0.029 (0.067)		0.043 (0.084)		0.040 (0.118)		-0.098 (0.094)		-0.040 (0.111)	
1-month surprise, media		0.128*** (0.033)		0.168*** (0.048)		-0.268*** (0.043)		0.154*** (0.042)		0.303*** (0.087)
1-year surprise, media		0.002 (0.086)		0.150** (0.071)		0.180 (0.168)		-0.020 (0.120)		-0.070 (0.138)
Dummy oct 2008	-6.567*** (1.979)	-5.035*** (0.908)	-13.061*** (2.475)	-9.820*** (0.861)	2.436 (3.295)	-2.918* (1.588)	-6.259 (5.182)	0.825 (1.273)	8.725*** (2.075)	8.668*** (1.310)
Dummy nov 2008	-3.886* (2.217)	-3.235** (1.292)	-6.492** (3.045)	-6.079*** (1.668)	4.486* (2.457)	6.090*** (0.718)	-6.001 (4.123)	-9.524*** (0.473)	5.831*** (1.848)	9.842*** (1.106)
Dummy dec 2008	-8.761*** (1.286)	-8.818*** (1.171)	-9.167*** (1.120)	-8.998*** (0.875)	-2.144** (1.018)	-1.653* (0.982)	-3.520*** (1.301)	-4.618*** (0.995)	-7.281*** (1.129)	-6.832*** (1.117)
Ind. prod. SP, backw.	-0.055 (0.077)	-0.062 (0.075)	0.130* (0.070)	0.127* (0.069)						
Ret. sales SP, backw.					0.353*** (0.103)	0.364*** (0.105)	0.047 (0.068)	0.044 (0.068)		
Serv. dem. SP, backw.									0.325*** (0.093)	0.322*** (0.094)
<i>Lasso selected controls:</i>										
Lag dependent	-0.389*** (0.068)	-0.382*** (0.068)	-0.249*** (0.075)	-0.261*** (0.073)	-0.310*** (0.077)	-0.306*** (0.075)	-0.237*** (0.076)	-0.247*** (0.076)	-0.362*** (0.076)	-0.363*** (0.078)
Ind. prod. EA, backw.	0.257** (0.099)	0.258*** (0.098)								
Ind. prod. EA, lag chge	-0.140** (0.063)	-0.143** (0.064)								
CEPR eco index, lag chge									13.626*** (4.360)	13.395*** (4.566)
constant	0.152 (0.297)	0.181 (0.303)	0.216 (0.303)	0.225 (0.308)	0.186 (0.540)	0.156 (0.542)	-0.078 (0.427)	-0.038 (0.432)	-0.161 (0.449)	-0.076 (0.462)
R^2	0.251	0.251	0.203	0.214	0.189	0.194	0.106	0.092	0.301	0.294
N	156	156	156	156	156	156	138.000	138.000	156	156

Notes: See Table 1.

Table 10: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (*second part*)

Variable	Services-prices		Constr.-employment		Constr.-prices		Consumers-prices		Consumers-eco	
	all surp. (11)	media surp. (12)	all surp. (13)	media surp. (14)	all surp. (15)	media surp. (16)	all surp. (17)	media surp. (18)	all surp. (19)	media surp. (20)
1-month surprise, all	-0.156 (0.227)		-0.266 (0.340)		0.325* (0.196)		-0.164 (0.158)		0.149 (0.124)	
1-year surprise, all	-0.048 (0.071)		0.095 (0.218)		0.529*** (0.140)		0.063 (0.069)		-0.044 (0.075)	
1-month surprise, media		0.237*** (0.052)		0.247 (0.171)		0.569*** (0.157)		-0.160** (0.063)		-0.227*** (0.063)
1-year surprise, media		0.150 (0.110)		0.131 (0.270)		0.633*** (0.216)		0.066 (0.074)		-0.041 (0.115)
Dummy oct 2008	-6.486 (4.334)	2.113 (1.572)	-13.692** (6.443)	-4.156 (4.045)	1.698 (3.719)	6.952*** (2.337)	-2.603 (2.888)	-2.429** (1.129)	-3.103 (2.382)	-9.939*** (1.603)
Dummy nov 2008	-9.194*** (3.327)	-10.991*** (1.905)	12.060** (4.918)	8.712*** (2.003)	-25.484*** (2.941)	-19.245*** (1.944)	-4.747* (2.474)	-6.895*** (0.611)	4.144** (2.041)	5.782*** (1.104)
Dummy dec 2008	-14.026*** (0.826)	-14.510*** (0.460)	-3.552* (1.892)	-3.930** (1.573)	-8.542*** (1.117)	-5.678*** (0.977)	-0.619 (0.844)	-0.689 (0.588)	-3.392*** (0.891)	-3.406*** (0.831)
Serv. dem. SP, backw.	0.110* (0.061)	0.136** (0.060)								
Constr. SP, backw.			0.143** (0.058)	0.135** (0.058)	0.188*** (0.057)	0.189*** (0.058)				
Cons. price SP, backw.							0.515*** (0.071)	0.523*** (0.071)		
Cons. eco SP, backw.									0.585*** (0.096)	0.597*** (0.098)
<i>Lasso selected controls:</i>										
EUR / USD change	-41.767** (18.323)	-36.707** (17.249)								
Lag dependent			-0.354*** (0.081)	-0.344*** (0.081)	-0.394*** (0.073)	-0.396*** (0.076)				
Spain spread change							3.517 (2.401)	3.3 70 (2.384)		
Eurostoxx change									15.990** (7.082)	13.561* (7.083)
Ind. prod. EA, lag chge									-0.155* (0.087)	-0.161* (0.090)
constant	0.180 (0.384)	0.206 (0.384)	0.061 (0.861)	0.017 (0.859)	0.183 (0.703)	0.144 (0.720)	-0.075 (0.357)	-0.131 (0.358)	0.180 (0.306)	0.198 (0.306)
R^2	0.177	0.183	0.175	0.173	0.312	0.297	0.342	0.338	0.342	0.339
N	139	139	156	156	156	156	156	156	156	156

Notes: See Table 1.

8.3 Media consistency of Jarociński & Karadi (2020)'s "information shocks"

In this section we discuss further the consistencies and inconsistencies between the media report and Jarociński & Karadi (2020)'s *"information shocks"* measure.

From Figure 3 it appears that most *"information shocks"* as identified by Jarociński & Karadi (2020)'s measure are not always conveyed as information surprises in the media. For example, a relatively large negative information shock (-4.2bps) arises in February 2009, when the ECB president decided to keep interest rates on hold. We count four articles in Le Monde this week referring to the ECB decision. Out of these four, none of them refers to or contains any information on the economic outlook. In contrast, most of the articles' content focuses on the hint given once again by Trichet that the ECB could *"modify its interest rates in March"* (as one of the articles is titled) and discusses the content in terms of the future monetary policy inclination (which thus appeared as a media-consistent monetary policy shock). In July of the same year, the same situation arises: the information shock is highly negative (-6.6bps) but the media does not convey any negative economic information stemming from the press conference. In fact, we find only one article referring to the ECB press conference that week, where it is said that the meeting *"did not reveal any surprise"*, that the president estimated that the level of the interest rates were *"appropriate"* and that the fall in consumer prices will be *"short-lived"*.

The above discussion illustrated cases where the media content was not conveying any particular negative or positive information on the state of the economy while the information shocks had extremely large magnitudes. However, there are also cases in which Jarociński & Karadi (2020)'s information shocks have a sign clearly inconsistent with Le Monde's report. For example, in September 2011, Le Monde titles one of its articles *"The ECB revises downward its growth forecasts for 2011 and 2012"*. They refer to *"a clear step back"*, and convey substantial new negative information on the economy. That day however, the information shock from Jarociński & Karadi (2020)'s measure is positive, at around 4.4 bps, as if new positive information on the economy was conveyed. Another example comes in December 2007, for one of the biggest pre-crisis positive information shocks. About the meeting, Le Monde reports in an article that the ECB *"markedly decreased"* its growth forecasts. This decrease in growth forecasts also appears in the subtitle of another article, while the loss of growth momentum is said to be a key reason why *"an increasing number of economists"* sees the ECB cutting rates in 2008. Most of the other economic information reported about the ECB meeting is related to international factors behind inflation (increase of the prices of oil and of agricultural commodities): no positive information is provided in the media

content justifying a positive information shock.

Turning to the information shocks consistently reported as such in the media, we first note that many information shocks from Jarociński & Karadi (2020)'s measure with extremely negative values after 2010 appear to be related to fears that the ECB does not intervene sufficiently in the form of unconventional monetary policies. For example, in August 2011, the information shock is around -8 bps (the third biggest negative shock). We found nine articles in *Le Monde*, one of them is titled *"the markets were expecting more from the ECB"*, another one *"international stock markets plummet, not convinced by the declarations of the ECB"*, another one *"the ECB is powerless in reassuring financial markets"*, another one *"Trichet, alone in the storm"*. At that meeting, the ECB decided to extend its asset purchases, but not to Italy or Spain, triggering worries for the outlook of the euro area. July and August 2012 (respectively the first and fourth biggest negative information shocks) as well as November 2014 are other similar examples.

The other media-consistent information shocks are directly and explicitly conveyed as new positive information on the economic outlook in the media. In December 2014 for example, the ECB revised downwards its growth forecasts. We find three articles all referring to this move, for example by claiming that *"the future promises to be dark"* or that *"the ECB forecasts are clearly less optimistic than the previous ones"*. Most of the pre-2010 media-consistent information shocks also have a similar context.

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