Media treatment of monetary policy surprises and their impact on firms' and consumers' expectations

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Abstract

We empirically investigate whether monetary policy announcements affect firms' and consumers' expectations by taking into account their media treatment. We initially rely on the standard monetary policy surprise measures in the euro area to identify exogenous changes in monetary policy stances. We then analyze how the main general newspapers in France report on announcements. 85 % of the monetary policy surprises are either not associated with the newspapers reporting a change in the monetary policy stance or have a sign that is inconsistent with the media report. Only when we consider media-consistent monetary policy surprises do we find that households and firms respond to monetary policy announcements. Further analysis reveals that the tonality of the media reports helps explain the sign of the response.

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

JEL Classification : D84, E02, E52, E31

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 in order to provide a comparative perspective. For identification purposes, we firstly 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, from Altavilla et al. (2019). Such market-based interest rate surprises (henceforth "financial monetary policy surprises") are extensively used in academic research for the above-stated exogeneity reasons.[1]

[1]Recent works using financial monetary policy surprises for macroeconomic investigations include for example Gürkaynak et al. (2021), Jarociński & Karadi (2020), Miranda-Agrippino & Rey (2020), Altavilla et al. (2019),

However, a key novelty of our analysis is 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 the newspapers with the largest audience in France (Le Monde, Le Figaro) over the week of the monetary policy event, and analyze how the newspapers report about the European Central Bank (ECB) announcement. We do so both for surprises in the immediate policy stance (taken as the change in the OIS 1-month during the press release window) and for surprises in the (expected) future monetary policy stance (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 the general newspapers, and in some cases they even have a sign inconsistent with the media report. Overall, these cases account for about 85% of the monetary policy surprises considered in our sample. It is mostly the case for small surprises, but not only for small surprises. For example, one of the largest financial monetary surprises related to the immediate stance in our sample arises in July 2012. It is around -10 basis points (bps), indicating that the interest rate cut 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 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 therefore not clearly seen as a policy more accommodating than expected, as the financial surprise has suggested. In some other cases, financial monetary policy surprises are consistently reported as such in the media we cover. This is the case, for example, in November 2011, where Le Monde starts one of its articles with *"to everyone's surprise, the ECB has decreased (...)"*, and explains that *"the ECB took by surprise observers and the market"*, while the OIS change is indeed negative. We have carefully coded around 1800 reports and selected only the financial monetary policy surprises that consistently appear as monetary policy surprises in the newspapers.

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

Enders et al. (2019), Nakamura & Steinsson (2018).

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 a recurrent effect only for surprises in the immediate policy stance, and 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 their 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 consistent with the view that 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. We code for each "information shock" whether or not it is consistently reported in the media, and run our baseline regressions with media-consistent shocks only. We also observe here 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 largest positive "information shock" in our sample is recorded. In fact, only about 23% of the "information shocks" in our sample appear to be 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 consideration or 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.

In a last step, we develop a measure of media monetary policy surprises and repeat the same estimates as above. We again find a positive relationship between monetary policy surprises and expectations when the associated coefficient is statistically significant. We then push the investigation deeper by asking whether the volume as well as the tonality of the news coverage matter for the reaction of firms and households' expectations. We find some evidence that the volume of news coverage matters for households. We find a striking role for the tonality of the reports on the monetary policy announcements. When we take into account the negativity of the media reports, by adding an interactive term between a monetary policy announcement and the tonality of the reports, the response of expectations to monetary policy decisions becomes negative and statistically significant, as standard theories predict. The interactive term is positive, suggesting that high negativity in media reports can make economic expectations decrease after an interest rate cut. The latter result is limited by the availability of suitable variables for monetary policy announcements and is evident only for half of the pairs we consider. Nonetheless, the finding brings forward a potentially important factor behind the puzzling positive association between expectations and monetary policy announcements found in several previous studies as well as in this study.

Overall, our results suggest that monetary policy surprises do matter for firms' and consumers' expectations but that the key aspect here is the report from general media. 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 compared to financial investors and actually do so less in practice (Candia et al. 2021). That can imply that only surprises clearly appearing as such in general newspapers impact them. The fact that the tonality of the report on monetary policy is found to play a key role for more than half of the pairs we investigated suggests that firms and households do not process only the information stemming from the policy decision in itself; other aspects emphasized in the media reports matter.

The remainder of the paper is structured as follows. The next section discusses the related literature. The third section details our data on monetary policy surprises and their consistency with media reports. Section four details our empirical strategy. Section five presents the baseline results and Section six other tests performed for robustness and interpretation. In Section seven we develop an index of media monetary policy surprises and present our results on the role of the volume and the tonality of the news coverage. 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 inflation for 10 consecutive quarters. They reach the conclusion 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 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. Coibion et al. (2018) also provide evidence that inattention to inflation and to monetary policy can be pervasive among firms in advanced economies. They build a large-scale survey of firms in New Zealand and extract backcasts as well as forecasts on a wide range of economic variables. 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. Using experimental methods, they 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 financial monetary policy surprises. 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 do not find a robust relationship between monetary policy surprises and firms' expectations: the relevant coefficient is only statistically significant for price expectations, at the 10% level, when all 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 with firms' expectations but that very large surprises no longer affect them.[2] 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 indices 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, there is dissonant evidence on whether monetary policy announcements feed into households' expectations. Using the Michigan Survey of Consumers, Binder (2017) 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) survey households before and after Fed monetary policy announcements, and find that announcement events have no measurable direct effects on 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. Further, Lamla & Vinogradov (2021) analyze the announcements of the Bank of England on its Twitter account and, based on about 10 000 individual consumer responses over 2018-2019, do not find statistically significant effects of announcements on perceptions or expectations about inflation or interest rate by consumers.[3] Lewis et al. (2019) find in contrast that consumers' expectations systematically respond to Fed monetary policy announcements. 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). However, this result 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

[2] See Bachmann (2019) for a comment on these results.

[3] Also focused on social media, Ehrmann & Wabitsch (2022) analyze Twitter traffic in English and German about the ECB and show that Twitter traffic by non-experts is responsive to ECB communication with varying intensity of reactions. It is also shown that Twitter often serves as a platform for controversial discussions.

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 expectation data that occurs in months when the Reserve Bank of Australia changed its key interest rate. They find that consumers adjust their 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. Relevant to our analysis is also the study from Conrad et al. (2022). Through *ad hoc* questions added to a survey administered by the Bundesbank, the authors find that 85% of the households get information about the ECB monetary policy through traditional media, and only 6% through social media. In a thought experiment where households are asked how inflation would evolve if the ECB were to unexpectedly raise rates, the number of respondents answering that inflation would increase is slightly higher than the number of respondents answering that inflation would decrease, what appears at odds with the outcome that one would expect from standard theories.

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"*. This 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] However, all the above-mentioned studies looking explicitly at this relationship do not take into account the media treatment and (with the exception of Lamla & Vinogradov (2019) and Lamla & Vinogradov (2021)) 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 changes in the monetary policy stance. The most popularized

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

[5]Note 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.

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 in a moderately simple way,[6] the OIS 1-month, for example, can be seen as the average EAONIA rate expected on average for the next 30 days by market participants. If no change arises to this 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 compared to their expectations. This can happen even if the central bank decided to change its interest rate, in the case where the move is totally expected by the market. If, on the other hand, 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. It is arguably for this reason that financial monetary policy surprises are used extensively in empirical works, including Lewis et al. (2019), Enders et al. (2019), and Kirchner (2020).

In this paper, in line with the majority of studies, we use in our baseline estimates 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 and surprises in the future monetary policy stance. The former 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, and are denoted in what follows *1-month surprises*. 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] *1-month surprises* is used as a measure of the surprising change in the rate decision. Surprises in the future policy stance 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, and are denoted *1-year surprises* in what follows. Because

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

[7] After 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.

the window considered to compute the OIS change does not overlap with the one considered for *1-month surprises* and because the press conferences usually contain all the relevant details for the future monetary policy stance, *1-year surprises* 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 release. In essence, this dissociation is similar to the one used in the last section of Enders et al. (2019), when they want to effectively separate 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 and Le Figaro on the day when the policy decision is announced and on any of the 4 days afterwards that contain at least one mention of "European central bank". Because press conferences take place on Thursdays, the (1+4)-day window is chosen to match the end of the week while taking into account the Monday report. Le Monde and Le Figaro were chosen because they are the two general newspapers that have the largest audience among firms and households according to the ACPM (*Alliance pour les chiffres de la presse et des médias*; alliance for newspapers and media figures).[8] In total, we have nearly 1800 articles for our period under research, with approximately a third of them focusing solely on the monetary policy announcement.

We then code for each monetary policy surprise whether or not the report given by Le Monde and Le Figaro on the monetary policy announcement is consistent with the financial monetary policy surprise.[9] 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 surprises in the immediate policy stance) or a *surprising* tone (for surprises in the future policy stance) in a direction consistent with the *sign* of the surprise. Specifically, after reading all media reports, we consider the following

[8] The surveys from the ACPM show that these are the two general newspapers that reach the most of the French population. For firms, the study "Onenext Influence" finds that 97.5% of decision makers are readers of at least one newspaper, and that among them, 67% tend to read Le Figaro, 59% Le Monde.

[9] Given the specific requirements to capture media content and the relatively low number of articles in our sample period, we chose a human coding approach rather than a dictionary or computational linguistic approach. The latter approaches are often used when human coding is demanding due to a large number of articles to analyze (see Ter Ellen et al. (2021) or Picault et al. (2022) for recent examples related to monetary policy). Human coding, while also used in Ehrmann & Fratzscher (2007) or Berger et al. (2011) in a similar context, comes at the expense of subjectivity. On the other hand, it has the advantage of precision, which is a great benefit in our context where we have a relatively low number of articles per announcement. Furthermore, we are not aware of any existing methodology that would allow us simultaneously (i) to capture the media perception on the current monetary decision separately from the media perception on the future policy stance as well as (ii) to capture whether such perception comes as a surprise or not.

coding criteria. For surprises in the immediate monetary policy stance, at least a remark that the decision mostly "surprised" has to be mentioned. In fact, for surprises in the immediate monetary policy stance 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 surprises in the immediate monetary policy stance we considered as consistently reported, we double-checked that the newspaper 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, the report must 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 that meet this criteria. Each time when we find the report from both newspapers to be consistent with the financial monetary policy surprise, we cross-check the newspapers' interpretation with that of The Financial Times to avoid capturing a potentially unilateral interpretation from the general newspapers; we found none. The whole coding is available on the corresponding author's website for transparency.

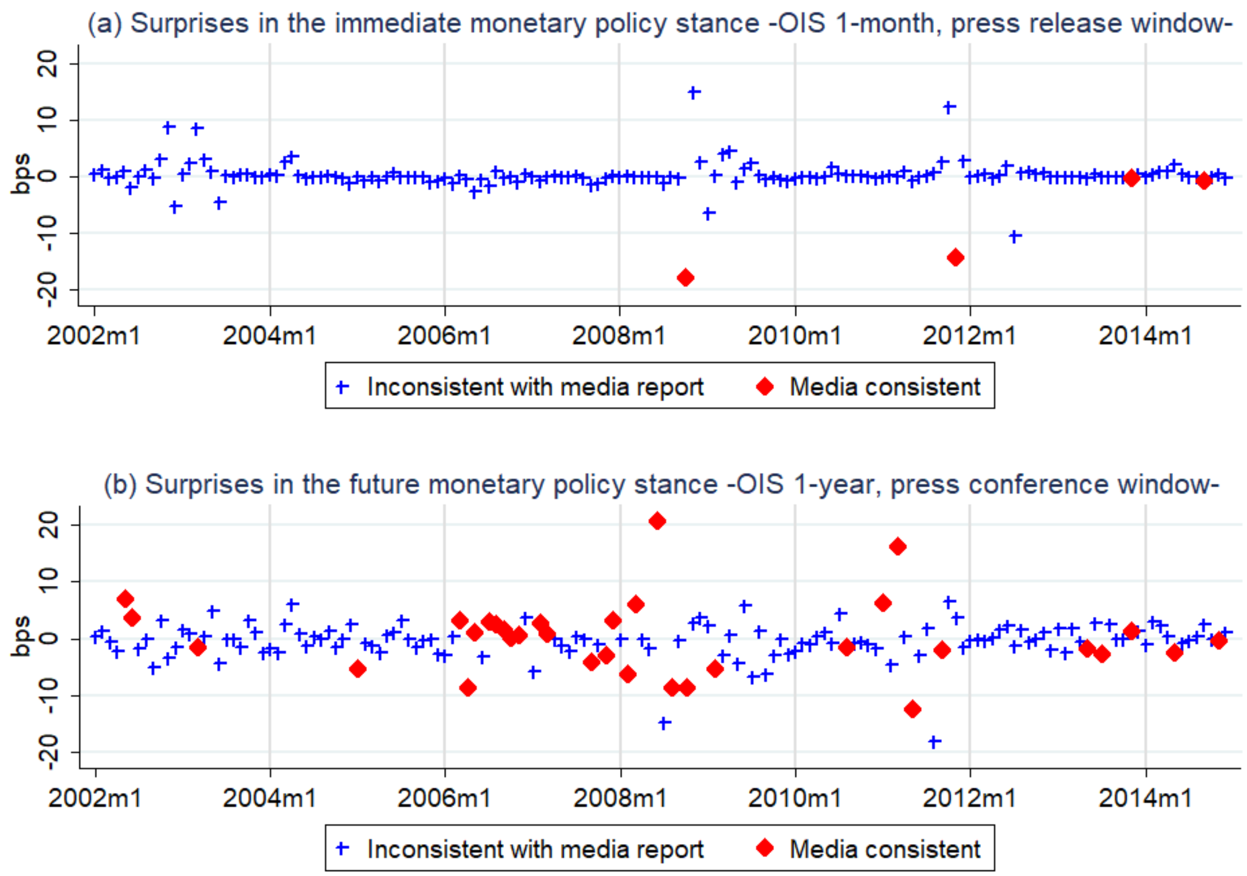

Figure 1: Financial monetary policy surprises, inconsistently (blue) versus consistently conveyed as such by Le Monde and Le Figaro (red)

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 both Le Monde and Le Figaro (*i.e.* the newspapers 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 surprises in the immediate and future monetary policy stance (in panel (a) and panel (b), respectively). Surprises which are consistent with both media reports appear in red, the others in blue.[10] What we observe is that very few monetary policy surprises

[10] We consider only surprises that appear consistent with both media reports in order to consider the information

in the immediate monetary policy stance appear as such in the media.[11] For example, the two largest contractionary surprises are not consistently reported as such in our general newspapers. In November 2008, the ECB decreased its key interest rate from 50bps, but the OIS surprise is positive at about +15bps, suggesting an important tightening. Le Monde refers to this interest rate decrease as *"an expected move, but a massive one"*. Furthermore, they note that *"Trichet says that other cuts are to be expected"*. Le Figaro makes a very similar report, starting one of its articles by noting that the recession *"won out over the ECB rigorism"*, and referring to an *"unprecendented pace of (rate) cuts"*. 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 +12bps. Le Monde reports that day that *"the ECB maintained, without surprise, its key interest rate"*.[12] The absence of rate change is not discussed much in Le Figaro. They note in one article that *"some market analysts toyed with the idea of a 50 basis points cut in one go (...) an expectation qualified as 'crazy' by Yves Mersch"*. In another article, they note that *"investors remained well oriented after the ECB decision to let its key interest rate unchanged"*. Two days before the press conference, an article from Le Figaro infers from Trichet's remarks that *"rates should remain unchanged on Thursday"*. 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 clearly consistent reports of monetary policy surprises in 2008, 2012, 2013, and 2014, each time when the central bank decreased its interest rate. In each case, both newspapers report a surprising decision. In Le Monde, for example, the first move is referred to as a *"brutal U-turn"*, the second and the third ones are communicated in articles where the first sentence starts by *"to the general surprise"*, while the last is communicated with articles stressing

which is the most likely to reach the average firm and the average household. Only a few surprises (about 4% of them) were consistently reported by one of the two newspapers but not by the other one, but in almost all of these cases the information that was consistently reported in the newspaper either occupied a relatively small part of the articles or was not clear-cut. For example, in September 2002, Le Figaro notes in two of its articles that the ECB is *"not anymore excluding the possibility of a rate cut"*, but in another one it mentions the *"restrictive tone"* of Duisenberg, adding that he *"did not let any clear hope for a rate cut"*. Le Monde simply quotes Duisenberg declaring that *"the current monetary policy is 'appropriate' and 'neutral'"*. Note that we find a mention of all but one of the monetary policy announcements in the two selected newspapers.

[11] When describing the inclination of the monetary policy stance we follow a common practice and refer to monetary policy surprises as expansionary (unexpected interest-rate reduction) and contractionary (unexpected interest-rate increase).

[12] 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.

that *"nobody expected it"*. We also analyzed for these particular dates the TV reports of the two main evening news shows in France (the "journal de 20h" of TF1 and France 2) and found that all these surprises were reported by at least one of the two TV shows.

For surprises in the future monetary policy stance, 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 contractionary surprises are consistently reported in the media. The first one, in June 2008, is positive at about +21bps. 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"*. Le Figaro titles one of its articles *"The ECB is preparing the markets to a rate hike"*. For the second one (March 2011), Le Monde titles one of its articles *"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 expansionary surprises are not consistently conveyed as such in the media. For the largest one, in the first week of August 2011, the contrast with the media report is striking. The surprise is about -18bps, 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.[13]

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:

$$\Delta Y_t = \alpha_1 + \beta_1 \textit{ 1-month surprises}_t^{all} + \phi_1 \textit{ 1-year surprises}_t^{all} + \gamma_1 X_t. \quad (1)$$

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

[13]The 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.

as:

$$\Delta Y_t = \alpha_2 + \beta_2 \ \textit{1-month surprises}_t^{media} + \phi_2 \ \textit{1-year surprises}_t^{media} + \gamma_2 X_t. \tag{2}$$

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. *1-month surprises* (*1-year surprises*) is the monetary policy surprise in the OIS 1-month (OIS 1-year) previously defined, and X is a vector of control variables. The superscript ^{all} indicates that all surprises are used, while the superscript ^{media} indicates that only the media-consistent ones are selected. In effect, the first specification considers all monetary policy surprises that appear in Figure 1, while the second considers only those that appear in red.

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 expectations is considered rather than their level,[14] and is related to monetary policy surprises linearly. 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 key independent 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 an issue of omitted variables, to the extent that market participants take into account recent news in their interest rate expectations.[15] 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 monetary policy shocks is based on specific assumptions.

The model is estimated using 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.

[14]It is also justified by the fact that it is difficult to reject the presence of a unit root for most variables with standard tests.

[15]An 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 later we 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.

4.2 Sample choice and data on expectations

4.2.1 Sample

Insofar as we use French newspapers, we chose to mainly focus on expectations in France. However, our baseline estimates will also be performed for Spain, Germany, and Italy to see whether the key results differ for other large economies.

We use monthly data from January 2002 to the end of 2014. We use this period because press conferences were held on a monthly frequency during this time, at the beginning of each month, generally on the first Thursday of the month.[16] 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 occur after expectations have been formed. Before 2002, there were two press conferences during a given month, and from 2015 press conference timing became once every six 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.[17] 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). We take data for consumers and for firms in the industrial,

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

[17] There 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).

retail sales, services, and construction sectors, on both economic and price expectations.[18] 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.

For economic expectations, the question posed to 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 indices" and use as control variables. For firms in the construction sector, 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 about their own 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 5 in Appendix 9.1.

4.3 Control variables

The issue we face when selecting 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 changes in professional forecasters' expectations. We still decide to add control variables in order to make sure that our results are not driven by other important variables affecting expectations that would also be 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

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

following variables: the change in the backward-looking index of economic expectations (for each sector considered)[19] 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 5) clearly suggests a substantial drop in expectations at the time of the 2008 financial crisis for all sectors, while policy surprises arise during this period. The former variable is included to diminish the risk of spurious correlation, for example, in case the economic environment recently improved or deteriorated and the central bank still managed to surprise financial markets with its decision. Its inclusion also has another useful purpose: it allows us to make sure that we measure the impact of monetary policy surprises on the change in expectations, conditional on the change in the current perception of the economic situation for the sector considered. This can be particularly important as backcasts and forecasts are usually very correlated. Its inclusion is thereby expected to also allow us to get a better identification of any potential effect of monetary policy surprises on expectations.[20]

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 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. We select our controls from the pool of variables that characterize various aspects of economic and financial development, detailed in Table 8 in Appendix 9.2.1.

For each pair considered, we implement the selection algorithm as follows. We estimate equation 1 using all potential control variables with the LASSO estimator. The 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 we use the BIC to choose the one with the 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.

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

[20] Such a control is present in Enders et al. (2019) but not in Lewis et al. (2019) when the authors investigate the impact of surprises on expectations.

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 (media-consistent surprises only).

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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1-month surprise, all	0.027		-0.150		0.041		-0.104		0.078	
	(0.096)		(0.094)		(0.154)		(0.115)		(0.114)	
1-year surprise, all	**0.143*****		0.018		0.020		-0.011		**0.091****	
	(0.047)		(0.097)		(0.063)		(0.080)		(0.043)	
1-month surprise, media		**0.242*****		**-0.148****		**0.123*****		**-0.332*****		**0.312*****
		(0.051)		(0.075)		(0.036)		(0.045)		(0.051)
1-year surprise, media		**0.188*****		0.104		0.074		0.118		**0.098***
		(0.057)		(0.123)		(0.068)		(0.088)		(0.050)
Dummy oct 2008	-8.006***	-3.711***	-8.043***	-7.435***	-9.745***	-7.823***	2.076	-0.651	-2.980	1.111
	(1.815)	(1.070)	(2.393)	(2.001)	(3.021)	(0.842)	(2.707)	(1.575)	(2.113)	(1.026)
Dummy nov 2008	-6.454***	-5.458***	0.080	-2.247	0.905	1.546***	-11.742***	-13.318***	-1.737	-0.354
	(1.614)	(0.932)	(2.267)	(1.786)	(2.317)	(0.570)	(2.560)	(1.881)	(1.881)	(0.882)
Dummy dec 2008	-7.680***	-6.974***	-1.610	-2.031	-8.263***	-8.065***	0.584	0.515	-0.633	-0.167
	(0.582)	(0.509)	(1.493)	(1.429)	(0.891)	(0.851)	(2.039)	(1.987)	(0.849)	(0.777)
Ind. prod. FR, backw.	0.045	0.045	0.049	0.049						
	(0.055)	(0.054)	(0.076)	(0.077)						
Retail dem. FR, backw.					0.296***	0.297***	-0.052	-0.046		
					(0.037)	(0.037)	(0.049)	(0.050)		
Serv. dem. FR, backw.									0.198**	0.211***
									(0.077)	(0.079)
Lasso selected controls:										
Eurostoxx change	14.470***	15.432***							13.649***	14.622***
	(5.057)	(5.085)							(4.252)	(4.381)
CPI FR, lag chge	-0.955**	-0.955**								
	(0.384)	(0.395)								
Constr. FR, lag chge			0.199***	0.203***						
			(0.075)	(0.077)						
Oil price change			11.616***	11.274***						
			(4.100)	(4.056)						
Lag dependent			-0.236***	-0.249***			-0.322***	-0.321***		
			(0.089)	(0.091)			(0.089)	(0.090)		
Ind. prod. EA, backw.							0.288**	0.292**		
							(0.115)	(0.114)		
CEPR eco index, lag chge									5.740**	4.490*
									(2.477)	(2.560)
constant	1.795***	1.771***	0.062	0.019	0.106	0.112	-0.060	-0.120	0.008	0.024
	(0.657)	(0.665)	(0.347)	(0.344)	(0.312)	(0.315)	(0.328)	(0.326)	(0.217)	(0.218)
R^2	0.255	0.258	0.183	0.183	0.382	0.385	0.305	0.315	0.276	0.279
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 with the report of both Le Monde and Le Figaro. (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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1-month surprise, all	-0.071		0.035		0.124		-0.170		0.162	
	(0.055)		(0.117)		(0.148)		(0.199)		(0.136)	
1-year surprise, all	0.040		0.083		**0.160*****		-0.117		-0.028	
	(0.028)		(0.054)		(0.059)		(0.127)		(0.079)	
1-month surprise, media		**0.066*****		**0.105*****		**-0.098***		0.000		**0.274*****
		(0.023)		(0.022)		(0.055)		(0.103)		(0.034)
1-year surprise, media		0.034		0.053		**0.219****		0.018		-0.122
		(0.034)		(0.078)		(0.092)		(0.170)		(0.095)
Dummy oct 2008	-2.817***	-0.336	-3.768*	-2.736***	-5.626**	-8.948***	2.602	6.686***	2.407	3.463***
	(1.012)	(0.588)	(2.087)	(0.936)	(2.779)	(1.280)	(3.990)	(2.248)	(2.642)	(0.889)
Dummy nov 2008	-1.916**	-2.656***	-8.637***	-7.878***	-6.786***	-4.617***	3.659	0.845	2.062	4.359***
	(0.852)	(0.515)	(1.794)	(0.294)	(2.241)	(0.800)	(3.951)	(3.473)	(2.224)	(0.660)
Dummy dec 2008	-3.336***	-3.270***	-1.159*	-0.722	-4.587***	-3.731***	4.142**	3.201*	-4.142***	-3.903***
	(0.442)	(0.433)	(0.659)	(0.544)	(1.122)	(1.133)	(1.680)	(1.760)	(0.719)	(0.564)
Serv. dem. FR, backw.	0.085*	0.086*								
	(0.051)	(0.051)								
Const. emp. FR, backw.			0.291***	0.295***	0.205***	0.220***				
			(0.045)	(0.046)	(0.057)	(0.061)				
Cons. price FR, backw.							0.221	0.208		
							(0.175)	(0.176)		
Cons. eco. FR, backw.									0.956***	0.949***
									(0.082)	(0.082)
Lasso selected controls:										
Eurostoxx change	7.095***	8.107***								
	(2.642)	(2.706)								
Unemp. EA, lag chge			-6.659***	-6.638***						
			(2.143)	(2.205)						
CEPR eco index, lag chge					7.514**	6.713*				
					(3.243)	(3.405)				
Unemp. FR, lag chge					-7.646**	-7.271*				
					(3.861)	(3.946)				
Lag dependent							-0.185	-0.193	-0.145**	-0.145**
							(0.139)	(0.143)	(0.057)	(0.058)
Oil price change							15.348***	15.651***		
							(5.738)	(5.830)		
constant	-0.001	-0.019	0.034	0.026	0.181	0.131	-0.273	-0.276	0.078	0.146
	(0.145)	(0.146)	(0.237)	(0.239)	(0.293)	(0.293)	(0.395)	(0.405)	(0.282)	(0.284)
R^2	0.175	0.166	0.322	0.315	0.307	0.300	0.145	0.132	0.591	0.593
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 8. Other variables are defined in Table 9. 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 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 an effect of media-consistent surprises in the future monetary policy stance (**1-year surprise, media**) in less cases. Only for three pairs (out of 10) do these appear linked to expectations in a statistically significant way (columns (2), (10) and (16)) For all of these, 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) Expansionary surprises in the immediate monetary policy stance are always found to decrease economic expectations, with a strongly statistically significant coefficient.

(5) For price expectations, we find that expansionary surprises increase price expectations, except in the case of services and consumers. 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.

These results can be put in perspective with the conclusions of previous studies. The fact that we do not find any effect of broadly defined monetary policy surprises (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. From this result we may draw two relevant conclusions. The first conclusion is that the media treatment of monetary policy announcements is key. The second one is that our results are consistent with a linear reaction of firms and households to monetary policy announcements (which does not rule out a nonlinear reaction, though). 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.[21]

The absence of a unanimous 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. Actual interest rate decisions may matter more than communications on hypothetical future changes. It is interesting to note, however, that the coefficient for firms is always positive.

The positive relationship between monetary policy surprises and economic expectations depicted in 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. 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.

5.2 Other countries

In Appendix 9.3 on Tables 10, 11 and 12, we repeated our baseline estimates respectively for Germany, Italy, and Spain. Such an exercise implicitly assumes that media-consistent monetary policy surprises identified using leading newspapers in France are also surprises in the 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 the French newspapers.

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

[21] Investigating more deeply this possibility, we could find general newspapers consistently reporting Lewis et al. (2019)'s biggest expansionary 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"*.

linked to expectations for all sectors and expectation indices in all countries (point (1)), except in three cases.[22] 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 monetary policy surprises in the immediate monetary policy stance are almost always significantly linked to expectations. In our 30 new estimates, there are only four pairs for which this is an exception.[23] 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: surprises in the future monetary policy stance are found to matter in fewer cases. They matter only in five of our 30 new estimates, for firms only (retail demand and services prices in Germany, industry prices in Italy and Spain, and construction prices in Spain). For four of these five cases, the coefficient is positive, as we found in France when we found a statistically significant relationship.

In terms of the sign of the coefficient of our key variable, some heterogeneity clearly appears between countries and between sectors, so we cannot conclude that points (4) and (5) hold.[24] 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 also see that firms

[22] The two exceptions for firms are services demand in Italy (Table 11, column (9)) and in Spain (Table 12, 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 11, column (19)). However, the related coefficient exhibits a magnitude approximately 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.

[23] These are retail demand and construction prices in Germany (Table 10, columns (6) and (16)), services prices in Italy (Table 11, columns (12)), and construction employment in Spain (Table 12, column (14)).

[24] For example, consumers now strongly respond to contractionary monetary policy surprises in Spain and Italy by decreasing their economic expectations (column (20) of tables 12 and 11). The 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. Firms in Italy and Germany almost systematically increase their economic expectations following an expansionary 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.

in Italy and Spain tend to respond much more strongly to immediate monetary policy surprises than firms in Germany. 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 policy stance 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 is sector- and country-dependent. That may imply that particular economic or societal contexts, or other factors of the media report, matter more for the responses of expectations to monetary policy announcements than what a mere economic textbook interpretation may suggest. In a following analysis, we will consider and test for other potential reasons that could explain the positive coefficients found for France.

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. They 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 use the CPI inflation flash estimates release for price expectations. These two have the important advantage that they usually come at the beginning of the month, often during the week of the press conference.[25] 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.[26] The third variable is taken as an equivalent to Bauer & Swanson (2020)'s US stock market index.[27]

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 alter their sign, 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 tend to 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 statistically 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 more deeply in what follows.

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

[26]This 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.

[27]Bauer & 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 chose the same specification.

Table 2: Estimates, Bauer-Swanson controls

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1-month surprise, media	**0.159*****	**-0.341*****	0.040	**-0.365*****	**0.255*****	0.017	**0.064***	-0.037	**-0.271*****	**0.250*****
	(0.057)	(0.070)	(0.059)	(0.062)	(0.039)	(0.024)	(0.033)	(0.051)	(0.084)	(0.065)
1-year surprise, media	**0.164****	0.059	0.038	0.064	**0.101***	0.028	0.037	**0.240****	0.022	-0.160
	(0.066)	(0.128)	(0.062)	(0.089)	(0.058)	(0.035)	(0.077)	(0.093)	(0.176)	(0.098)
Dummy oct 2008	-6.998***	-7.248***	-7.844***	3.931***	-0.533	-1.222***	-2.898***	-7.470***	3.117*	3.031***
	(0.804)	(1.441)	(1.000)	(1.375)	(0.681)	(0.384)	(0.899)	(1.221)	(1.647)	(0.966)
Dummy nov 2008	-6.978***	-3.680**	3.718***	-16.840***	-0.700	-2.419***	-7.114***	-5.479***	-3.545*	5.849***
	(0.900)	(1.420)	(1.087)	(1.802)	(0.833)	(0.483)	(0.995)	(1.267)	(2.093)	(0.998)
Dummy dec 2008	-6.168***	0.592	-5.601***	6.129**	1.038	-1.710**	-0.234	-5.630***	8.316***	-5.004***
	(1.028)	(2.344)	(1.217)	(2.803)	(1.028)	(0.863)	(1.005)	(1.991)	(2.639)	(1.247)
Ind. prod. FR, backw.	0.066	0.032								
	(0.056)	(0.083)								
Retail dem. FR, backw.			0.290***	-0.079						
			(0.038)	(0.052)						
Serv. dem. FR, backw.					0.228***	0.087				
					(0.081)	(0.055)				
Const. emp. FR, backw.							0.280***	0.249***		
							(0.047)	(0.063)		
Cons. price FR, backw.									0.134	
									(0.161)	
Cons. eco. FR, backw.										0.913***
										(0.084)
Bauer & Swanson (2020) controls:										
Unemp. release, chge	236.492		-242.607		101.795		-210.176			5.667
	(175.865)		(211.106)		(126.636)		(138.233)			(199.044)
Flash CPI release, chge		375.255**		60.265		54.680		-65.270	533.238***	
		(166.562)		(190.038)		(70.886)		(123.441)	(190.029)	
CEPR eco index, lag chge	4.573	7.459	4.279	7.138	1.529	-0.791	3.958*	5.281	2.631	4.618
	(4.117)	(4.640)	(4.083)	(4.935)	(2.427)	(2.179)	(2.313)	(4.212)	(6.534)	(3.920)
Eurostoxx change, B-S	4.380	1.150	4.473	2.650	9.556***	5.606***	2.163	0.873	5.161	-1.958
	(3.657)	(4.254)	(3.690)	(4.158)	(2.719)	(1.783)	(3.617)	(3.674)	(6.875)	(3.718)
constant	0.180	-0.003	0.124	-0.110	0.016	-0.016	-0.080	0.042	-0.094	0.131
	(0.298)	(0.366)	(0.320)	(0.343)	(0.219)	(0.144)	(0.242)	(0.299)	(0.428)	(0.298)
R^2	0.211	0.101	0.408	0.222	0.289	0.186	0.308	0.274	0.103	0.578
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 an issue of omitted variables?

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 an issue of omitted variables could be at work. We address this 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 obtained 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.[28] Our assumption is the following: if substantial omitted variables issue stemming from influential factors would be the main reason for our results, this omitted variables issue would arguably also be 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 an issue of omitted variables. 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 13, available in Appendix 9.4, 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 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, the results suggest that financial investors also do respond to surprises in the future monetary policy stance, while the associated coefficient is also negative. Overall, this outcome supports that our initial results

[28]In 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 solid correlation with the data on economic expectations for firms in the euro area (for most sectors, the correlation is at least 50%).

are not plagued by an issue of omitted variables.

Second, we repeat the same estimation 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, 0 otherwise. We denote this variable by *Dummy*. In effect, $\textit{1-month surprises}^{media}$ in equation 2 could be written equivalently as $\textit{1-month surprises}_t^{all} * \textit{Dummy}$, and we thus now separately add the variable *Dummy* to the regression. Our underlying assumption in specification 2 was that there was no specific information present from *Dummy* in itself, meaning that what was relevant was only the monetary policy surprise. However, if a negative factor that we omitted weighs on expectations at the same time as a monetary policy surprise and is responsible for such effect instead of the surprise, the inclusion of *Dummy* would likely make the statistical significance of our monetary policy surprises vanish, while only the coefficient of *Dummy* would remain significant. By including the dummy variable into the regression, we scrutinize such a case. A drawback of this approach is that the correlation between *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 the last five columns of Table 13. 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. This suggests that the dummy variable is never statistically seen as more relevant than the monetary policy surprise variable. As we could 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 be clearly rejected, except for the case of construction prices expectations.[29] The coefficient associated with media-consistent monetary policy surprises retains its significance for five pairs, despite the presence of the dummy variable, indicating that it contains more relevance than the dummy variable. We also note 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

[29]The relevant coefficient for this pair also lost statistical significance when using the Bauer-Swanson controls.

the effect of omitted variables.[30]

Finally, it could also be that relevant factors correlated with the "consistency of the media report" characteristic were ignored and that such factors, rather than the "consistency of the media report", explain our key result. The size of the surprise could be such a factor. To investigate this aspect, we selected the four largest financial surprises (in magnitude) in the OIS 1-month (during the press release window) and repeated our baseline estimates. Two of these surprises were consistently reported as such in the media reports. Estimates also showed that these surprises were linked in a statistically significant way to expectations for half of the pairs considered, and with a similar sign as in our baseline estimates. Such results therefore seem to add a limit to our analysis. When selecting the eight largest financial surprises, however, the related coefficient was significant at the 5% threshold in only one estimate.[31] We will further investigate the role of the media treatment in Section 7.

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

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 contractionary monetary policy surprise is associated with higher economic expectations.[32] 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

[30] As another robustness check, we considered the change in the OIS 3-month during the press release window as our key variable for surprises in the immediate monetary policy stance. This variable has the advantage of better matching the firms' expectation horizon, but the disadvantage of mixing information on the current decision and the future policy stance. While the coefficients remain of similar sign for 9 out of 10 specifications, they were statistically significant only for 3 out of our 10 previous estimates. The results are available upon request.

[31] We also performed the analysis of Enders et al. (2019) to assess potential nonlinearities and re-estimated model 1 adding cubic terms to it. The coefficients related to a linear effect of *1-month surprise, all* were found to be statistically insignificant in all regressions, while only one coefficient associated with the cubic term was statistically significant at 10% level. The results of this additional analysis do not provide an overall support that small or moderate surprises impact expectations differently from large ones. The results are not reported in detail, but are available on request.

[32] The 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).

as *"information shocks"*, while *"pure monetary policy shocks"* refers to those comoving 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"* measured by Jarociński & Karadi (2020)'s "poorman proxy". The second measure of the authors also comes with a sign opposite of the sign of our monetary policy surprise in all of these latter cases, suggesting an effect inverse to the one we measure. Overall, these observations suggest that our results are not reflective of "information shocks".

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

$$\Delta Y_t = \alpha_3 + \beta_3 \ \textit{pure MP shock}_t^{media} + \phi_3 \ \textit{information shocks}_t^{media} + \gamma_3 X_t \tag{3}$$

The new key variables here are *pure MP shocks* and *information shocks*, which refer, respectively, to the *"pure monetary policy shocks"* and to the *"information shocks"* from Jarociński & Karadi (2020). We use their measure computed from posterior means, as it is arguably more precise. Note that these are built from the surprises 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. 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. Equation 3 consistently considers only media-consistent shocks, as indicated by the superscript ^{media}.

For our coding, we consider that the newspaper consistently reports an "information shock" when it refers to changes in economic forecasts or to more optimism/pessimism on the economic outlook stemming from the central bank communication.[33] We consider only those shocks appear-

[33]For *pure MP shocks*^{media}, we use our coding from section 3 and consider that a shock is consistently reported

ing as consistent with the reports of the two newspapers. Reading 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 (APP) in the period 2010-2014, triggering worry or optimism. We show them as "media-consistent, APP-related" in Figure 2 when they appear as such, but we do not consider them in $\textit{information shocks}^{media}$ in the below estimates because of their specific nature. In Figure 2 we present the "information" and "pure monetary policy" shocks; the shocks consistently reported in the media appear in red. Once again, we observe that most surprises identified by the financial measure do not appear to be consistent with the media report. In total, only about 23% of the "information shocks" appear to be consistently reported as such in the media. In several cases, the "information shocks" appear to be totally inconsistent with the newspaper reports. For the sake of brevity we provide a detailed discussion on these inconsistencies in Appendix 9.5.

by the media when the media report either on the immediate or on the future monetary policy stance is consistent with the sign of the monetary policy shock given by Jarociński & Karadi (2020)'s measure.

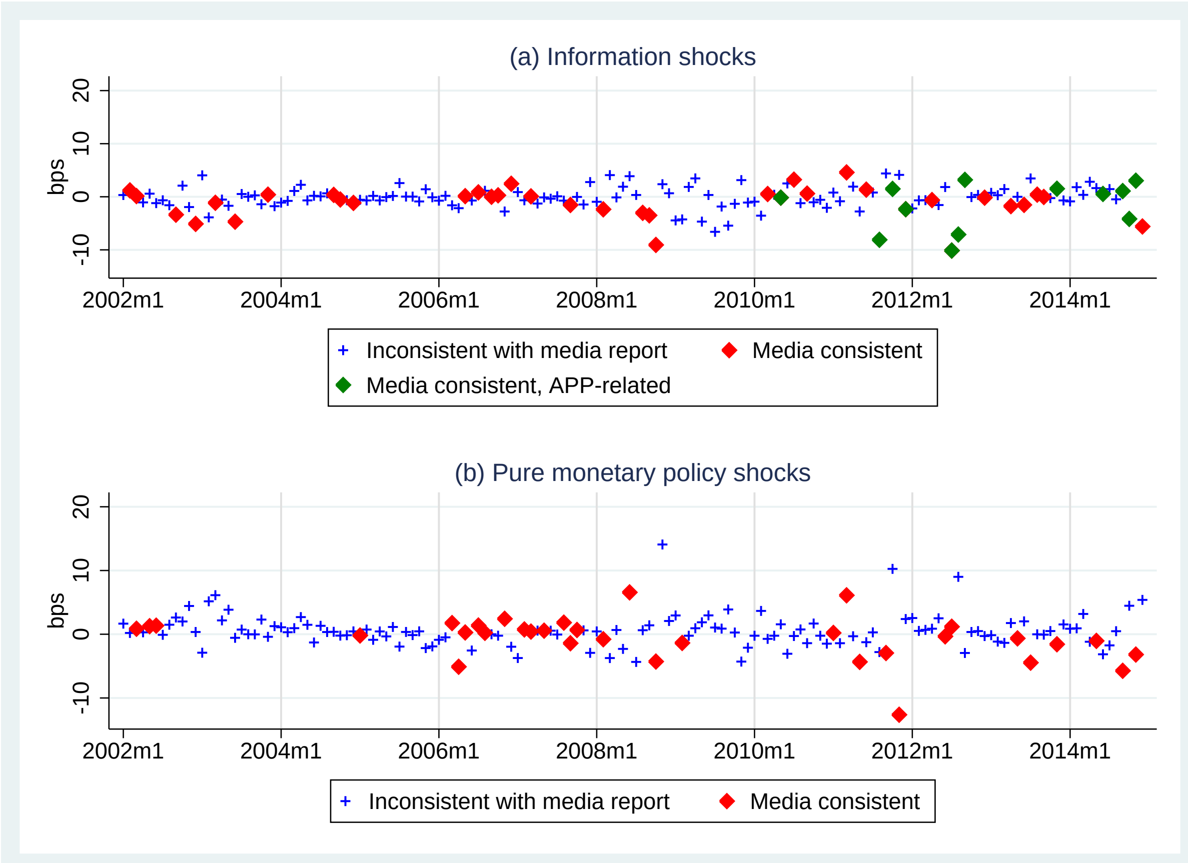

Figure 2: Information and monetary policy shocks from Jarociński & Karadi (2020), inconsistently (blue) versus consistently conveyed as such by Le Monde and Le Figaro (red), with information shocks appearing as related to APP in green

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 reports from Le Monde and Le Figaro appear in red, the others appear in blue. Media consistent information shocks are those for which both newspapers report a change in economic forecasts or convey optimism/pessimism on the economic outlook in the direction indicated by the shock. Media consistent, APP-related information shocks are those information shocks that appear related to APP considerations. Media consistent monetary policy shocks are those for which both newspapers report a surprising decision/tone on the monetary policy stance in the direction indicated by the shock. The sample period is 2002:m1 - 2014:m12.

The results are presented in Table 3. 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 two cases out of ten do media-consistent information shocks appear significantly related to expectations. It is the case for retail prices (column (4)) and construction prices (column (8)). In both cases, the coefficient appears with the expected sign:

positive information surprises lead agents to increase their price expectations.[34] Overall, these results show limited evidence that informational effects matter in our context.

[34]Media-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 found not to recurrently matter.

Table 3: Estimates, information versus pure monetary policy shocks

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	demand	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Information shocks, media	0.103	0.247	0.111	**0.436***	-0.110	-0.008	0.183	**0.389*****	-0.125	0.155
	(0.183)	(0.270)	(0.314)	(0.262)	(0.137)	(0.089)	(0.133)	(0.144)	(0.318)	(0.216)
Pure MP shocks, media	0.181	0.091	-0.116	-0.151	**0.302*****	**0.093***	-0.002	0.128	0.124	-0.276
	(0.121)	(0.289)	(0.128)	(0.185)	(0.075)	(0.056)	(0.115)	(0.138)	(0.259)	(0.284)
Dummy oct 2008	-9.497***	0.532	-8.325***	12.768***	-5.519***	-1.471*	-2.912**	-5.370***	7.055**	0.348
	(1.596)	(2.770)	(2.872)	(2.706)	(1.225)	(0.758)	(1.327)	(1.359)	(2.919)	(2.198)
Dummy nov 2008	-6.972***	-3.941***	3.745***	-17.111***	-0.650	-2.441***	-7.184***	-5.452***	-3.521*	5.744***
	(0.915)	(1.400)	(1.177)	(1.700)	(0.855)	(0.490)	(1.003)	(1.333)	(2.115)	(1.001)
Dummy dec 2008	-6.137***	0.226	-5.561***	5.758**	1.158	-1.732**	-0.368	-5.769***	8.267***	-5.013***
	(1.046)	(2.297)	(1.233)	(2.716)	(1.053)	(0.862)	(1.018)	(2.118)	(2.609)	(1.238)
Ind. prod. FR, backw.	0.074	0.043								
	(0.058)	(0.084)								
Retail dem. FR, backw.			0.289***	-0.080						
			(0.038)	(0.051)						
Serv. dem. FR, backw.					0.235***	0.089				
					(0.082)	(0.055)				
Const. emp. FR, backw.							0.270***	0.216***		
							(0.048)	(0.062)		
Cons. price FR, backw.									0.140	
									(0.168)	
Cons. eco FR, backw.										0.927***
										(0.083)
Additional controls:										
Bauer & Swanson (2020) controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	0.225	0.105	0.136	0.013	0.013	-0.006	-0.044	0.134	-0.075	0.093
	(0.300)	(0.368)	(0.310)	(0.339)	(0.221)	(0.144)	(0.247)	(0.308)	(0.425)	(0.296)
R^2	0.201	0.098	0.410	0.230	0.297	0.190	0.311	0.260	0.102	0.575
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), encompassing information on both the immediate and the 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.

7 Further evidence on the role of media treatment

Until now we have shown that media treatment matters in the relationship between monetary policy announcements and firms and households' expectations, in the sense that only financial surprises conveyed as such in the media were found to impact expectations. Still, there are other issues related to the media treatment worthy of assessment with which we proceed. First, we analyze the effect of media surprises *per se*, defined solely from the qualitative content of the media report. Second, we analyze the impact of the volume of media coverage. Third, we assess whether the tonality of the media coverage matters.

7.1 The impact of media surprises

In our previous analysis, a few monetary policy announcements were conveyed as surprises for newspapers, but came with the opposite sign as the one of the media reports. That can be said to be the case for example for the June 2014 ECB decision, where a negative interest rate on the deposit facility was introduced. The decision is commented in both Le Monde and Le Figaro as a *"spectacular move"*, while the OIS 1-month surprise is positive that day, suggesting an unexpected tightening. In the following specification, we take into account these idiosynchratic media surprises to investigate whether media monetary policy surprises, more generally, matter.

More specifically, we start by following the coding of Ehrmann & Fratzscher (2007), and build an indicator that takes the value of +1 if the report of the newspaper indicates a tightening inclination, 0 if the inclination is neutral, -1 if it is an easing inclination. We do so for both the assessment of the decision taken, and the assessment of the future policy inclination. In building this indicator, we consider only the content which is conveyed as surprising.[35] We then take advantage of the fact that newspapers usually report the size of the surprise on the policy rate decision to make our indicator more precise in this regard. For example, in December 2008, when a 75bps cut occurred, Le Monde makes it explicit that a 50bps cut was expected instead.[36] In cases such as the preceding example, we assign the value of -0.25 to our indicator instead of the -1 that the binary coding would imply.[37] We then compute an overall index based on the average of the

[35]Regression considering all news content, irrespective of whether announcements are conveyed as surprises or not, did not yield statistically significant coefficients for the media monetary policy surprises. That may be expected insofar as inclination changes that are not conveyed as surprises are often pre-announced, or likely to pose endogeneity issues. All results are available on request.

[36]This example is illustrated by the very clear wording from Le Monde: *"If such a decision from the ECB was expected, its amplitude is a surprise: the majority of economists were betting on a 50 basis points cut in the main interest rate"*.

[37]In one case, in which the newspaper was not explicit on the size of the surprise in the report, we went through

indicators at the newspaper-level, weighted by the audience figures as indicated by the ACPM.[38] The resulting indices are plotted in Figure 6, shown in Appendix 9.1. We then investigate whether our indices help explain expectations through the following regression:

$$\Delta Y_t = \alpha_4 + \beta_4 MS_t^{decision} + \phi_4 MS_t^{future} + \gamma_4 X_t. \tag{4}$$

where the dependent variable Y_t and the controls X_t are the same variables as previously defined, and MS_t refers to the media surprise index, either relating to the interpretation of the rate decision (superscript ^{decision}) or to the one of the future policy stance (superscript ^{future}).

The results are reported on Table 4. As can be seen, we do find a statistically significant relationship in some, but not all, cases. The coefficient is statistically significant only when it relates to economic expectations for the industrial sector, the construction sector, and consumers. These are also pairs that we found robust to the Bauer and Swanson specification in section 6.1. The sign is similar to the one we found before, i.e., positive. In further tests, we investigated whether the results were robust to the inclusion of the Bauer-Swanson controls: it was the case for the three pairs except the industry-production pair.

All in all, these results reinforce the previous conclusions that monetary policy announcements affect economic expectations of these sectors, but do not reinforce the conclusions we drew for the other sectors. For the latter group, it could be that media surprises *per se* do not affect expectations, or it could be that the information in the financial monetary policy surprise was of better informational relevance than that of our index. It could also be that other aspects of the media treatment are missing for a correct identification of the relevant coefficients, which the next sections will allow us to investigate.

past reports to see which figures were mentioned as potential outcome beforehand to judge on the size of the surprise. In a few cases, like the negative rate adoption in June 2014, the policy move was reported as a surprise on the day of the announcement despite the fact that we could find reports the days before mentioning that some observers expected the outcome (in some cases this is conveyed as *"expected by a minority of observers"*). For simplicity, in such cases we assume that the move is a complete surprise.

[38] For all the indices built from ACPM weighs used in the regressions of this paper, we used the figures of the survey related to decision-makers for firms, and those of the general survey for households, although the correlation between the two resulting indices is more than 99% for both measures. All indices plotted in the paper are those using the weighs for firms.

Table 4: Estimates, media surprises index

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Media surprise, decision	**11.448****	7.982	-2.056	1.697	-2.942	-4.390	**13.100****	2.961	0.512	**11.763****
	(5.394)	(7.991)	(7.685)	(9.051)	(8.349)	(3.492)	(5.344)	(6.866)	(10.773)	(5.850)
Media surprise, future	**1.399*****	0.725	-0.743	0.292	**0.682***	0.410*	-0.154	**1.117***	0.272	-0.166
	(0.502)	(0.649)	(0.556)	(0.608)	(0.402)	(0.237)	(0.529)	(0.607)	(0.953)	(0.622)
Dumy oct 2008	-2.463	-0.984	-12.442***	5.158	-6.031	-3.626**	1.423	-6.604*	7.057	5.307*
	(2.752)	(4.288)	(3.903)	(4.868)	(4.266)	(1.796)	(2.824)	(3.492)	(5.373)	(2.730)
Dumy nov 2008	-4.224***	-1.553	0.796	-13.104***	0.103	-2.404***	-8.000***	-3.616***	1.078	4.202***
	(1.053)	(1.885)	(0.855)	(1.908)	(0.948)	(0.496)	(0.563)	(0.963)	(3.448)	(0.855)
Dumy dec 2008	-3.435**	0.123	-9.021***	0.817	-0.441	-4.150***	2.601*	-2.673	3.470	-1.055
	(1.468)	(2.376)	(2.073)	(3.110)	(2.278)	(0.992)	(1.484)	(1.936)	(3.381)	(1.513)
Additional controls:										
Backward-looking indices	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	1.872***	0.018	0.136	-0.079	-0.039	-0.053	0.079	0.091	-0.285	0.152
	(0.650)	(0.347)	(0.319)	(0.325)	(0.216)	(0.143)	(0.248)	(0.304)	(0.419)	(0.287)
R^2	0.275	0.186	0.388	0.303	0.271	0.180	0.329	0.291	0.132	0.591
N	156.000	156.000	156.000	156.000	156.000	156.000	156.000	143.000	156.000	156.000

Notes: OLS estimates of the coefficients of equation 4, where the controls are the same as the ones used in Table 1. *Media surprise, decision* corresponds to the index of media surprises on the policy rate decision, *Media surprise, future* corresponds to the index of media surprises on the future monetary policy stance. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

7.2 The impact of the volume of the coverage

In the next step, we take a potentially key aspect into consideration: the volume of the news coverage. A higher volume of media coverage may affect the response of expectations, simply because more agents are exposed to the news, or because the higher coverage makes the news seen as more important.

We create an index of news coverage volume to investigate this particular aspect. For each monetary policy announcement, we identify the volume of coverage it received; this is done for the part of the announcement related to the policy rate decision as well as for the part related to the future monetary policy stance. Specifically, we identify for each article whether the dominant topic (defined as the topic covering at least half of the article) is the current rate decision or whether it is the future policy move.[39] We choose again a human coding approach here given the relatively low number of articles, and also because of the textual ambiguities inherent in such a context, difficult to address with alternative approaches.[40] We then count the number of characters in each article retained using textual analysis tools and build an aggregate measure for each monetary policy announcement at the newspaper level. After that, we compute the average number of characters in the two newspapers for each announcement, weighted by the ACPM readership figures previously mentioned. The resulting index is plotted in Figure 3. As one can see, there is generally more news volume on the current rate decision than on the communication on the future monetary policy stance. The peak of news volume on the policy rate decision relates to the adoption of negative interest rates in June 2014. The peak of volume on the future monetary policy stance is the introduction of forward guidance in July 2013.

[39]Sometimes, articles report on the press conference, but the dominant theme is neither of those. For example, in October 2002 or November 2003, some articles just focus on the comments of the President on the Stability and Growth Pact and the need for fiscal discipline. Around that period, other articles focus only on the comments vis-à-vis the exchange rate that Trichet made during the press conference and on the relevance of the exchange rate. In 2010, many articles focus on Trichet's declarations vis-à-vis Greece and the role of the ECB in the Troika. We naturally do not select those articles and focus only on the ones that are relevant to our object of interest.

[40]For example the article *"Les justifications de Wim Duisenberg"* (the justifications of Wim Duisenberg) in May 2003 starts by saying *"Duisenberg had to justify yesterday the ECB decision to keep its interest rates unchanged. Here are his answers to the main questions."* and then the article deals with growth, inflation, financial, and fiscal developments. With standard automatic text classification methods, it would be difficult to capture the fact that this article deals with the monetary policy decision and its justifications, rather than with the future monetary policy inclination or with any other aspect. Each article that justifies the policy rate decision is treated as related to the monetary policy decision, while each article that discusses the future monetary policy inclination is considered as related to the future monetary policy inclination. The few cases where we cannot clearly distinguish which is the dominant theme are counted as both.

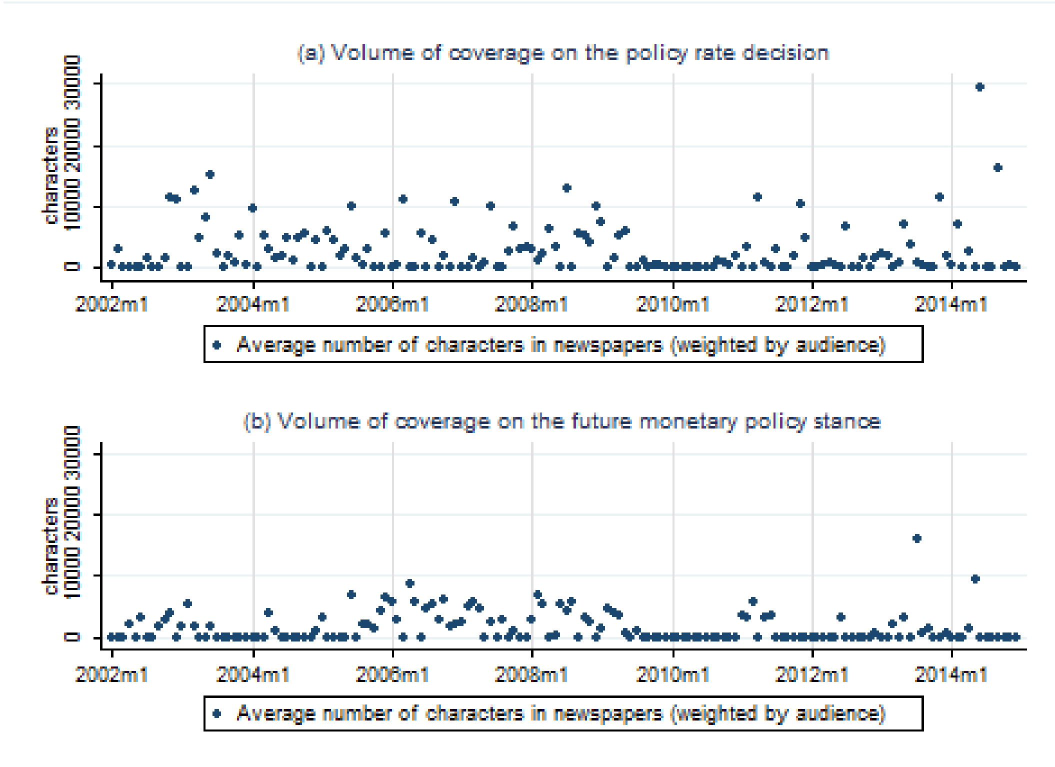

Figure 3: Volume of the coverage on the policy rate decision (upper panel) and on the future monetary policy stance (lower panel)

Notes: Panel (a) shows the volume of the coverage related to the policy rate decision. Panel (b) shows the volume of the coverage related to the future monetary policy stance. For each aspect, the volume of coverage is proxied by the number of characters in all articles where the aspect in question is the dominant theme. The weighted average for both newspapers (weighted by audience) is then taken. The sample period is 2002:m1 - 2014:m12.

We then investigate whether the volume of media coverage plays a role by running the following regression:

$$\begin{aligned}\Delta Y_t = \alpha_5 + \beta_5 MS_t^{decision} + \phi_5 MS_t^{future} + \delta_5 MS_t^{decision} * VOL_t^{decision} + \\ \omega_5 MS_t^{future} * VOL_t^{future} + \psi_5 VOL_t^{decision} + \eta_5 VOL_t^{future} + \gamma_5 X_t\end{aligned} \tag{5}$$

where MS_t refers to the media surprise index built in the previous section, either for the monetary policy decision, or for the future policy stance, and $VOL_t^{decision}$ and VOL_t^{future} are the indices of news volume previously discussed, standardized.

The results are displayed in Table 5. As one can see, the volume of news coverage seems not to make a strong difference for firms. The coefficient on the interactive term is never statistically significant at conventional statistical levels, except in the case of the construction-prices pair. The volume of coverage seems to matter for consumers' economic expectations. A higher volume of coverage on the rate decision makes the reaction to the monetary policy decision less positive, thus making it less in contradiction with what standard theories would predict. However, the relevant coefficient is statistically significant only at the 10% level.

We double checked these results by building an alternative index of media attention. We use the figures from the company Lesewert, which found that around 25% of a newspaper is usually read,[41] and build an attention score accordingly. We give a value of +1 for each article that has as a dominant theme the policy rate decision. We then give a value of +.5 if other articles mention the policy rate decision, without it being the dominant theme.[42] We then give a value of +4 if the decision makes it to the first page of the newspaper. This is tantamount to assuming that the first page is always read, while the probability of other articles being read is 25%. The same is done for the future monetary policy stance aspect of the announcements. The resulting index shows a very similar pattern to the one previously obtained and is plotted in Figure 7, in Appendix 9.1. We then estimated equation 5 with the two resulting attention variables in place of $VOL_t^{decision}$ and VOL_t^{future}. The results, which appear in Table 14 in Appendix 9.6, show the same pattern as those depicted previously. Higher media attention to the rate decision always makes the reaction to the monetary policy decision less positive, when the interaction term is statistically significant. Attention appears to matter once more for households' economic expectations and for the construction sector's price expectations, but we also find some support that it matters for the pairs industry-price and retail-price. As with the previous specification, the coefficients related to the linear coefficients for monetary policy surprises see their amplitude change, but this is to be expected with the inclusion of the nonlinear terms.

Note that there is a limit to the above analysis, namely that most of the media surprises come with a relatively high volume of news. All surprises in the policy rate decision that we identified

[41] Available here: *https://www.niemanlab.org/2019/09/this-company-opens-up-the-black-box-of-what-print-newspaper-subscribers-are-actually-reading/*

[42] About two thirds of the 1800 articles we considered just quickly mention the ECB decision without commenting on it. For example, several articles discussing the stock market developments tend to recall the ECB decision or communication often with just one sentence, so that the ECB takes a very small part of the article, many times less than 5 percent of the total characters. We chose not to ignore them by putting a score of +.5 if such articles exist, while still keeping things simple on this aspect, which represents a minor aspect of news coverage. Initially, we have tried, for Le Monde, to give a score of +0.15 for each extra article where at least a paragraph mentioned the relevant aspect and +0.05 for each extra article where a sentence mentioned the relevant aspect. These two figures were chosen based on the average ratio of the number of characters in the sentence(s) related to the said aspect to the total number of characters, in two randomly chosen years for which we did these computations. The correlation between the index built as such and the original index was 99.9%, so we decided to keep things simple.

have a volume of news in the highest quartile of the distribution of the associated index. The median surprise in the future monetary policy stance has a volume of news in the highest quartile of the distribution of the associated index. One should therefore not conclude from this section that the volume of news doesn't matter, but rather that our estimates show no evidence that it matters at the margin, starting from a relatively high volume of news.

Table 5: Estimates, media surprises index and volume of the coverage

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Media surprise, decision	25.006***	21.735	-26.464	13.525	9.420	-1.916	20.974**	34.742**	-26.945	39.815**
	(9.243)	(17.559)	(17.024)	(19.087)	(15.199)	(8.418)	(10.246)	(14.748)	(17.443)	(15.439)
Media surprise, future	1.996***	1.451*	-0.426	-0.300	1.139*	0.472	-0.755	0.134	-0.477	0.272
	(0.649)	(0.810)	(0.693)	(0.808)	(0.585)	(0.345)	(0.615)	(0.787)	(1.297)	(0.807)
Media surprise, decision * Volume, decision	-7.426	-10.330	12.012	-6.891	-5.107	-1.124	-5.566	-14.559**	14.311	-13.938*
	(5.199)	(7.718)	(9.452)	(6.741)	(5.892)	(3.429)	(4.075)	(6.905)	(10.376)	(7.068)
Media surprise, future * Volume, future	-0.742	-0.961*	-0.363	0.595	-0.447	-0.068	0.461	0.949**	0.823	-0.488
	(0.467)	(0.553)	(0.365)	(0.487)	(0.306)	(0.181)	(0.331)	(0.415)	(0.736)	(0.571)
Volume, decision	-0.423	-0.992**	0.123	-0.198	0.007	-0.031	-0.558**	-0.100	0.416	-0.369
	(0.321)	(0.477)	(0.516)	(0.367)	(0.296)	(0.150)	(0.240)	(0.419)	(0.571)	(0.310)
Volume, future	-0.298	-0.110	-0.293	0.519	-0.340	-0.094	-0.137	-0.129	0.286	-0.176
	(0.285)	(0.370)	(0.296)	(0.324)	(0.223)	(0.120)	(0.246)	(0.253)	(0.434)	(0.365)
Dummy oct 2008	2.709	3.483	-21.221***	9.145	-0.978	-2.617	4.002	5.239	-3.129	15.851***
	(3.373)	(7.275)	(6.915)	(8.643)	(6.444)	(3.423)	(4.536)	(6.152)	(7.031)	(5.898)
Dummy nov 2008	-3.494***	-0.821	1.117	-13.598***	0.437	-2.336***	-8.108***	-4.024***	0.519	4.762***
	(1.092)	(1.732)	(1.012)	(1.882)	(1.053)	(0.552)	(0.621)	(1.103)	(3.427)	(0.886)
Dummy dec 2008	-2.107	1.413	-10.105***	1.500	0.503	-3.985***	2.698	-1.536	1.832	0.781
	(1.315)	(2.583)	(2.255)	(3.716)	(2.384)	(1.115)	(1.710)	(2.289)	(3.073)	(1.558)
Baseline controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	1.556**	-0.074	0.178	-0.100	-0.073	-0.059	0.087	0.088	-0.186	0.063
	(0.699)	(0.347)	(0.343)	(0.332)	(0.222)	(0.145)	(0.245)	(0.302)	(0.422)	(0.279)
R^2	0.295	0.237	0.400	0.319	0.289	0.182	0.357	0.341	0.148	0.602
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 4, where the controls are the same as the ones used in Table 1. *Media surprise, decision* corresponds to the index of media surprises on the policy rate decision, *Media surprise, future* corresponds to the index of media surprises on the future monetary policy stance. $Volume, decision$ and $Volume, future$ are indices of the volume of the news coverage, respectively for the coverage on the policy rate decision and the coverage on the future monetary policy stance, which were standardized before entering the regression (for readability). In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

7.3 The impact of the tonality of the media report

Finally, we turn to the question of whether the tonality of the media report matters. Media may present a monetary policy decision under different forms. They may for example overstress the bad news that justify the ECB decision, or focus more on the positive aspects of the decision. That may, in turn, impact the reaction of firms and households to the monetary policy announcement.

To investigate whether tonality matters, we first build an index of sentiment of the media reports based on Natural Language Processing (NLP) methods. We follow Shapiro et al. (2022) and use the VADER sentiment analyzer (Valence Aware Dictionary for Sentiment Reasoning), that computes the degree of positivity or negativity of a specific text; we use the French extension of VADER.[43] VADER analysis offers several advantages as it takes into account the qualitative differences between words (for example the word "great" is considered much more positive than the word "good") and accounts for punctuation. These features make it often seen as superior to standard "bag-of-words" approaches.[44] We follow Picault et al. (2022) and previously clean our news articles by removing all words that refer to particular monetary policy aspects while being indicative of emotions in the VADER dictionary.[45] We also remove expressions containing homonym words that we found several times in our corpus, while they did not correspond to the emotional word of the VADER dictionary.[46] We then chose to focus only on the negative content, in line with Tetlock (2007), insofar as negations of negative words are more rare and thus makes the NLP approach more robust.[47] Following Shapiro et al. (2022) we compute the score at the sentence-level, and then aggregate it for each article. From each newspaper, for each monetary announcement we take the average of the sentiment of the articles published on the monetary policy announcement (weighted by the number of characters). We then weigh by the newspaper's audience to obtain our final index of the sentiment of the monetary policy decision report. The resulting index is shown in Figure 4, and in Appendix 9.7 we list the most frequent words present in the index.

[43] Available here: $https://github.com/pvhk/vader_fr$

[44] See Shapiro et al. (2022) for a more exhaustive description of VADER.

[45] For example, "interest rate" is removed as "interest" is a positive word in the VADER dictionary, as is "facility" in "marginal facility rate". "negative deposit rate" is removed because "negative" is indicative of a negative content in the VADER dictionary, as is "cut" in "interest rate cut" (we thus remove "interest rate cut").

[46] These for example include the word "prix" which refers to both "prices" (not part of the VADER English dictionary) and "prize" (part of the VADER English dictionary) in French. Another example is "pb", which is the French shortcut for "basis point", but which is identified as "problem" in VADER. "secteur privé" (private sector) or "banque privée" (private bank) are removed as they contain the word "privé" (private), indicative of negative content in VADER.

[47] This is also likely to be a more relevant focus for our analysis insofar as a considerable amount of research has shown that individuals tend to react more to the negative content than they do to the positive one (Soroka 2006).

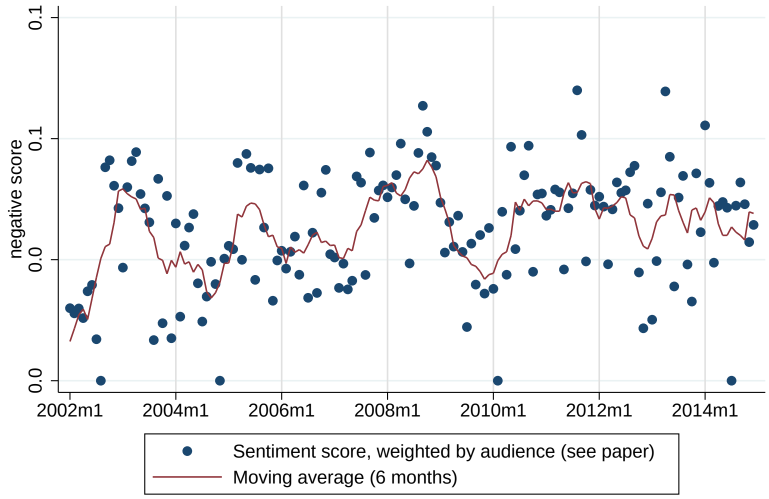

Figure 4: Sentiment of the media reports on monetary policy announcements (negativity score)

Notes: The graph shows the sentiment index built using the negative content of the selected articles, from the French extension of the VADER sentiment analyzer. Each article related to the monetary policy announcement is considered at the newspaper level, and then the weighted average for both newspapers' scores (weighted by audience) is taken. Homonyms not related to the English dictionary and words that are related to monetary policy are carefully discarded before applying the VADER analyzer. The moving average is calculated as the average score over the past three and next three months, considering as well the contemporaneous value. The sample period is 2002:m1 - 2014:m12.

We then investigate whether the sentiment of the media reports on the policy announcement plays a role by running the following regression:

$$\begin{aligned}\Delta Y_t = \alpha_6 + \beta_6 MS_t^{decision} + \phi_6 MS_t^{future} + \delta_6 MS_t^{decision} * SENT_t + \\ \omega_6 MS_t^{future} * SENT_t + \psi_6 SENT_t + \gamma_6 X_t\end{aligned} \tag{6}$$

where $SENT_t$ is the media sentiment index considered, and the other variables have been previously defined.

The results are displayed in Table 6. As can be seen, we do not find strong evidence that the sentiment matters. Only in two cases, the coefficient of the interaction term is statistically significant (column (3) and (8)), while in these cases the coefficient associated with $MS^{decision}$ is not.

There is, however, one important nuance relevant to the above conclusion, namely that the "surprise", by construction, captures some of the relevant information present in the sentiment measure. For example, if we consider the case of the March 2003 meeting where the ECB decreased rates less than expected by some observers, the tightening surprise that day comes with some particularly negative reports, so that one may argue that the relevant information of our sentiment index is also the one relevant to the surprise measure here. We account for this second issue by using the REFI rate change *on the days where decision surprises arise* instead of $MS^{decision}$ in equation 6, and estimate the same model. In effect, the index is similar to our initial measure, except for three dates. Estimates that consider only the changes in the REFI rate when decision surprises arise (without interaction terms) are provided in Appendix 9.6 in Table 15 and show statistically significant coefficients for the variable of interest in only two cases, for price expectations.

The results, which appear in Table 7, are relatively striking. Without accounting for sentiment, the coefficient related to REFI changes was mostly positive and never statistically significant when considering economic expectations (columns (1), (3), (5), (7), (10) of Table 15). When the sentiment term and its interaction is taken into account, the sign changes and becomes negative for three of the pairs (columns (1), (2), and (7)), and becomes much more negative for those two which were statistically significant (columns (4) and (9)). The sign is now negative for more than half of our estimates, i.e. in line with the response implied by standard theories, while the coefficient is statistically significant at the 5% level for five of the ten pairs. For all these pairs, the interactive term with the sentiment index is positive, suggesting that negative media reports associated with the monetary policy announcement can make the response of firms and households to monetary policy surprises positive. Interestingly, the sentiment index is never statistically significant on its own (except in one estimate), suggesting that the sentiment clearly and solely impacts the response to the rate decision.

We performed robustness tests for this result first using the control variables suggested by Bauer & Swanson (2020): the conclusions were unchanged. We also ran "placebo tests" using the volume of news coverage variable (as another positive variable) instead of $SENT$ when interacting with the REFI changes variable: in none of the cases the coefficient associated with $MS^{decision}$ was negative and statistically significant at the 10% level. We have also tested whether sentiment plays a role for investors' responses, using the same specification as the one used above for firms and households, but did not find any statistically significant coefficient for the interactive term. That may suggest that the sentiment of the report matters only for the response of less-informed agents. Finally, we have tried to use our initial financial monetary policy surprises as the $MS^{decision}$ and MS^{future} variables, despite the drawbacks this approach may have. In all cases, the coefficient on the interaction term with $MS^{decision}$ was opposite to the one associated with $MS^{decision}$, but the coefficient on $MS^{decision}$ turned out negative only for 4 of the 10 estimates.[48]

Overall, this suggests that the sentiment of the media report on monetary policy announcements, while not entirely explaining the positive response of firms and households, certainly matters. In contrast to the volume of news, omitting the sentiment of the media report from the regression can change the perceived response of firms and households to monetary policy announcements.

Table 6: Estimates, media surprises and negative sentiment

Variable	**Industry**		**Retail**		**Services**		**Construction**		**Consumers**	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Media surprise, decision	**12.513****	10.158	4.396	-0.341	-1.514	-4.560	**12.858****	-1.160	-4.335	**14.827****
	(4.975)	(9.453)	(6.684)	(9.627)	(9.287)	(4.265)	(5.119)	(7.624)	(10.725)	(6.624)
Media surprise, future	**1.540*****	0.898	**-1.026***	0.235	**0.728***	0.320	-0.293	1.066	0.179	-0.024
	(0.506)	(0.695)	(0.540)	(0.657)	(0.436)	(0.243)	(0.583)	(0.664)	(0.963)	(0.676)
Media surprise, decision * Neg. sentiment	77.511	153.971	**746.070*****	-223.646	139.234	18.328	13.272	**-477.688****	-620.956	170.049
	(221.928)	(204.304)	(282.812)	(210.558)	(348.621)	(148.338)	(186.074)	(235.905)	(581.698)	(201.362)
Media surprise, future * Neg. sentiment	-10.911	-16.078	-7.945	3.072	-4.003	6.069	4.963	4.183	18.085	**-14.840***
	(7.181)	(11.304)	(8.149)	(11.713)	(6.166)	(5.131)	(8.544)	(10.979)	(14.570)	(8.431)
Neg. sentiment	2.002	4.718	**15.974*****	3.450	-1.016	-0.819	3.821	**8.984***	-4.243	3.030
	(4.578)	(5.621)	(4.803)	(6.155)	(3.480)	(2.324)	(3.321)	(5.001)	(7.116)	(4.316)
Baseline controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Dummy oct 2008	-3.650	-3.592	-32.633***	11.769*	-9.801	-4.815	0.746	7.705	24.009	2.234
	(7.804)	(6.364)	(8.324)	(6.090)	(9.806)	(4.135)	(7.128)	(7.882)	(20.569)	(5.127)
Dummy nov 2008	-3.227**	0.028	2.685**	-12.972***	0.346	-2.986***	-8.151***	-3.035*	-0.565	5.979***
	(1.411)	(2.244)	(1.197)	(2.471)	(1.190)	(0.650)	(1.301)	(1.602)	(3.716)	(1.416)
Dummy dec 2008	-3.561*	-0.238	-11.947***	2.127	-1.099	-4.415***	2.505	0.032	6.358	-1.174
	(2.100)	(2.405)	(1.970)	(2.995)	(2.380)	(1.086)	(2.003)	(2.349)	(5.372)	(1.301)
constant	1.884***	0.029	-0.031	-0.167	0.006	-0.065	-0.002	-0.091	-0.341	0.171
	(0.647)	(0.371)	(0.321)	(0.376)	(0.220)	(0.146)	(0.259)	(0.300)	(0.434)	(0.307)
R^2	0.283	0.201	0.447	0.308	0.275	0.190	0.338	0.327	0.153	0.599
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 6, where the controls are the same as the ones used in Table 1. *REFI change, surprise month* corresponds to the change in the REFI rate on months where media surprises in the immediate monetary policy stance arise, *Media surprise, future* corresponds to our index of media surprises in the future monetary policy stance. *Neg. sentiment* is an index of the negativity of the media reports on the monetary policy announcement, as proxied by a VADER sentiment analysis. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

[48] All results mentioned in this paragraph are not reported for space reasons but are available on request.

Table 7: Estimates, REFI changes on months of surprising announcements and negative sentiment

Variable	**Industry**		**Retail**		**Services**		**Construction**		**Consumers**	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
REFI change, surprise month	**-44.229*** **	-28.174	6.321	**-49.408** **	4.859	13.534	**-43.070** **	**-42.564** **	**143.298*** **	**-86.016*** **
	(16.236)	(19.436)	(25.123)	(21.357)	(18.468)	(12.769)	(20.551)	(20.131)	(40.645)	(16.627)
Media surprise, future	-0.334	**-3.880***	**-3.337***	2.241	0.406	1.260	0.972	1.046	0.921	0.473
	(2.034)	(1.973)	(1.813)	(2.459)	(1.451)	(0.948)	(1.928)	(1.815)	(4.188)	(2.357)
REFI change, surprise month * Neg. sentiment	**842.369*** **	437.349	45.998	**607.861***	35.735	-149.302	**772.518** **	449.936	**-2457.967*** **	**1383.772*** **
	(285.869)	(355.294)	(440.918)	(359.348)	(364.599)	(231.676)	(372.844)	(374.342)	(716.333)	(287.767)
Media surprise, future * Neg. sentiment	31.641	**82.872** **	43.737	-39.988	4.491	-15.412	-26.152	1.037	-5.452	-15.012
	(35.360)	(37.510)	(31.231)	(45.645)	(29.292)	(17.238)	(38.042)	(34.817)	(74.943)	(40.818)
Neg. sentiment	8.493	-30.615	**-29.986***	-30.613	4.847	10.403	-14.684	-16.611	21.864	-8.621
	(13.788)	(19.519)	(15.741)	(19.793)	(12.696)	(7.599)	(12.149)	(17.330)	(21.814)	(13.281)
Baseline controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Dummy oct 2008	4.695	1.638	-4.861	5.170	-0.734	-1.467	4.609	-10.109*	-23.041**	13.013***
	(3.845)	(5.629)	(6.459)	(5.008)	(6.027)	(3.426)	(5.210)	(5.751)	(10.064)	(3.876)
Dummy nov 2008	-4.149***	0.116	2.203**	-14.124***	0.134	-2.748***	-8.367***	-3.134**	1.819	4.025***
	(1.293)	(2.085)	(1.111)	(2.268)	(1.200)	(0.573)	(1.137)	(1.270)	(3.519)	(1.123)
Dummy dec 2008	5.391	1.311	-0.881	-3.301	5.690	-1.134	8.260	-10.753*	-20.293**	5.311
	(4.058)	(6.175)	(6.380)	(4.971)	(6.443)	(3.402)	(5.257)	(5.865)	(9.999)	(4.661)
constant	1.494	1.713*	1.805**	1.267	-0.204	-0.558	0.774	0.813	-1.491	0.512
	(0.948)	(1.017)	(0.893)	(0.999)	(0.673)	(0.436)	(0.650)	(0.987)	(1.130)	(0.631)
R^2	0.287	0.217	0.414	0.336	0.280	0.195	0.337	0.322	0.184	0.600
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 6, where the controls are the same as the ones used in Table 1. *REFI change, surprise month* corresponds to the change in the REFI rate on months where media surprises in the immediate monetary policy stance arise, *Media surprise, future* corresponds to our index of media surprises in the future monetary policy stance. *Neg. sentiment* is an index of the negativity of the media reports on the monetary policy announcement, as proxied by a VADER sentiment analysis. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

8 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 this 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.

Inspired by recent evidence showing that firms and households are largely uninformed on monetary policy, we have analyzed the reports from the two general newspapers with the highest coverage in France. Our analysis has revealed that accounting for the media treatment is of key importance: very few of the monetary policy surprises stemming from financial market measures appeared to be consistent with the media report. In our sample, less than 15% of all monetary policy surprises appeared as consistent with the media reports on central bank announcements, and only 23% 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 that appear consistently 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 general assessment was globally confirmed when the same estimates were repeated for Germany, Italy, and Spain. We further tested for the robustness of this result using alternative controls, including the ones suggested by Bauer & Swanson (2020), and repeated our analysis for investors' expectations. The results appeared to be generally robust to all tested specifications and confirmed our interpretation that media-consistent monetary policy surprises matter for households and firms.

We found in our baseline 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) but could not find conclusive evidence. We have then developed our own measure of media monetary policy surprises and investigated whether the volume as well as the tonality of the news coverage matters. We found some evidence that the volume of news matters in the response of households' economic expectations to monetary policy announcements. We found robust evidence that taking the tonality of the media report on the monetary policy announcement is a key aspect: for several of our estimates, the sign of the response to the policy rate decisions changed when we considered the negativity of the media report.

Overall, we believe that our paper makes three key contributions. First, we point out that very few monetary policy surprises are consistent with the media reports and this fact highlights the need for caution in the use of standard monetary-policy-surprise measures for macroeconomic investigation. Such measures are increasingly used in economic research, mainly because of their exogeneity properties. However, as we have shown, the information content in these financial market measures can be completely different from the information appearing in general newspapers, sources that affect firms and consumers. Second, the media treatment does matter for the response of firms and households to monetary policy announcements. Third, our results strongly suggest that researchers must account for how monetary policy announcements were conveyed in the media. Specifically, we show that the negativity of the media reports on the monetary policy announcement should be taken into account when linking monetary policy decisions and non-financial agents' expectations. This is an important aspect that could provide at least a partial explanation for the puzzling positive sign found for the response of agents' expectations to monetary policy announcements in previous studies.

Further research on the media content related to monetary policy could greatly help shed more light on these aspects. In particular, it would be interesting to develop alternative measures of media surprises, and to add other kinds of media to the analysis, such as TV and radio, provided that such data are available. We leave this open for further research.

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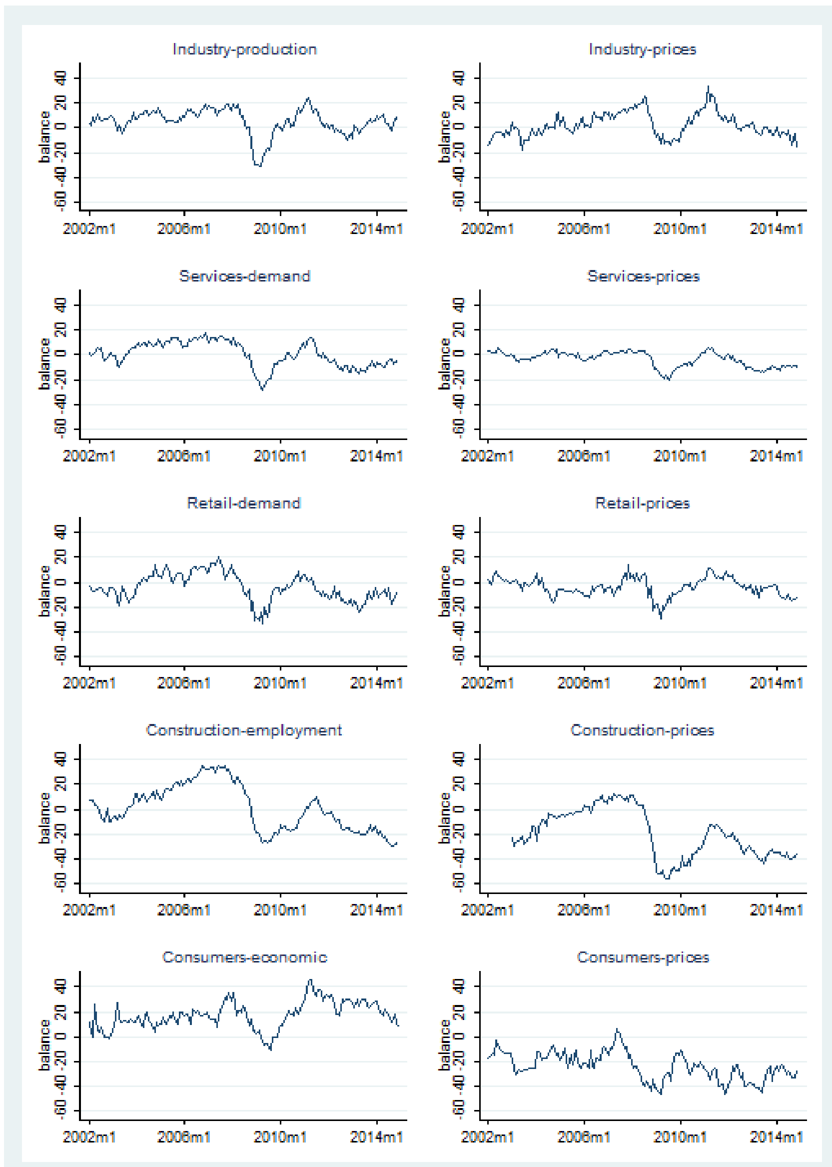
9 Appendix

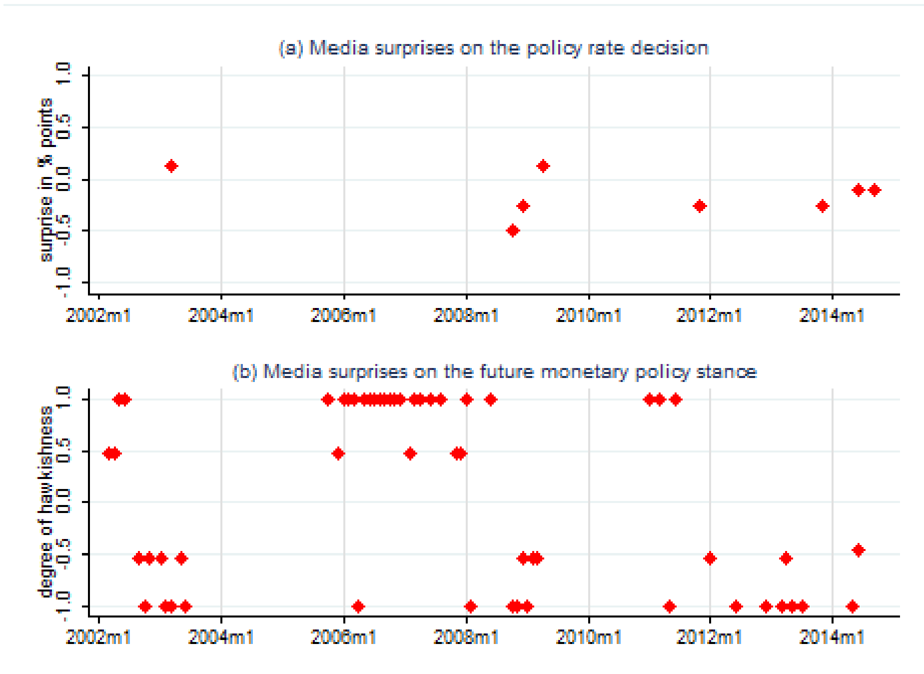
9.1 Additional figures

Figure 5: Economic and price expectations data for France (in level)



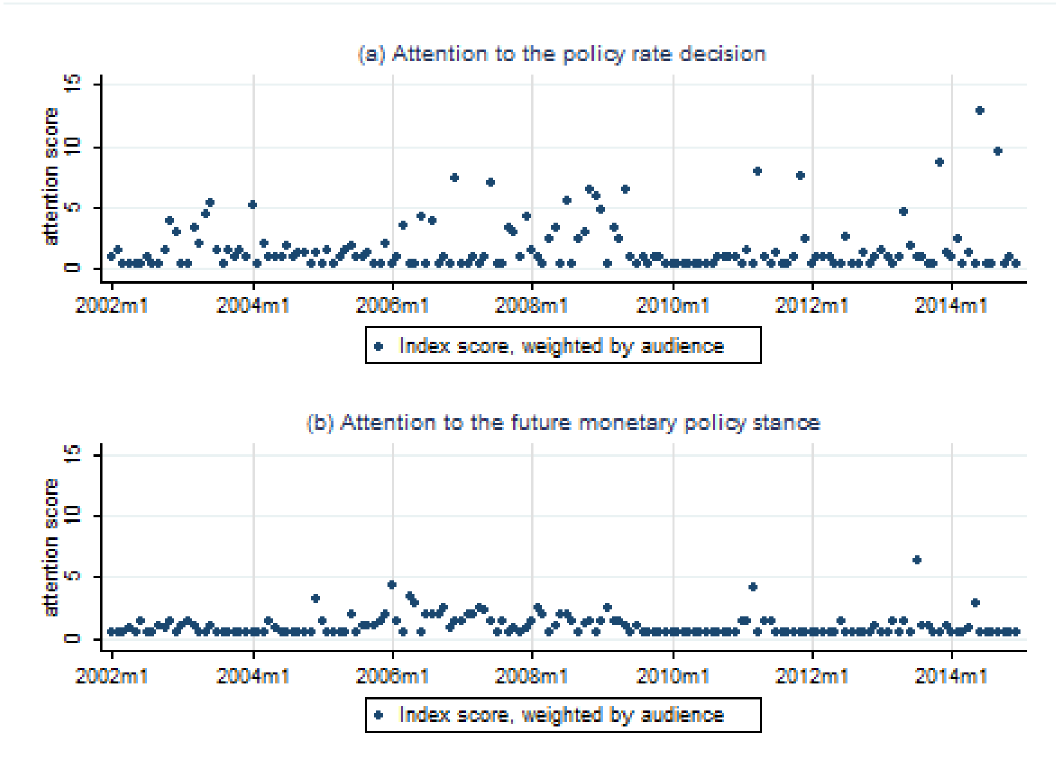
Notes: Data are from DG-ECFIN. For each sector, the data correspond to the seasonally adjusted balance of the answers to the questions of the survey related to economic activity (left graph) or prices (right graph) expectations.

Figure 6: Media surprises index



Notes: Panel (a) shows the media surprise index (based on acute coding) related to the policy rate decision. Panel (b) shows the media surprise index (based on binary coding) related to the future monetary policy stance. The construction is detailed in section 7.1. The sample period is 2002:m1 - 2014:m12.

Figure 7: Media attention to the policy rate decision (upper panel) and to the future monetary policy stance (lower panel)



Notes: Panel (a) shows the attention related to policy rate decision. Panel (b) shows the attention related to the future monetary policy stance. For each aspect, attention is proxied by a score giving +1 for each article where the aspect in question is the dominant theme, +4 if an article on the related aspect is located in the first page of the newspaper, and +.5 if other types of articles mention the related aspect. The weighted average for both newspapers (weighted by audience) is then taken. The sample period is 2002:m1 - 2014:m12.

9.2 Control variables

9.2.1 LASSO selected controls

Table 8: List of the pool of candidate control variables, LASSO selected

Variable	*Definition*
Financial variables	
EUR / USD change	change* in the log of the EUR / USD
Vstoxx change	change* in the log of the Vstoxx

Continued on next page

Table 8 – continued from previous page

Variable	*Definition*
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).
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).

Continued on next page

Table 8 – continued from previous page

Variable	*Definition*
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 seasonnally 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.

9.2.2 Baseline controls

Table 9: List of the other control variables mentioned in the tables of estimates (set X_1)

Variable	*Definition*
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).

Continued on next page

Table 9 – continued from previous page

Variable	*Definition*
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).

9.3 Results for Germany, Italy and Spain

9.3.1 Results for Germany

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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1-month surprise, all	0.033		0.056		0.052		-0.081		-0.095	
	(0.104)		(0.054)		(0.078)		(0.088)		(0.108)	
1-year surprise, all	0.010		0.059		0.065		0.045		0.058	
	(0.059)		(0.047)		(0.088)		(0.058)		(0.072)	
1-month surprise, media		**-0.263***		**0.061**		0.010		**0.069***		**-0.205***
		(0.033)		(0.029)		(0.047)		(0.041)		(0.052)
1-year surprise, media		-0.068		0.093		**-0.117***		0.074		0.051
		(0.069)		(0.064)		(0.069)		(0.070)		(0.065)
Dummy oct 2008	-9.013***	-14.761***	-0.606	-0.249	-1.995	-4.262***	-5.659***	-2.759**	-11.735***	-13.668***
	(2.048)	(0.611)	(1.158)	(0.879)	(1.753)	(1.182)	(1.769)	(1.219)	(2.118)	(0.564)
Dummy nov 2008	-11.405***	-10.697***	-4.124***	-3.223***	-2.707**	-1.775*	0.350	-0.625	-6.215***	-7.356***
	(1.612)	(0.704)	(1.274)	(1.004)	(1.181)	(1.012)	(1.977)	(1.736)	(2.318)	(1.480)
Dummy dec 2008	-5.579***	-5.213***	-0.794	-0.451	-0.694	-0.309	-3.550***	-3.541***	2.360	2.447
	(0.881)	(0.869)	(0.999)	(0.974)	(0.499)	(0.398)	(1.071)	(1.073)	(1.997)	(1.938)
Ind. prod. GE, backw.	0.073	0.072	0.059*	0.062**						
	(0.044)	(0.045)	(0.030)	(0.030)						
Retail dem. GE, backw.					0.320***	0.316***	0.175***	0.181***		
					(0.049)	(0.050)	(0.054)	(0.054)		
Serv. dem. GE, backw.									0.362***	0.362***
									(0.134)	(0.136)
Lasso selected controls:										
Ind. prod. EA, backw.									-0.360***	-0.355***
									(0.118)	(0.118)
CEPR eco index, lag chge	11.175***	12.076***								
	(2.699)	(2.661)								
Ind. prod. GE, lag chge	-0.091***	-0.085***								
	(0.027)	(0.026)								
Lag dependent			0.237***	0.238***						
			(0.084)	(0.086)						
Oil price change			7.608***	7.286***			8.225**	8.319**		
			(2.037)	(2.042)			(3.616)	(3.713)		
Eurostoxx change					19.573***	19.692***				
					(4.626)	(4.662)				
constant	0.401*	0.369*	-0.014	-0.019	0.091	0.097	-0.086	-0.112	0.305	0.251
	(0.224)	(0.221)	(0.171)	(0.172)	(0.282)	(0.286)	(0.301)	(0.300)	(0.409)	(0.414)
R^2	0.415	0.425	0.304	0.305	0.301	0.303	0.151	0.150	0.153	0.153
N	156	156	156	156	156	156	156	156	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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1-month surprise, all	0.023		-0.003		0.035		-0.021		-0.040	
	(0.071)		(0.122)		(0.087)		(0.104)		(0.068)	
1-year surprise, all	**0.086***		0.006		-0.037		0.060		0.010	
	(0.049)		(0.042)		(0.052)		(0.071)		(0.037)	
1-month surprise, media		**-0.063***		**-0.187*****		0.038		**-0.141*****		**-0.038****
		(0.033)		(0.023)		(0.033)		(0.029)		(0.017)
1-year surprise, media		**0.129****		0.038		0.009		0.071		-0.023
		(0.055)		(0.059)		(0.058)		(0.111)		(0.027)
Dummy oct 2008	-2.478	-3.669***	-0.286	-3.252***	-4.961***	-4.535***	3.983**	1.974*	-8.214***	-8.423***
	(1.504)	(0.913)	(2.196)	(0.551)	(1.714)	(0.903)	(1.948)	(1.012)	(1.226)	(0.287)
Dummy nov 2008	-3.040**	-2.651**	0.524	0.518*	-0.096	0.267	-9.427***	-9.546***	1.844	1.312***
	(1.352)	(1.191)	(1.814)	(0.266)	(1.537)	(1.113)	(1.644)	(0.908)	(1.130)	(0.419)
Dummy dec 2008	-1.971*	-1.618	-2.704***	-2.656***	-2.265***	-2.348***	2.095*	2.294**	-7.306***	-7.321***
	(1.011)	(0.983)	(0.444)	(0.296)	(0.708)	(0.724)	(1.158)	(1.137)	(0.660)	(0.622)
Serv. dem. GE, backw.	0.046	0.053								
	(0.055)	(0.056)								
Const. emp. GE, backw.			-0.029	-0.028	0.009	0.010				
			(0.038)	(0.038)	(0.029)	(0.030)				
Cons. price GE, backw.							0.401***	0.400***		
							(0.113)	(0.114)		
Cons. eco. GE, backw.									0.836***	0.839***
									(0.057)	(0.058)
Lasso selected controls:										
Lag dependent	-0.261***	-0.262***								
	(0.092)	(0.091)								
Oil price change	10.430***	9.856***			7.275***	7.194***				
	(2.651)	(2.605)			(2.409)	(2.490)				
Exports GE, lag chge	0.045*	0.046*								
	(0.025)	(0.024)								
Ind. prod. EA, lag chge									-0.279***	-0.278***
									(0.041)	(0.041)
constant	0.040	0.002	0.253	0.229	0.027	0.045	-0.117	-0.155	0.112	0.101
	(0.210)	(0.209)	(0.252)	(0.254)	(0.204)	(0.206)	(0.322)	(0.322)	(0.190)	(0.192)
R^2	0.243	0.246	0.011	0.017	0.121	0.117	0.232	0.232	0.694	0.694
N	139	139	156	156	156	156	156	156	156	156

Notes: See Table 1.

9.3.2 Results for Italy

Table 11: 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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1-month surprise, all	-0.096		0.004		0.281		-0.124		**-0.560*** **	
	(0.122)		(0.056)		(0.277)		(0.116)		(0.150)	
1-year surprise, all	0.024		0.089		0.086		0.091		0.036	
	(0.056)		(0.063)		(0.148)		(0.084)		(0.093)	
1-month surprise, media		**-0.448*** **		**0.064*** **		**0.411*** **		**-0.149* **		**-0.460*** **
		(0.044)		(0.018)		(0.113)		(0.082)		(0.063)
1-year surprise, media		0.008		**0.228*** **		0.028		0.093		0.077
		(0.059)		(0.056)		(0.180)		(0.110)		(0.141)
Dummy oct 2008	-5.683**	-11.826***	-4.579***	-2.347***	3.904	5.608***	-5.914***	-6.287***	-14.777***	-12.602***
	(2.261)	(0.823)	(1.111)	(0.574)	(4.893)	(1.822)	(2.136)	(1.211)	(2.661)	(1.317)
Dummy nov 2008	-6.455***	-7.594***	-4.594***	-4.292***	-10.412**	-6.108***	-6.282***	-7.842***	6.593***	-1.261*
	(2.050)	(0.806)	(1.108)	(0.518)	(4.698)	(1.141)	(2.113)	(0.794)	(2.249)	(0.726)
Dummy dec 2008	-4.871***	-4.804***	-9.349***	-8.991***	-11.534***	-10.635***	-9.292***	-9.227***	2.138***	0.849
	(0.825)	(0.706)	(0.573)	(0.393)	(2.090)	(1.688)	(1.372)	(1.298)	(0.813)	(0.584)
Ind. prod. IT, backw.	0.132	0.135	0.178***	0.174***						
	(0.103)	(0.102)	(0.061)	(0.059)						
Retail dem. IT, backw.					0.307***	0.297**	0.081	0.083		
					(0.115)	(0.116)	(0.070)	(0.071)		
Serv. dem. IT, backw.									0.311***	0.292***
									(0.073)	(0.076)
Lasso selected controls:										
CEPR eco index, lag chge	8.749**	9.479***								
	(3.502)	(3.453)								
Lag dependent					-0.368***	-0.367***	-0.192**	-0.195**	-0.246***	-0.212**
					(0.111)	(0.111)	(0.093)	(0.094)	(0.082)	(0.085)
constant	0.093	0.024	0.084	0.050	0.431	0.492	-0.032	-0.084	-0.049	-0.190
	(0.264)	(0.266)	(0.188)	(0.182)	(0.761)	(0.786)	(0.476)	(0.481)	(0.404)	(0.419)
R^2	0.195	0.210	0.257	0.304	0.212	0.208	0.096	0.093	0.245	0.203
N	156	156	156	156	156	156	132	132	156	156

Notes: See Table 1.

Table 11: 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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1-month surprise, all	0.052		-0.025		0.006		0.124		**-0.376****	
	(0.101)		(0.158)		(0.109)		(0.116)		(0.170)	
1-year surprise, all	0.016		-0.031		-0.017		0.005		0.033	
	(0.066)		(0.059)		(0.063)		(0.081)		(0.082)	
1-month surprise, media		0.085		**-0.288*****		**0.155****		**0.371*****		**-0.846*****
		(0.051)		(0.041)		(0.062)		(0.039)		(0.026)
1-year surprise, media		0.102		-0.036		0.042		0.102		-0.071
		(0.081)		(0.072)		(0.087)		(0.113)		(0.046)
Dummy oct 2008	-0.232	1.091	0.922	-3.782***	-0.234	2.869**	2.525	7.642***	-4.241	-13.232***
	(1.875)	(0.755)	(2.981)	(1.005)	(1.995)	(1.147)	(2.144)	(1.094)	(3.104)	(0.462)
Dummy nov 2008	-9.492***	-8.689***	-5.807**	-6.241***	-3.945*	-3.966***	-0.763	1.035**	3.456	-1.771***
	(1.544)	(0.337)	(2.423)	(0.783)	(2.217)	(1.119)	(1.773)	(0.415)	(2.460)	(0.596)
Dummy dec 2008	-3.909***	-3.798***	3.054***	2.978***	0.307	0.145	0.805	1.056	-5.954***	-6.591***
	(0.885)	(0.810)	(0.948)	(0.828)	(1.271)	(1.132)	(0.806)	(0.707)	(0.787)	(0.650)
Serv. dem. IT, backw.	0.044	0.049								
	(0.059)	(0.058)								
Const. emp. IT, backw.			0.439***	0.438***	-0.026	-0.025				
			(0.072)	(0.072)	(0.059)	(0.059)				
Cons. price IT, backw.							0.450***	0.444***		
							(0.098)	(0.100)		
Cons. eco. IT, backw.									0.562***	0.578***
									(0.086)	(0.088)
Lasso selected controls:										
Lag dependent	-0.267***	-0.280***	-0.301***	-0.293***	-0.485***	-0.490***				
	(0.092)	(0.092)	(0.070)	(0.069)	(0.095)	(0.096)				
Ind. prod. EA, backw.					0.189**	0.184**				
					(0.079)	(0.078)				
Ind. prod. EA, lag chge									-0.071	-0.059
									(0.052)	(0.054)
constant	0.120	0.127	-0.200	-0.221	-0.322	-0.305	-0.214	-0.169	0.202	0.059
	(0.344)	(0.345)	(0.347)	(0.344)	(0.291)	(0.296)	(0.384)	(0.390)	(0.316)	(0.312)
R^2	0.100	0.105	0.393	0.396	0.277	0.279	0.162	0.169	0.331	0.341
N	142	142	156	156	156	156	156	156	156	156

Notes: See Table 1.

9.3.3 Results for Spain

Table 12: 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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1-month surprise, all	0.056		0.035		0.101		-0.217		**0.286*** **	
	(0.114)		(0.134)		(0.161)		(0.285)		(0.100)	
1-year surprise, all	-0.029		0.043		0.040		-0.098		-0.040	
	(0.067)		(0.084)		(0.118)		(0.094)		(0.111)	
1-month surprise, media		**0.128*** **		**0.167*** **		**-0.268*** **		**0.154*** **		**0.303*** **
		(0.033)		(0.048)		(0.044)		(0.042)		(0.087)
1-year surprise, media		0.028		**0.152** **		0.106		-0.010		-0.071
		(0.090)		(0.068)		(0.173)		(0.118)		(0.132)
Dummy oct 2008	-6.567***	-4.802***	-13.061***	-9.809***	2.436	-3.522**	-6.259	0.905	8.725***	8.662***
	(1.979)	(0.938)	(2.475)	(0.843)	(3.295)	(1.585)	(5.182)	(1.270)	(2.075)	(1.266)
Dummy nov 2008	-3.886*	-3.244**	-6.492**	-6.112***	4.486*	6.113***	-6.001	-9.524***	5.831***	9.849***
	(2.217)	(1.296)	(3.045)	(1.672)	(2.457)	(0.719)	(4.123)	(0.474)	(1.848)	(1.104)
Dummy dec 2008	-8.761***	-8.825***	-9.167***	-9.015***	-2.144**	-1.692*	-3.520***	-4.623***	-7.281***	-6.825***
	(1.286)	(1.175)	(1.120)	(0.876)	(1.018)	(0.991)	(1.301)	(0.994)	(1.129)	(1.116)
Ind. prod. SP, backw.	-0.055	-0.064	0.130*	0.125*						
	(0.077)	(0.074)	(0.070)	(0.069)						
Retail dem. SP, backw.					0.353***	0.358***	0.047	0.045		
					(0.103)	(0.106)	(0.068)	(0.068)		
Serv. dem. SP, backw.									0.325***	0.322***
									(0.093)	(0.093)
Lasso selected controls:										
Lag dependent	-0.389***	-0.381***	-0.249***	-0.261***	-0.310***	-0.305***	-0.237***	-0.248***	-0.362***	-0.363***
	(0.068)	(0.068)	(0.075)	(0.073)	(0.077)	(0.074)	(0.076)	(0.076)	(0.076)	(0.078)
Ind. prod. EA, backw.	0.257**	0.260***								
	(0.099)	(0.097)								
Ind. prod. EA, lag chge	-0.140**	-0.143**								
	(0.063)	(0.064)								
CEPR eco index, lag chge									13.626***	13.446***
									(4.360)	(4.573)
constant	0.152	0.179	0.216	0.217	0.186	0.154	-0.078	-0.039	-0.161	-0.072
	(0.297)	(0.302)	(0.303)	(0.308)	(0.540)	(0.544)	(0.427)	(0.432)	(0.449)	(0.463)
R^2	0.251	0.251	0.203	0.214	0.189	0.191	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 12: 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.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.	all surp.	media surp.
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1-month surprise, all	-0.156		-0.266		0.325*		-0.164		0.149	
	(0.227)		(0.340)		(0.196)		(0.158)		(0.124)	
1-year surprise, all	-0.048		0.095		0.529***		0.063		-0.044	
	(0.071)		(0.218)		(0.140)		(0.069)		(0.075)	
1-month surprise, media		**0.238*** **		0.243		**0.562*** **		**-0.161** **		**-0.227*** **
		(0.052)		(0.170)		(0.157)		(0.063)		(0.063)
1-year surprise, media		0.157		0.288		**0.643*** **		0.043		-0.042
		(0.111)		(0.309)		(0.212)		(0.079)		(0.110)
Dummy oct 2008	-6.486	2.183	-13.692**	-2.868	1.698	6.984***	-2.603	-2.633**	-3.103	-9.953***
	(4.334)	(1.587)	(6.443)	(4.290)	(3.719)	(2.311)	(2.888)	(1.158)	(2.382)	(1.596)
Dummy nov 2008	-9.194***	-10.972***	12.060**	8.694***	-25.484***	-19.274***	-4.747*	-6.882***	4.144**	5.774***
	(3.327)	(1.904)	(4.918)	(2.005)	(2.941)	(1.951)	(2.474)	(0.611)	(2.041)	(1.102)
Dummy dec 2008	-14.026***	-14.510***	-3.552*	-3.911**	-8.542***	-5.653***	-0.619	-0.674	-3.392***	-3.411***
	(0.826)	(0.459)	(1.892)	(1.558)	(1.117)	(0.974)	(0.844)	(0.588)	(0.891)	(0.829)
Serv. dem. SP, backw.	0.110*	0.135**								
	(0.061)	(0.060)								
Const. emp. SP, backw.			0.143**	0.136**	0.188***	0.191***				
			(0.058)	(0.058)	(0.057)	(0.058)				
Cons. price SP, backw.							0.515***	0.525***		
							(0.071)	(0.070)		
Cons. eco. SP, backw.									0.585***	0.596***
									(0.096)	(0.098)
Lasso selected controls:										
EUR / USD change	-41.767**	-36.530**								
	(18.323)	(17.240)								
Lag dependent			-0.354***	-0.344***	-0.394***	-0.395***				
			(0.081)	(0.081)	(0.073)	(0.075)				
Spain spread change							3.517	3.371		
							(2.401)	(2.385)		
Eurostoxx change									15.990**	13.539*
									(7.082)	(7.077)
Ind. prod. EA, lag chge									-0.155*	-0.161*
									(0.087)	(0.089)
constant	0.180	0.206	0.061	-0.006	0.183	0.107	-0.075	-0.132	0.180	0.200
	(0.384)	(0.383)	(0.861)	(0.854)	(0.703)	(0.721)	(0.357)	(0.359)	(0.306)	(0.306)
R^2	0.177	0.184	0.175	0.177	0.312	0.299	0.342	0.337	0.342	0.339
N	139	139	156	156	156	156	156	156	156	156

Notes: See Table 1.

9.4 Results: investor sentiment and dummy inclusion

Table 13: Estimates, investor sentiment, and dummy variable specification *(first part)*

Variable	Investor sentiment eco			Industry		Retail	
	baseline	bauer-swanson	dummy included	demand	prices	demand	prices
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1-month surprise, media	**-0.308*****	-0.039	-0.037	0.141	**-0.579*****	**0.280*****	**-0.556*****
	(0.064)	(0.111)	(0.217)	(0.237)	(0.113)	(0.072)	(0.062)
1-year surprise, media	**-0.305****	**-0.249****	**-0.249****	**0.189*****	0.111	0.073	0.120
	(0.148)	(0.114)	(0.114)	(0.057)	(0.123)	(0.067)	(0.087)
Dummy sep 2008	-20.050***	-18.436***	-18.429***	-4.105***	-9.463***	-7.123***	-1.680
	(1.287)	(1.365)	(1.441)	(1.315)	(1.932)	(0.840)	(1.560)
Dummy nov 2008	9.059***	9.198***	9.198***	-5.418***	-2.672	1.546***	-13.223***
	(1.603)	(2.159)	(2.174)	(0.930)	(1.801)	(0.572)	(1.887)
Dummy dec 2008	9.232***	6.867***	6.868***	-6.973***	-2.374*	-8.003***	0.447
	(1.322)	(2.175)	(2.193)	(0.511)	(1.423)	(0.860)	(1.987)
Investors eco, bacw.	0.665***	0.711***	0.711***				
	(0.085)	(0.082)	(0.084)				
D.FRindustrybackward				0.047	0.065		
				(0.054)	(0.078)		
D.FRretailbackward						0.299***	-0.048
						(0.037)	(0.050)
Additional controls:							
Dummy			0.024	-1.356	**-5.743*****	**2.129***	**-3.018*****
			(3.037)	(3.297)	(1.337)	(1.086)	(0.732)
Bauer & Swanson (2020) controls	NO	YES	YES	NO	NO	NO	NO
Lasso selected controls	NO	NO	NO	YES	YES	YES	YES
constant	-0.004	-0.219	-0.219	1.832***	0.095	0.086	-0.084
	(0.481)	(0.452)	(0.459)	(0.672)	(0.347)	(0.319)	(0.328)
R^2	0.397	0.459	0.459	0.259	0.201	0.387	0.320
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 all other columns 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. (Continued on the second part of the table)

Table 13: Estimates, dummy variable specification *(second part)*

Variable	**Services**		**Construction**		**Consumers**	
	demand	prices	empl.	prices	prices	eco
	(8)	(9)	(10)	(11)	(12)	(13)
1-month surprise, media	0.281	0.064	-0.096	-0.053	**0.218***	**0.298****
	(0.180)	(0.077)	(0.187)	(0.109)	(0.115)	(0.118)
1-year surprise, media	**0.098***	0.034	0.055	**0.219****	0.014	-0.122
	(0.050)	(0.034)	(0.079)	(0.092)	(0.172)	(0.095)
Dummy oct 2008	0.989	-0.343	-3.640***	-8.741***	7.717***	3.573***
	(1.137)	(0.617)	(1.161)	(1.327)	(2.289)	(1.048)
Dummy nov 2008	-0.350	-2.656***	-7.891***	-4.613***	1.099	4.353***
	(0.886)	(0.517)	(0.295)	(0.803)	(3.514)	(0.665)
Dummy dec 2008	-0.169	-3.270***	-0.723	-3.724***	3.389*	-3.894***
	(0.780)	(0.434)	(0.548)	(1.136)	(1.787)	(0.570)
Sev. dem. FR, backw.	0.212***	0.086*				
	(0.080)	(0.052)				
Constr. dem. FR, backw.			0.292***	0.221***		
			(0.047)	(0.061)		
Cons. price FR, backw.					0.213	
					(0.177)	
Cons. eco FR, backw.						0.951***
						(0.087)
Additional controls:						
Dummy	-0.426	-0.026	-2.681	0.605	**2.910*****	0.329
	(2.521)	(1.092)	(2.665)	(1.378)	(0.746)	(1.816)
Lasso selected controls	YES	YES	YES	YES	YES	YES
constant	0.029	-0.019	0.063	0.122	-0.317	0.142
	(0.219)	(0.148)	(0.240)	(0.298)	(0.410)	(0.287)
R^2	0.279	0.166	0.322	0.301	0.135	0.593
N	156	156	156	143	156	156

Notes (continued): *"Dummy"* is a dummy variable taking a value of 1 for each month where we identified a media-consistent surprise in the immediate monetary policy stance. 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.

9.5 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 2 it appears that most of the *"information shocks"* identified by Jarociński & Karadi (2020)'s measure are not conveyed as information surprises in the media. For example, a relatively large negative information shock (-4.2bps) arises in February 2009, when the Governing Council of the ECB decided to keep interest rates on hold. We count four articles in Le Monde this week referring to the ECB decision. None of them refers to or contains any information on the economic outlook. Most of the articles' content that week focuses on the hint given once again by Jean-Claude Trichet that the ECB could *"modify (cut) its interest rates in March"* (as one of the articles is titled) and discusses the content in terms of the future monetary policy inclination.[49] In July of the same year, the same situation arises: the information shock is highly negative (-6.6bps) but Le Monde does not convey any negative economic information stemming from the press conference. In fact, the only article referring to the ECB press conference that week reports 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"*.[50]

The above discussion illustrated cases where the media content was not conveying any new negative or positive information on the state of the economy while the information shocks had extremely large magnitudes. These were, therefore, potential cases where the economic information conveyed during the press conference was consistent with Jarociński & Karadi (2020)'s shocks, but simply not reported by the media. However, there are also cases in which Jarociński & Karadi (2020)'s information shocks have a sign clearly inconsistent with the newspapers' reports. 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. For the same announcement, Le Figaro titles one of its articles *"Eurozone: the ECB cuts its forecasts"* and another one *"Trichet worries about the bad economic outlook"*. However, that day, the information shock from Jarociński & Karadi (2020)'s measure is positive, at around 4.4bps, as if new positive information on the economy was conveyed.

[49]In Le Figaro, there are two articles referring to the press conference. The first one does not contain any information related to the economic situation. The other one simply contains one sentence on the economic outlook, where it is noted that Trichet *"recognizes"* that *"the euro area and its main trading partners are going through a prolonged period of economic slowdown"*.

[50]Le Figaro reports on the economic activity but points to an overall unchanged assessment from the ECB.

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 that would justify 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 -8bps (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. In Le Figaro, the focus is the same, and no single information on the economy from the press conference is reported. July and August 2012 (respectively the first and fourth biggest negative information shocks) as well as October 2014 are other examples where fears related to unconventional monetary policies largely prevail in the media reports, while in September 2012 the positive information shock (while all growth forecasts were revised downward) seems to be related to the launch of the *"Outright monetary transactions"* program.

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 in Le Monde and in Le Figaro 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.

9.6 Results: additional tests

Table 14: Estimates, media surprises index and media attention

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Media surprise, decision	13.881	**34.228***	**-64.740****	**37.644****	-8.839	-11.699	12.347	**73.710*****	27.636	**61.151****
	(17.210)	(19.331)	(30.459)	(18.632)	(20.015)	(9.628)	(15.744)	(14.543)	(82.725)	(30.860)
Media surprise, future	**3.076*****	**2.460***	-0.255	-0.146	0.727	0.422	-0.933	-0.707	-0.866	1.450
	(0.945)	(1.454)	(0.916)	(1.108)	(0.822)	(0.458)	(0.921)	(1.074)	(1.932)	(1.075)
Media surprise, decision * Attention, decision	-1.114	**-5.631***	**9.367****	**-5.394***	0.736	0.885	-0.509	**-10.209*****	-3.215	**-7.059***
	(2.661)	(3.279)	(4.429)	(3.054)	(2.894)	(1.376)	(2.377)	(2.682)	(9.804)	(3.802)
Media surprise, future * Attention, future	**-0.954****	-1.015	-0.336	0.232	-0.021	-0.013	0.433	**1.098*****	0.683	**-0.848***
	(0.442)	(0.787)	(0.385)	(0.473)	(0.334)	(0.176)	(0.395)	(0.397)	(0.765)	(0.471)
Attention, decision	-0.250	**-0.558****	0.217	-0.087	-0.038	-0.045	-0.191	-0.189	0.067	-0.176
	(0.187)	(0.228)	(0.219)	(0.202)	(0.146)	(0.066)	(0.124)	(0.191)	(0.219)	(0.140)
Attention, future	-0.312	0.069	-0.202	**0.634****	-0.190	-0.158	-0.273	-0.180	-0.046	-0.011
	(0.287)	(0.448)	(0.293)	(0.304)	(0.193)	(0.167)	(0.231)	(0.249)	(0.417)	(0.306)
Dummy oct 2008	-1.664	5.599	-30.972***	15.898**	-7.873	-5.936*	0.295	14.048***	15.399	20.926**
	(5.361)	(6.298)	(9.834)	(7.144)	(6.605)	(3.115)	(5.328)	(4.712)	(27.513)	(10.269)
Dummy nov 2008	-2.351	1.347	0.086	-13.335***	0.372	-2.099***	-7.015***	-2.723*	0.707	5.597***
	(1.528)	(1.898)	(1.447)	(2.155)	(1.295)	(0.630)	(0.933)	(1.458)	(3.979)	(1.024)
Dummy dec 2008	-2.899*	1.501	-12.533***	3.254	-0.817	-4.606***	2.169	0.564	4.798	2.282
	(1.695)	(2.193)	(2.729)	(3.402)	(2.344)	(1.027)	(1.725)	(1.789)	(7.203)	(2.606)
Baseline controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	2.479***	0.741	0.125	-0.578	0.195	0.167	0.607*	0.383	-0.376	0.337
	(0.787)	(0.589)	(0.493)	(0.477)	(0.356)	(0.232)	(0.356)	(0.467)	(0.670)	(0.407)
R^2	0.309	0.239	0.411	0.328	0.276	0.191	0.351	0.365	0.141	0.605
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 4, where the controls are the same as the ones used in Table 1. *Media surprise, decision* corresponds to the index of media surprises on the policy rate decision, *Media surprise, future* corresponds to the index of media surprises on the future monetary policy stance. $Attention, decision$ and $Attention, future$ are indices of media attention, respectively to the policy rate decision and to the communication on the future monetary policy stance, built by considering the number of articles on the respective aspect, as well as specific weighs for articles in the first page of the newspaper. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

Table 15: Estimates, REFI changes in months of surprising announcements

Variable	Industry		Retail		Services		Construction		Consumers	
	demand	prices	demand	prices	demand	prices	empl.	prices	prices	eco
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
REFI change, surprise month	8.185	1.643	10.928	**-10.208***	7.019	3.641	5.567	**-14.018****	-11.242	-0.753
	(5.812)	(6.323)	(6.620)	(5.929)	(6.112)	(3.183)	(6.180)	(5.832)	(14.371)	(9.136)
Media surprise, future	**1.312*****	0.694	-0.833	0.373	0.614	0.371	-0.192	**1.228****	0.358	-0.098
	(0.500)	(0.657)	(0.537)	(0.613)	(0.400)	(0.239)	(0.533)	(0.586)	(0.940)	(0.631)
Dummy oct 2008	-4.214	-4.190	-6.360**	-0.234	-1.166	0.367	-2.590	-14.562***	1.260	-0.666
	(2.849)	(3.185)	(3.071)	(2.875)	(3.038)	(1.590)	(2.970)	(2.817)	(7.185)	(4.205)
Dummy nov 2008	-4.353***	-1.437	0.773	-13.194***	0.121	-2.343***	-8.103***	-3.249***	0.999	4.187***
	(1.026)	(1.887)	(0.831)	(1.877)	(0.942)	(0.492)	(0.580)	(0.948)	(3.496)	(0.862)
Dummy dec 2008	-0.261	-0.545	-0.681	-6.715	5.393	-0.381	3.300	-13.502***	-5.227	-4.377
	(4.313)	(4.962)	(4.648)	(4.338)	(4.485)	(2.359)	(4.555)	(4.149)	(10.635)	(6.744)
Baseline controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Lasso selected controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
constant	1.914***	0.009	0.233	-0.171	0.029	-0.010	0.078	-0.043	-0.369	0.108
	(0.659)	(0.355)	(0.324)	(0.329)	(0.219)	(0.145)	(0.253)	(0.300)	(0.410)	(0.291)
R^2	0.272	0.183	0.396	0.311	0.279	0.180	0.316	0.313	0.139	0.586
N	156	156	156	156	156	156	156	143	156	156

Notes: OLS estimates of the coefficients of equation 6, where the controls are the same as the ones used in Table 1. *REFI change, surprise month* corresponds to the change in the REFI rate on months where media surprises in the immediate monetary policy stance arise, *Media surprise, future* corresponds to our index of media surprises in the future monetary policy stance. In parentheses are Huber-White Standard Errors. ***, **, and * represent statistical significance at 1%, 5%, and 10%, respectively.

9.7 Sentiment index: top 20 word occurrences

5-word root	most present word within this root	English translation	*occurrences*
baiss	baisse	decrease	852
risk	risques	risks	759
crise	crise	crisis	475
dette	dette	debt	399
bas	bas	low	388
faibl	faible	weak	227
press	pressions	pressures	172
inqui	inquiétudes	concerns	168
diffi	difficulté	difficulty	157
fois	fois	times	154
tensi	tensions	tensions	154
réces	récession	recession	143
chôma	chômage	unemployment	124
doute	doute	doubts	109
limit	limite	limits	105
incer	incertitudes	uncertainty	104
menac	menaces	threats	104
probl	problèmes	problems	101
seule	seule	alone	101
negat	négatif	negative	95

Note: The table shows the 20 negative words from the VADER dictionary with the highest number of occurrences in the articles analyzed.