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

We investigate whether monetary policy announcements affect firms' and consumers' expectations by considering their media treatment. We initially use standard monetary policy surprise measures and analyze how the main general newspapers in France report on the announcements. Eighty-five percent of the monetary policy surprises are either not associated with the newspapers reporting a change in the monetary policy stance or have a sign inconsistent with the media report. Only when we consider media-consistent monetary policy surprises do we find that consumers and firms respond to monetary policy announcements. The economic tonality of the media reports drives the sign of consumers' response.

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“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

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one inch type (...). But in fact the treatment that newspapers (and TV) give this news affects the way people react to it.” (Sims 2003, p. 687)

FIRMS’ AND CONSUMERS’ EXPECTATIONS ARE commonly considered of central importance by macroeconomists, insofar as they affect decisions and thus economic outcomes (Carroll 2003, Candia, Coibion, and Gorodnichenko 2021). They are also, consistently, a variable that monetary policymakers seek to affect. The extent to which policymakers’ decisions and communications can affect expectations has only been investigated very recently. The recent studies of Enders, Hünnekes, and Müller (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 and Nguyen (2020) find that consumers update their expectations on economic activity after a monetary policy shock, while Lamla and 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, Hünnekes, and Müller (2019) and Kirchner (2020), who derive results from market-based measures of monetary policy surprises. If nonfinancial 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 nonfinancial 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 consumers’ 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 first 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 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 nonfinancial 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 consider all the media reports made by the newspapers with the largest audience in France (Le Monde, Le Figaro) over the week of the

1. Recent works using financial monetary policy surprises for macro-economic investigations include, for example, Gürkaynak et al. (2021), Jarociński and Karadi (2020), Miranda-Agrippino and Rey (2020), Altavilla et al. (2019), Enders, Hünnekes, and Müller (2019), and Nakamura and Steinsson (2018).

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 exclusively. 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 1,800 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 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, Hünnekes, and Müller (2019). The second general regression considers only financial monetary policy surprises that appear consistent with the general media report. The results suggest that taking media treatment into account is key. When we use all monetary policy surprises as an independent variable, we mostly do not find a statistically significant association between monetary policy surprises and firms’ or consumers’ expectations. On the other hand, when we take only monetary policy surprises consistent with the newspaper-reported inclination, 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 and Steinsson (2018) for professional forecasters’ expectations, or with Enders, Hünnekes, and Müller (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 and Swanson (2023) to deal with

the potential endogeneity of the surprise in such a framework. There is, however, heterogeneity in the sign of the response to 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 and 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 and 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 and 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 purchase programs (APPs). 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 on the economic situation of the news coverage matter for the reaction of firms and consumers’ expectations. We find some evidence that the volume of news coverage matters for consumers. Further, for consumers, we find that the tonality about the economic situation present in the reports on monetary policy announcements plays a striking role. When we add an interactive term between a monetary policy announcement and the tonality on the economy in the reports, the response of consumers’ economic 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.

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 con-

sumers may naturally have less incentive to carefully monitor central bank communication compared to financial investors and actually do so less in practice (Candia, Coibion, and Gorodnichenko 2021). That can imply that only surprises clearly appearing as such in general newspapers impact them. The fact that the tonality on the economy in the reports on monetary policy is found to play a role suggests that nonfinancial agents do not process only the information stemming from the policy decision in itself as other aspects emphasized in the media reports matter as well. This is, in itself, consistent with the conjecture of Coibion, Gorodnichenko, and Weber (2022) that consumers may respond not only to the monetary policy decisions but also to the change in economic conditions justifying the decision and intrinsically associated to it. In fact, our results suggest that, for consumers, the economic information stemming from reports on central bank announcements is, on average, more important than the interest rate decision itself.

The remainder of the paper is structured as follows. The next section discusses the related literature. The second section details our data on monetary policy surprises and their consistency with media reports. Section 3 details our empirical strategy. Section 4 presents the baseline results and Section 5 other tests performed for robustness and interpretation. In Section 6, 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.

1. 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 (Carroll 2003, Candia, Coibion, and Gorodnichenko 2021). 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, Coibion, and Gorodnichenko (2021) and Coibion, Gorodnichenko, and Kumar (2018) shed important light. Through a large-scale survey of U.S. firms, Candia, Coibion, and Gorodnichenko (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% 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, Gorodnichenko, and Kumar (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 macro-economic conditions. They find evidence that firms' inattentiveness to macro-economic 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, Hünnekes, and Müller (2019), related the closest to our paper, uses firm-level expectations on production and prices for the next 3 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 non-linear 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 consumers' expectations, there is dissonant evidence on whether monetary policy announcements feed into consumers' 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, Gorodnichenko, and Ropele (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 and 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 Federal Open Market Committee announcements with press conferences increase the proba-

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

bility of receiving monetary policy news, especially at a time of interest rate change. Further, Lamla and Vinogradov (2021) analyze the announcements of the Bank of England on its Twitter account and, based on about 10,000 individual consumer responses over 2018–19, do not find statistically significant effects of announcements on perceptions or expectations about inflation or interest rate by consumers.³ Fiore, Lombardi, and Schuffels (2021) also find that households' expectations are generally unresponsive to monetary policy announcements, when these relate to inflation or to unemployment. They find that only interest rate expectations react to Fed announcements, on a sample ranging from 2013 to 2019. The first announcement related to the “taper tantrum,” an event particularly covered in the media, is also found to significantly affect unemployment expectations.

Lewis, Makridis, and Mertens (2020) find in contrast that consumers' expectations systematically respond to Fed monetary policy announcements. The authors use monetary policy surprises measures closely related to the ones used by Fiore, Lombardi, and Schuffels (2021) but different data and a different sample period (2008–17). 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 macro-economic theory suggests, contrasting with the response professional forecasters found, for example, in Nakamura and 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 are reached by Claus and 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, Enders, and Glas (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.

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

Overall, as Candia, Coibion, and Gorodnichenko (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 and Vinogradov (2019) and Lamla and 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

2. MONETARY POLICY SURPRISES AND MEDIA REPORTS

2.1 *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 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 fund futures or OIS mostly encompass information on what the future policy rate (the Fed funds rate for the former, the Euro OverNight Index Average -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 EONIA 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

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 and Swanson (2023) for a thorough review.

6. Such financial instruments also naturally encompass risk premiums, though the consensus seems to be that these are relatively small (Bauer and Swanson 2023).

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, Makridis, and Mertens (2020), Enders, Hünnekes, and Müller (2019), and Kirchner (2020).

In our paper, in line with the majority of studies, we use in our baseline estimates the monetary policy surprise measure defined as the high-frequency change in the OIS during the central bank event. We take these high-frequency intraday 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 surprises in the immediate monetary policy stance 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 henceforth denoted as $I - monthsurprises$. Because the ECB press release (usually available 45 minutes before the beginning of the press conference) only discusses details on the interest rate decision in our sample period,⁷ $I - monthsurprises$ can be taken as a measure of the surprising change in the interest rate decision. This is in itself consistent with the observation of Altavilla et al. (2019) that the OIS 1-month is “the standard measure of the immediate policy setting surprise,” and who consider the surprise in the OIS 1-month around the press release window as a measure of the surprise about the current setting of the interest rate. The 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 $I - yearsurprises$ in what follows. Important facts are that (i) the window considered to compute $I - yearsurprises$ does not overlap with the one considered for $I - monthsurprises$ and (ii) the press conference usually contains all relevant details for the future monetary policy stance. Therefore, $I - yearsurprises$ can be used as a measure of the surprising change in the future monetary policy stance that does not contain the impact of the potential surprise in the policy rate from the press release. The use of such type of high-frequency intraday data enables to effectively separate the information related to the interest rate decision from the information related to the future policy stance. In essence, this dissociation is similar to the one used in the last section of Enders, Hünnekes, and Müller (2019), when they want to effectively separate the reaction to the monetary policy decision *per se* from the press conference communication.

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.

2.2 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 1,800 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 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.” 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

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, Larsen, and Thorsrud 2022 or Picault, Pinter, and Renault 2022 for recent examples related to monetary policy). Human coding, while also used in Ehrmann and Fratzscher (2007) or Berger, Ehrmann, and Fratzscher (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.

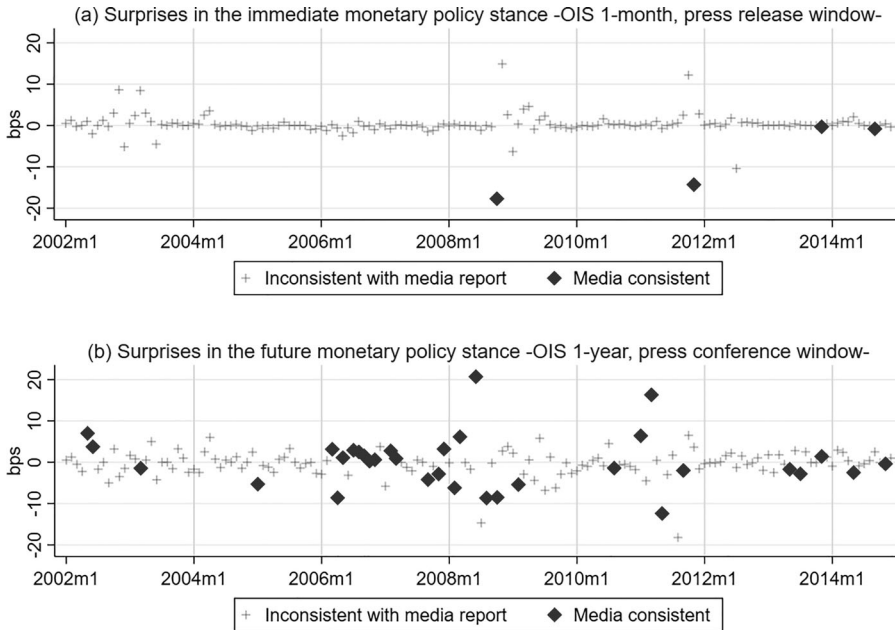


Fig 1. Financial Monetary Policy Surprises, Inconsistently (plus sign †) Versus Consistently Conveyed as Such by Le Monde and Le Figaro (diamond sign).

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 with a diamond sign, the others appear with a plus sign. The sample period is 2002:m1–2014:m12.

the market expects a future move are noninclusive 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.

In Figure 1, we plot all the surprises in the immediate and future monetary policy stance (in panel (a) and panel (b), respectively). Surprises that are consistent with both media reports appear with a diamond sign, the others with a plus sign.¹⁰ What

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

we observe is that very few monetary policy surprises 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 50 bps, but the OIS surprise is positive at about +15 bps, 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 “*unprecedented 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 +12 bps. 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 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.

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 five 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.

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 +21 bps. That day, *Le Monde* reports that Trichet “*indicated*” that “*a rate increase is considered for July*,” while quoting after this sentence an analyst saying “*it will hurt*.” *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 –18 bps, indicating a very dovish shift. Three articles in *Le Monde* are titled that week, respectively, “*The ECB powerless in reassuring markets*,” “*the international stock markets drop, not convinced by the declarations of the ECB*,” “*The markets were expecting more from the ECB*.” There is no reference to any potential future monetary policy easing.¹³

3. EMPIRICAL STRATEGY

3.1 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 nonfinancial agents, in line with the implicit assumption of the previous literature (Enders, Hünnekes, and Müller 2019, Lewis, Makridis, and Mertens 2020, Kirchner 2020). It is specified as:

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

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

$$\Delta Y_t = \alpha_2 + \beta_2 I - \text{month surprises}_t^{\text{media}}(\text{press release}) + \phi_2 I - \text{year surprises}_t^{\text{media}}(\text{press conference}) + \gamma_2 X_t. \quad (2)$$

In both specifications the dependent variable Y represents a forward-looking component of either an economic or price level expectation index for the country and

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.

the sector considered. $I - \text{monthsurprises}$ ($I - \text{yearsurprises}$) 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 specification considers only those surprises that appear with a diamond sign.

The general specification is inspired from the connected literature, in particular from the work of Enders, Hünnekes, and Müller (2019) and Nakamura and 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.

3.2 Sample Choice and Data on Expectations

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

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 did not 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 and Swanson (2023). 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.

beginning of each month, generally on the first Thursday of the month.¹⁶ Data on firms' and consumers' expectations are collected in the first 2 to 3 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 6 weeks. Including these months would expose us to obvious estimation problems, adding to identification issues stemming from the fact that the ECB press release content changed after 2015.

Even though monthly data are often used in the context of expectations and monetary policy announcements (Campbell et al. 2012, Nakamura and Steinsson 2018, Claus and 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, Hünnekes, and Müller (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 microdata as they are generally only available for a specific country.

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, 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

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, for example, in Claus and Nguyen (2020) and Lamla and Lein (2014).

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

question does not 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, Hünnekes, and Müller (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 OA-1 in Online Appendix A.

3.3 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 and 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 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 OA-1) 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 corre-

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

lated. 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. We select our controls from the pool of variables that characterize various aspects of economic (economic activity, prices, unemployment, uncertainty) and financial (stock market, oil prices, bond yields) development, detailed in Table OA-1 in Online Appendix B.1.²¹

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 Bayesian information criterion (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 ordinary least squares (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.

4. BASELINE RESULTS

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

20. Such a control is present in Enders, Hünnekes, and Müller (2019) but not in Lewis, Makridis, and Mertens (2020) when the authors investigate the impact of surprises on expectations.

21. As our estimates will show, variables related to stock market and oil price changes are ultimately often selected by LASSO. This feature correlates with the fact that during past decades attention of researchers and policymakers was attracted by the importance of oil prices and financial market developments for monetary policy (see Bernanke et al. 1997, for example, on the former aspect).

TABLE 1
 MONETARY SURPRISES AND EXPECTATIONS, BASELINE ESTIMATES OF MODELS 1 AND 2 FOR EACH SECTOR CONSIDERED

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
1-month surprise, all (press release)	0.027 (0.096)		-0.150 (0.094)		0.041 (0.154)		-0.104 (0.115)		0.078 (0.114)	
1-year surprise, all (press conference)	0.143*** (0.047)		0.018 (0.097)		0.020 (0.063)		-0.011 (0.080)		0.091** (0.043)	
1-month surprise, media (press release)		0.242*** (0.051)		-0.148** (0.075)		0.123*** (0.036)		-0.332*** (0.045)		0.312*** (0.051)
1-year surprise, media (press conference)		0.188*** (0.057)		0.104 (0.123)		0.074 (0.068)		0.118 (0.088)		0.098* (0.050)
Dummy oct 2008	-8.006*** (1.815)	-3.711*** (1.070)	-8.043*** (2.393)	-7.435*** (2.001)	-9.745*** (3.021)	-7.823*** (0.842)	2.076 (2.707)	-0.651 (1.575)	-2.980 (2.113)	1.111 (1.026)
Dummy nov 2008	-6.454*** (1.614)	-5.458*** (0.932)	0.080 (2.267)	-2.247 (1.786)	0.905 (2.317)	1.546*** (0.570)	-11.742*** (2.560)	-13.318*** (1.881)	-1.737 (1.881)	-0.354 (0.882)
Dummy dec 2008	-7.680*** (0.582)	-6.974*** (0.509)	-1.610 (1.493)	-2.031 (1.429)	-8.263*** (0.891)	-8.065*** (0.851)	0.584 (2.039)	0.515 (1.987)	-0.633 (0.849)	-0.167 (0.777)
Ind. prod. FR, backw.	0.045 (0.055)	0.045 (0.054)	0.049 (0.076)	0.049 (0.077)						
Retail dem. FR, backw.					0.296*** (0.037)	0.297*** (0.037)	-0.052 (0.049)	-0.046 (0.050)		
Serv. dem. FR, backw.									0.198** (0.077)	0.211*** (0.079)
<i>Lasso selected controls:</i>										
Eurostoxx change	14.470*** (5.057)	15.432*** (5.085)							13.649*** (4.252)	14.622*** (4.381)
CPI FR, lag chge	-0.955** (0.384)	-0.955** (0.395)								

(Continued)

TABLE 1
(CONTINUED)

Variable	Industry-production		Industry-prices		Retail-demand		Retail-prices		Services-demand	
	all surp. (1)	media surp. (2)	all surp. (3)	media surp. (4)	all surp. (5)	media surp. (6)	all surp. (7)	media surp. (8)	all surp. (9)	media surp. (10)
Constr. FR, lag chge			0.199*** (0.075)	0.203*** (0.077)						
Oil price change			11.616*** (4.100)	11.274*** (4.056)						
Lag dependent			-0.236*** (0.089)	-0.249*** (0.091)			-0.322*** (0.089)	-0.321*** (0.090)		
Ind. prod. EA, backw.							0.288** (0.115)	0.292** (0.114)		
CEPR eco index, lag chge									5.740*** (2.477)	4.490* (2.560)
Constant	1.795*** (0.657)	1.771*** (0.665)	0.062 (0.347)	0.019 (0.344)	0.106 (0.312)	0.112 (0.315)	-0.060 (0.328)	-0.120 (0.326)	0.008 (0.217)	0.024 (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

(Continued)

TABLE 1
(CONTINUED)

Variable	Services-prices		Constr.-employment		Constr.-prices		Consumers-eco		Consumers-prices	
	all surp. (11)	media surp. (12)	all surp. (13)	media surp. (14)	all surp. (15)	media surp. (16)	all surp. (17)	media surp. (18)	all surp. (19)	media surp. (20)
1-month surprise, all (press release)	-0.071 (0.055)		0.035 (0.117)		0.124 (0.148)		0.162 (0.136)		-0.170 (0.199)	
1-year surprise, all (press conference)	0.040 (0.028)		0.083 (0.054)		0.160*** (0.059)		-0.028 (0.079)		-0.117 (0.127)	
1-month surprise, media (press release)		0.066*** (0.023)		0.105*** (0.022)		-0.098* (0.055)		0.274*** (0.034)		0.000 (0.103)
1-year surprise, media (press conference)		0.034 (0.034)		0.053 (0.078)		0.219*** (0.092)		-0.122 (0.095)		0.018 (0.170)
Dummy oct 2008	-2.817*** (1.012)	-0.336 (0.588)	-3.768* (2.087)	-2.736*** (0.936)	-5.626** (2.779)	-8.948*** (1.280)	2.407 (2.642)	3.463*** (0.889)	2.602 (3.990)	6.686*** (2.248)
Dummy nov 2008	-1.916** (0.852)	-2.656*** (0.515)	-8.637*** (1.794)	-7.878*** (0.294)	-6.786*** (2.241)	-4.617*** (0.800)	2.062 (2.224)	4.359*** (0.660)	3.659 (3.951)	0.845 (3.473)
Dummy dec 2008	-3.336*** (0.442)	-3.270*** (0.433)	-1.159* (0.659)	-0.722 (0.544)	-4.587*** (1.122)	-3.731*** (1.133)	-4.142*** (0.719)	-3.903*** (0.564)	4.142** (1.680)	3.201* (1.760)
Serv. dem. FR, backw.	0.085* (0.051)	0.086* (0.051)								
Const. emp. FR, backw.			0.291*** (0.045)	0.295*** (0.046)	0.205*** (0.057)	0.220*** (0.061)				
Cons. price FR, backw.									0.221 (0.175)	0.208 (0.176)
Cons. eco. FR, backw.									0.956*** (0.082)	0.949*** (0.082)

(Continued)

- (1) When all monetary policy surprises are used for the surprises in the immediate monetary policy stance (**1-month surprise, all (press release)**), 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 (press release)**), 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 (press conference)**) 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, Gorodnichenko, and Ropele (2019) that "*firms and households seem unresponsive to central bank announcements*" and with the conclusions of Lamla and Vinogradov (2019) for households or Enders, Hünnekes, and Müller (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 consumers and firms: media-consistent monetary policy surprises do affect consumers' 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 of key importance. The second one is that our results are consistent with a linear reaction of firms and consumers to monetary policy announcements (which does not rule out a nonlinear reaction, though). For consumers, the results may seem to corroborate those of Lewis, Makridis, and Mertens (2020) who find an effect of interest rate surprises on consumers' economic expectations. However, as we pointed out before, one cannot preclude that the few interest rate surprises identified by Lewis, Makridis, and

Mertens (2020) in their sample period share similar characteristics with respect to media coverage to the surprises that appear to matter in our estimates.²²

The absence of a unanimous response to surprises in the future monetary policy stance (point (3)) may simply mean that consumers 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 and Steinson (2018) or Campbell et al. (2012) for professional forecasters' expectations and with the sign obtained in Enders, Hünnekes, and Müller (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 consumers' price expectations to monetary policy announcements (columns (19) and (20)) is similar to what is found in all studies we previously mentioned.

4.2 Other Countries

In Online Appendix C in Tables OA-3, OA-4, and OA-5, 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 linked to expectations for all sectors and expectation indices in all countries (point (1)), except in three cases.²³ Given that in total this makes three cases out of 40 pairs tested, this clearly appears as an exception rather than

22. Investigating more deeply this possibility, we could find general newspapers consistently reporting Lewis, Makridis, and Mertens's (2020) 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, 2 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."

23. The two exceptions for firms are services demand in Italy (Table OA-4, column (9)) and in Spain (Table OA-5, 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 OA-4, column (17)). 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.

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.²⁴ 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.²⁵ 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 (18) of each corresponding table). We also see that firms 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 consumers 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

24. These are retail demand and construction prices in Germany (Table OA-3, columns (6) and (16)), services prices in Italy (Table OA-4, columns (12)), and construction employment in Spain (Table OA-5, column (14)).

25. For example, consumers now strongly respond to contractionary monetary policy surprises in Spain and Italy by decreasing their economic expectations (column (18) of tables OA-5 and OA-4). 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.

may suggest. In a following analysis, we will consider and test for other potential reasons that could explain the positive coefficients found for France.

5. ROBUSTNESS AND INTERPRETATION

5.1 *Does Our Key Result Reflect News Not Taken into Account by Market Participants?*

The recent analysis of Bauer and Swanson (2023) 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 forecast revisions that has been documented in Nakamura and 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 and 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 and Swanson (2023) to our analysis. In particular, we reestimate 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 (€-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 nonfarm payroll figures used in Bauer and Swanson (2023) for the United States. 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.²⁶ The second variable intends to substitute Bauer and Swanson's (2023) business cycle indicator for the United States, which has no exact equivalent in the euro area to our knowledge. As the index used in Bauer and Swanson (2023), the CEPR/Banca d'Italia economic

26. 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.

activity index incorporates information from a wide range of macro-economic 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.²⁷ The third variable is taken as an equivalent to Bauer and Swanson's (2023) U.S. stock market index.²⁸

The results in Table 2 show that our baseline result does not disappear when we account for the arguments raised by Bauer and Swanson (2023). In fact, none of our coefficients alter their sign, while Bauer and Swanson (2023) 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 is 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.²⁹ 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.

5.2 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 and Swanson's (2023) 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

27. 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.

28. Bauer and Swanson (2023) 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.

29. Note that the results of regression (1) also do not change substantially when we include the Bauer–Swanson controls (available on request).

TABLE 2
ESTIMATES, BAUER-SWANSON CONTROLS

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	eco (9)	prices (10)
1-month surprise, media (press release)	0.159*** (0.057)	-0.341*** (0.070)	0.040 (0.059)	-0.365*** (0.062)	0.255*** (0.039)	0.017 (0.024)	0.064* (0.033)	-0.037 (0.051)	0.250*** (0.065)	-0.271*** (0.084)
1-year surprise, media (press conference)	0.164** (0.066)	0.059 (0.128)	0.038 (0.062)	0.064 (0.089)	0.101* (0.058)	0.028 (0.035)	0.037 (0.077)	0.240** (0.093)	-0.160 (0.098)	0.022 (0.176)
Dummy oct 2008	-6.998*** (0.804)	-7.248*** (1.441)	-7.844*** (1.000)	3.931*** (1.375)	-0.533 (0.681)	-1.222*** (0.384)	-2.898*** (0.899)	-7.470*** (1.221)	3.031*** (0.966)	3.117* (1.647)
Dummy nov 2008	-6.978*** (0.900)	-3.680*** (1.420)	3.718*** (1.087)	-16.840*** (1.802)	-0.700 (0.833)	-2.419*** (0.483)	-7.114*** (0.995)	-5.479*** (1.267)	5.849*** (0.998)	-3.545* (2.093)
Dummy dec 2008	-6.168*** (1.028)	0.592 (2.344)	-5.601*** (1.217)	6.129** (2.803)	1.038 (1.028)	-1.710** (0.863)	-0.234 (1.005)	-5.630*** (1.991)	-5.004*** (1.247)	8.316*** (2.639)
Ind. prod. FR, backw.	0.066 (0.056)	0.032 (0.083)								
Retail dem. FR, backw.			0.290*** (0.038)	-0.079 (0.052)						
Serv. dem. FR, backw.					0.228*** (0.081)	0.087 (0.055)	0.280*** (0.047)	0.249*** (0.063)		0.134 (0.161)
Const. emp. FR, backw.									0.913*** (0.084)	
Cons. price FR, backw.										
Cons. eco. FR, backw.										

(Continued)

TABLE 2
(CONTINUED)

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	eco (9)	prices (10)
<i>Bauer and Swanson</i>										
<i>(2023) controls:</i>										
Unemp. release, chge	236.492 (175.865)		-242.607 (211.106)		101.795 (126.636)		-210.176 (138.233)		5.667 (199.044)	
Flash CPI release, chge		375.255** (166.562)		60.265 (190.038)		54.680 (70.886)		-65.270 (123.441)		533.238*** (190.029)
CEPR eco index, lag chge	4.573 (4.117)	7.459 (4.640)	4.279 (4.083)	7.138 (4.935)	1.529 (2.427)	-0.791 (2.179)	3.958* (2.313)	5.281 (4.212)	4.618 (3.920)	2.631 (6.534)
Eurostoxx change, B-S	4.380 (3.657)	1.150 (4.254)	4.473 (3.690)	2.650 (4.158)	9.556*** (2.719)	5.606*** (1.783)	2.163 (3.617)	0.873 (3.674)	-1.958 (3.718)	5.161 (6.875)
constant	0.180 (0.298)	-0.003 (0.366)	0.124 (0.320)	-0.110 (0.343)	0.016 (0.219)	-0.016 (0.144)	-0.080 (0.242)	0.042 (0.299)	0.131 (0.298)	-0.094 (0.428)
R ²	0.211	0.101	0.408	0.222	0.289	0.186	0.308	0.274	0.578	0.103
N	156	156	156	156	156	156	156	143	156	156

NOTE: OLS estimates of the coefficients of equation (2), where the set of controls X_2 now corresponds to controls inspired from Bauer and Swanson (2023). "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 * present statistical significance at 1%, 5%, and 10%, respectively.

the euro area for the next 6 months, with higher values expressing more optimism.³⁰ 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 OA-6, available in Online Appendix D, 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 and Swanson (2023) 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 macro-economic 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 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, *1-month surprises*^{media} in equation (2) could be written equivalently as *1-month surprises*^{all} * *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

30. 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%).

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 OA-6. 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.³¹ 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 the effect of omitted variables.³²

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,

31. The relevant coefficient for this pair also lost statistical significance when using the Bauer–Swanson controls.

32. 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. Approximately the same conclusion arises if we use an even longer horizon, for example, using the change in the OIS 1-year during the press release window. That may suggest that the change in the current policy rate resulting from the central bank announcement is more informative to consumers’ and firms’ expectations than the changes in indicators encompassing longer maturities. The results are available upon request.

the related coefficient was significant at the 5% threshold in only one estimate.³³ We will further investigate the role of the media treatment in Section 6.

5.3 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.³⁴ The previous estimates have furthermore ruled out any "ECB response to news" explanation advanced in Bauer and Swanson (2023) 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 and Karadi (2020). The authors classify monetary policy surprises that are accompanied by movements in the stock market index in the same direction as "*information shocks*," while "*pure monetary policy shocks*" 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 vector autoregression (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, these data correspond 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 and Karadi's (2020) "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*."

33. We also performed the analysis of Enders, Hünnekes, and Müller (2019) to assess potential nonlinearities and reestimated 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 did not provide an overall support that small or moderate surprises impact expectations differently from large ones. The results are available on request.

34. 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).

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

$$\Delta Y_t = \alpha_3 + \beta_3 \text{pureMPshock}_t^{\text{media}} + \phi_3 \text{informationshocks}_t^{\text{media}} + \gamma_3 X_t. \quad (3)$$

The new key variables here are *pureMPshocks* and *informationshocks*, which refer, respectively, to the “*pure monetary policy shocks*” and to the “*information shocks*” from Jarociński and 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.³⁵ We consider only those shocks appearing as consistent with the reports of the two newspapers. Reading media reports, many important information shocks reported by Jarociński and Karadi (2020) are associated with surprises in the ECB communication on whether or not to consider or modify APPs in the period 2010–14, 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 *informationshocks*^{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 with a diamond sign. 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 Online Appendix E.

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 and Swanson (2023) in the specific context of information shocks. We observe that only in 2 cases out of 10 do

35. For *pureMPshocks*^{media}, we use our coding from Section 2 and consider that a shock is consistently reported 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 and Karadi’s (2020) measure.

TABLE 3
ESTIMATES, INFORMATION VERSUS PURE MONETARY POLICY SHOCKS

Variable	Industry			Retail			Services			Construction			Consumers		
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	demand (7)	prices (8)	eco (9)	prices (10)					
Information shocks, media	0.103 (0.183)	0.247 (0.270)	0.111 (0.314)	0.436* (0.262)	-0.110 (0.137)	-0.008 (0.089)	0.183 (0.133)	0.389*** (0.144)	0.155 (0.216)	-0.125 (0.318)					
Pure MP shocks, media	0.181 (0.121)	0.091 (0.289)	-0.116 (0.128)	-0.151 (0.185)	0.302*** (0.075)	0.093* (0.056)	-0.002 (0.115)	0.128 (0.138)	-0.276 (0.284)	0.124 (0.259)					
Dummy oct 2008	-9.497*** (1.596)	0.532 (2.770)	-8.325*** (2.872)	12.768*** (2.706)	-5.519*** (1.225)	-1.471* (0.758)	-2.912** (1.327)	-5.370*** (1.359)	0.348 (2.198)	7.055** (2.919)					
Dummy nov 2008	-6.972*** (0.915)	-3.941*** (1.400)	3.745*** (1.177)	-17.111*** (1.700)	-0.650 (0.855)	-2.441*** (0.490)	-7.184*** (1.003)	-5.452*** (1.333)	5.744*** (1.001)	-3.521* (2.115)					
Dummy dec 2008	-6.137*** (1.046)	0.226 (2.297)	-5.561*** (1.233)	5.758** (2.716)	1.158 (1.053)	-1.732** (0.862)	-0.368 (1.018)	-5.769*** (2.118)	-5.013*** (1.238)	8.267*** (2.609)					
Ind. prod. FR, backw.	0.074 (0.058)	0.043 (0.084)													
Retail dem. FR, backw.			0.289*** (0.038)	-0.080 (0.051)											
Serv. dem. FR, backw.					0.235*** (0.082)	0.089 (0.055)									
Const. emp. FR, backw.							0.270*** (0.048)	0.216*** (0.062)		0.140 (0.168)					
Cons. price FR, backw.															
Cons. eco FR, backw.									0.927*** (0.083)						
<i>Additional controls:</i>															
<i>Bauer and Swanson (2023) controls</i>	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES					
constant	0.225 (0.300)	0.105 (0.368)	0.136 (0.310)	0.013 (0.339)	0.013 (0.221)	-0.006 (0.144)	-0.044 (0.247)	0.134 (0.308)	0.093 (0.296)	-0.075 (0.425)					
R ²	0.201	0.098	0.410	0.230	0.297	0.190	0.311	0.260	0.575	0.102					
N	156	156	156	156	156	156	156	143	156	156					

NOTE: Estimates of the coefficients of equation (3), where the set of controls X₂ corresponds to controls inspired from Bauer and Swanson (2023). "Information shocks, media" are "information shocks" from Jarocinski and Karadi (2020), which appear as consistent with the media report, while "Pure MP shocks, media" are the "pure monetary policy shocks" from Jarocinski and 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.

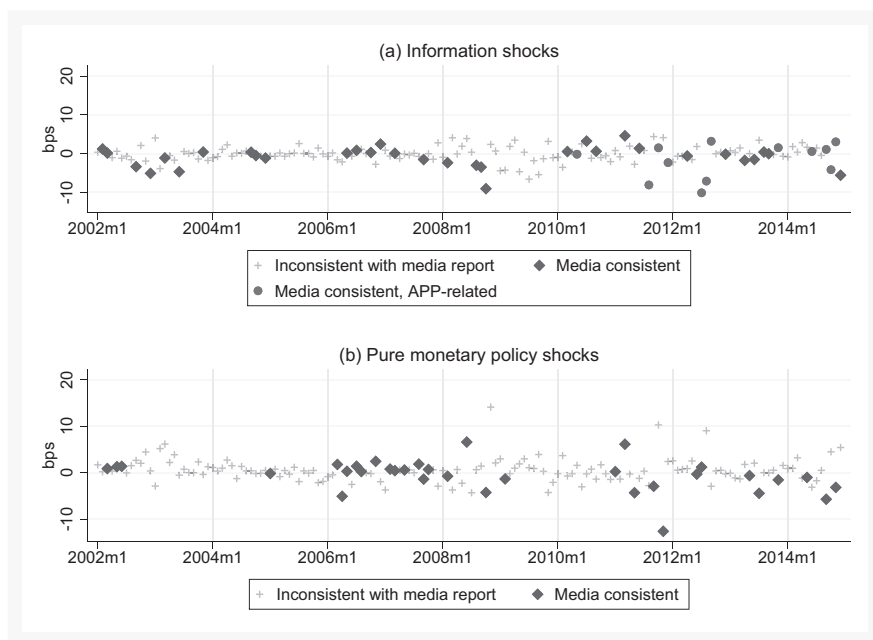


Fig 2. Information and Monetary Policy Shocks from Jarociński and Karadi (2020), Inconsistently (plus sign) Versus Consistently Conveyed as Such by Le Monde and Le Figaro (diamond sign), with Information Shocks Appearing as Related to APP denoted with a circle sign.

NOTES: Panel (a) shows the “*information shocks*” from Jarociński and 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 with a plus sign, the others appear with a diamond or circle sign. 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/stance on the monetary policy stance in the direction indicated by the shock. The sample period is 2002:m1–2014:m12.

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.³⁶ Overall, these results show limited evidence that informational effects matter in our context.

36. Media-consistent “pure monetary policy shocks” from Jarociński and Karadi’s (2020) 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.

6. 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 consumers' 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.

6.1 *The Impact of Media Surprises*

In our previous analysis, a few monetary policy announcements were conveyed as surprises in the media, but the media reports were inconsistent with the sign of the financial surprise. 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 idiosyncratic media surprises to investigate whether media monetary policy surprises matter in general.

Specifically, consistent with Section 2.2, we employ two indicators: one for media surprises on the policy rate decisions, and another one for media surprises on the future policy stance. For the assessment of the surprise on the policy rate decision, our indicator takes precise values in terms of bps, taking advantage of the fact that the newspapers usually report the size of the surprise on the policy rate decision. For example, in December 2008, when a 75 bps cut occurred, *Le Monde* makes it explicit that a 50 bps cut was expected instead.³⁷ Hence, in cases similar to the preceding example, we assign the value of -0.25 to our indicator.³⁸ For the assessment of the surprises in the future policy stance, we employ a second indicator and follow the coding of Ehrmann and Fratzscher (2007). The indicator takes the value of $+1$ if the report of the newspaper indicates a tightening inclination in the future, the value of 0 if the inclination is neutral, and value of -1 if it reports an easing inclination with respect to the future policy. When building this indicator, we consider only the content that is conveyed as surprising, consistent with the focus of our paper.

37. 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.*”

38. In one case, in which the newspaper was not explicit on the size of the surprise in the report, we went through 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.

Finally, we compute an overall index based on the average of the indicators at the newspaper level, weighted by the audience figures as indicated by the ACPM.³⁹ The resulting indices are plotted in Figure OA-2, shown in Online Appendix A. With the following regression, we then investigate whether our indices help to explain expectations:

$$\Delta Y_t = \alpha_4 + \beta_4 MS_t^{decision} + \phi_4 MS_t^{future} + \gamma_4 X_t, \quad (4)$$

where the dependent variable Y_t represents again a forward-looking component of either an economic or price-level expectation index defined earlier in Section 3.1, and the controls X_t are the same variables as previously defined in Section 3.3. MS_t refers to the media surprise index, either related to the interpretation of the policy rate decision ($MS_t^{decision}$) or to the one of the future policy stance (MS_t^{future}).

The results are reported in Table 4. As can be seen, we do find a statistically significant relationship in some case, but not all. The coefficients are statistically significant only when it relates to economic expectations for the sectors of industry, construction, and consumers. These are also pairs that we found robust with respect to the Bauer and Swanson specification in Section 5.1. The sign is similar to the one we found before, that is, 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 for the sectors of industry, construction, and for consumers. For the other sectors, 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.

6.2 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 ($VOL_t^{decision}$) as well as for the part related to the future monetary policy stance (VOL_t^{future}). Specifically, we identify for each article whether the dominant topic (de-

39. For all the indices built from ACPM weights 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 consumers, 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 weights for firms.

TABLE 4
ESTIMATES, MEDIA SURPRISES INDEX

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	eco (9)	prices (10)
Media surprise, decision	11.448** (5.394)	7.982 (7.991)	-2.056 (7.685)	1.697 (9.051)	-2.942 (8.349)	-4.390 (3.492)	13.100** (5.344)	2.961 (6.866)	11.772* (6.255)	1.920 (12.443)
Media surprise, future	1.399*** (0.502)	0.725 (0.649)	-0.743 (0.556)	0.292 (0.608)	0.682* (0.402)	0.410* (0.237)	-0.154 (0.529)	1.117* (0.607)	-0.155 (0.623)	0.274 (0.948)
Dummy oct 2008	-2.463 (2.752)	-0.984 (4.288)	-12.442*** (3.903)	5.158 (4.868)	-6.031 (4.266)	-3.626** (1.796)	1.423 (2.824)	-6.604* (3.492)	5.333* (2.956)	7.747 (6.190)
Dummy nov 2008	-4.224*** (1.053)	-1.553 (1.885)	0.796 (0.855)	-13.104*** (1.908)	0.103 (0.948)	-2.404*** (0.496)	-8.000*** (0.563)	-3.616*** (0.963)	4.220*** (0.857)	1.061 (3.451)
Dummy dec 2008	-3.435** (1.468)	0.123 (2.376)	-9.021*** (2.073)	0.817 (3.110)	-0.441 (2.278)	-4.150*** (0.992)	2.601* (1.484)	-2.673 (1.936)	-1.044 (1.606)	3.798 (3.719)
<i>Additional controls:</i>										
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*** (0.650)	0.018 (0.347)	0.136 (0.319)	-0.079 (0.325)	-0.039 (0.216)	-0.053 (0.143)	0.079 (0.248)	0.091 (0.304)	0.146 (0.287)	-0.281 (0.418)
R ²	0.275	0.186	0.388	0.303	0.271	0.180	0.329	0.291	0.591	0.133
N	156	156	156	156	156	156	156	143	156	156

NOTE: 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.

defined as the topic covering at least half of the article) is the current rate decision or whether it is the future policy move.⁴⁰ 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.⁴¹ 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.

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

$$\Delta Y_t = \alpha_5 + \beta_5 MS_t^{decision} + \phi_5 MS_t^{future} + \delta_5 MS_t^{decision} * VOL_t^{decision} + \omega_5 MS_t^{future} * VOL_t^{future} + \psi_5 VOL_t^{decision} + \eta_5 VOL_t^{future} + \gamma_5 X_t, \quad (5)$$

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 standardized indices of news volume discussed presently.

The results are displayed in Table 5. As one can see, the volume of news coverage does not seem 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

40. 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.

41. 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.

TABLE 5
ESTIMATES, MEDIA SURPRISES INDEX, AND VOLUME OF THE COVERAGE

Variable	Industry		Retail		Services		Construction		Consumers	
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	eco (9)	prices (10)
Media surprise, decision	24.274** (9.314)	21.337 (17.575)	-25.609 (16.820)	13.300 (18.993)	10.595 (15.273)	-1.993 (8.365)	21.643** (10.163)	34.464** (14.528)	39.267** (15.368)	-28.196 (17.028)
Media surprise, future	2.002** (0.652)	1.443* (0.800)	-0.436 (0.693)	-0.301 (0.807)	1.124* (0.588)	0.473 (0.346)	-0.770 (0.613)	0.134 (0.786)	0.268 (0.805)	-0.458 (1.287)
Media surprise, decision *	-7.006 (5.286)	-10.128 (7.737)	11.529 (9.368)	-6.800 (6.705)	-5.922 (5.903)	-1.082 (3.421)	-6.092 (4.051)	-14.498** (6.793)	-13.916* (7.143)	15.457 (10.274)
Volume, decision	-0.738 (0.469)	-0.946* (0.554)	-0.361 (0.363)	0.598 (0.487)	-0.445 (0.307)	-0.068 (0.182)	0.473 (0.328)	0.950** (0.415)	-0.487 (0.578)	0.827 (0.741)
Volume, future	-0.392 (0.328)	-0.974** (0.479)	0.084 (0.511)	-0.191 (0.363)	-0.064 (0.291)	-0.028 (0.150)	-0.605** (0.242)	-0.096 (0.409)	-0.364 (0.312)	0.500 (0.562)
Volume, future	-0.292 (0.287)	-0.098 (0.373)	-0.295 (0.294)	0.522 (0.324)	-0.341 (0.222)	-0.093 (0.121)	-0.130 (0.242)	-0.127 (0.253)	-0.173 (0.369)	0.288 (0.440)
Dummy oct 2008	2.493 (3.419)	3.367 (7.316)	-20.981** (6.885)	9.095 (8.639)	-0.563 (6.491)	-2.639 (3.416)	4.229 (4.517)	5.208 (6.114)	7.298** (2.887)	5.871 (5.457)
Dummy nov 2008	-3.507** (1.095)	-0.893 (1.736)	1.123 (1.005)	-13.596** (1.881)	0.466 (1.046)	-2.338** (0.551)	-8.111** (0.616)	-4.024** (1.102)	4.752** (0.886)	0.540 (3.422)
Dummy dec 2008	-2.143 (1.323)	1.379 (2.595)	-10.070** (2.246)	1.495 (3.717)	0.557 (2.383)	-3.988** (1.114)	2.719 (1.711)	-1.542 (2.283)	0.733 (1.557)	1.801 (3.030)
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	1.571** (0.701)	-0.069 (0.347)	0.175 (0.343)	-0.099 (0.332)	-0.077 (0.222)	-0.059 (0.144)	0.085 (0.245)	0.088 (0.302)	0.061 (0.279)	-0.176 (0.422)
R ²	0.294	0.236	0.400	0.319	0.289	0.182	0.360	0.341	0.602	0.150
N	156	156	156	156	156	156	156	143	156	156

NOTE: 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.

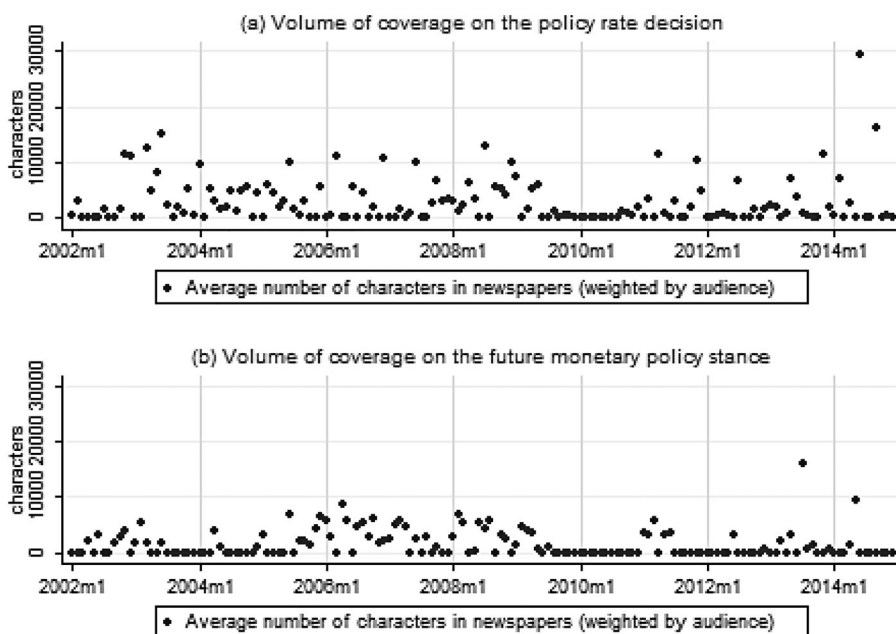


Fig 3. Volume of the Coverage on the Policy Rate Decision (Upper Panel) and on the Future Monetary Policy Stance (Lower Panel).

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.

in contradiction with what standard theories would predict. However, the relevant coefficient is statistically significant only at the 10% level.

We doubled checked these results by building an alternative index of media attention. We use the figures from the company Lesewert, indicating that around 25% of a newspaper is usually read,⁴² and build an attention score accordingly. We assign the value of +1 for each article that has the policy rate decision as a dominant theme. We then assign the value of +0.5 if other articles mention the policy rate decision, without it being the dominant theme.⁴³ Finally, we assign the value of +4 if the policy rate

42. The results of the analysis are reported here: <https://www.niemanlab.org/2019/09/this-company-opens-up-the-black-box-of-what-print-newspaper-subscribers-are-actually-reading/>

43. About two thirds of the 1,800 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% of the total characters. We chose not to ignore them by putting a score of +0.5 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

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 about 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 OA-3, in Online Appendix A.

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 OA-7 in Online Appendix F, 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 again for consumers' 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 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. Therefore, the results from this section should not be interpreted as showing that the volume of news does not matter in general. Instead, our estimates simply show no evidence that it matters at the margin, starting from a relatively high volume of news.

6.3 *The Impact of the Tonality of the Media Report Vis-à-Vis the Economic Situation*

Finally, we turn to the question of whether the tonality of the media report vis-à-vis the economic situation does matter. Media may present a monetary policy decision under different forms. They may, for example, overstress the bad economic news that justify the monetary policy decision, or focus more on the positive aspects that the decision entails for the economy. That may, in turn, impact the reaction of firms and consumers to the monetary policy announcement.

To investigate whether tonality vis-à-vis the economic situation matters, we first build an index of sentiment of the media reports on the economy based on Natural Language Processing (NLP) methods. Within our corpus of articles, we start by selecting all sentences containing a noun referring to economic conditions. This is done in two ways. First, we manually go through the list of the most common nouns present in our corpus of articles and identify the relevant ones. Second, we use 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.

online glossary of economic terms of *The Economist* as a complementary approach.⁴⁴ The list of all nouns used is presented in Online Appendix G, and allows us to select around 4,000 sentences in total. We then follow Shapiro, Sudhof, and Wilson (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.⁴⁵ VADER analysis offers several advantages as it takes into account the qualitative differences between words (e.g., 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.⁴⁶ We follow Picault, Pinter, and Renault (2022) and previously clean our news articles by removing all words that refer to particular monetary policy aspects while being indicative of emotions in our dictionary.⁴⁷ 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.⁴⁸ 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 make the NLP approach more robust.⁴⁹ Following Shapiro, Sudhof, and Wilson (2022), we compute the score at the sentence level, and then aggregate it for each article.⁵⁰ From each newspaper,

44. More specifically, we use the package *Spacy* in Python to list all the words used as nouns in our corpus, and go manually through the list of those present at least more than two times, which represent 96% of nouns occurrences. The list of economic terms of *The Economist* is available here: <https://www.economist.com/economics-a-to-z/a>. In this list, we selected all nouns that we judged as relevant to comment on economic conditions. In case we had doubts on whether the word was used to comment on economic conditions, we analyzed 50 sentences where the word occurred in our corpus and where “economy” was not present, and selected the word only if it was used to comment on economic conditions in more than 50% of the cases. This led us to dismiss words such as “borrowing,” “cycle,” or “lending,” which are most often used to refer to monetary policy. In some cases, we identified some expressions in which a specific word was always relevant, while when not associated with the expression, such a word alone was most often not relevant. In such cases, we considered the expression rather than a word alone. This led us to consider, for example, expressions such as “labor market” or “credit market,” instead of the words “labor” and “credit,” which were used in more versatile contexts.

45. Available here: https://github.com/pvhk/vader_fr

46. See Shapiro, Sudhof, and Wilson (2022) for a more exhaustive description of VADER.

47. For example, “interest rate” is removed as “interest” is a positive word in the VADER dictionary, similarly as is “facility” in “marginal facility rate.” The expression “negative deposit rate” is removed because “negative” is indicative of a negative content in the VADER dictionary; following the same logic, we removed the expression “interest rate cut” as “cut” is also indicative of a negative content.

48. 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. As another example, “secteur privé” (private sector) or “banque privée” (private bank) are removed as they contain the word “privé” (deprived), indicative of negative content in VADER.

49. 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).

50. In our context, that implies that sentences which are not related to economic conditions will have a score of 0. In effect, that allows our index to better measure the degree of negativity on the economy present

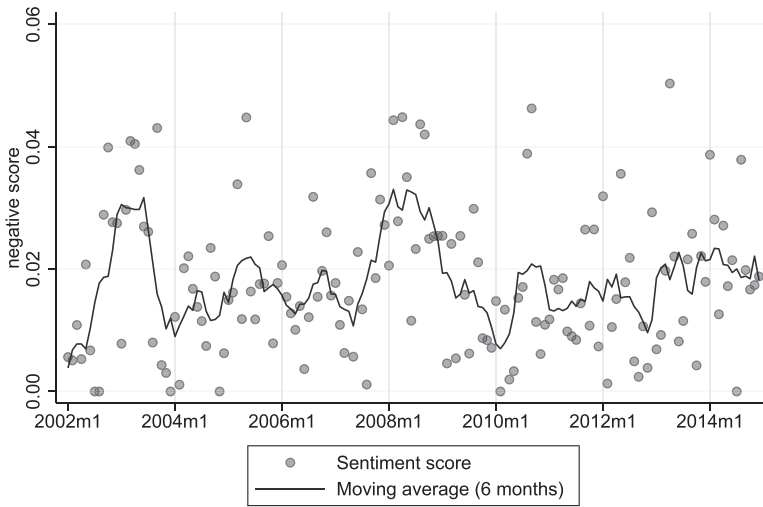


Fig 4. Sentiment on the Economic Situation of the Media Reports on Monetary Policy Announcements (Negativity Score).

NOTES: The graph shows the sentiment index on the economic situation 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, a score is then computed on economic-related sentences and then the weighted average for both newspapers' scores (weighted by audience) is taken. 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.

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 weight this score 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 Online Appendix G, we list the most frequent words present in the index.

With our newly built index we investigate whether the sentiment of the report vis-à-vis the economic situation matters in the reaction of firms and consumers to monetary policy announcements. To make our estimates interpretable, and since the vast majority of detected surprises are expansionary ones, we only focus on expansionary surprises in this section. Indeed, given that we most often found a positive link between decision surprises and expectations, we *a priori* expect a negative sentiment on the economy to have asymmetric effects: it could amplify the effect of expansionary surprises (thus the coefficient of an interaction term between the sentiment and the surprise variables would have the same sign as the coefficient of the surprise variable)

in an article: an article containing 5 negative sentences out of 10 sentences will have a higher negativity score than an article containing 5 negative sentences out of 40 sentences.

but dampen the effect of contractionary surprises (thus the coefficient of the interaction term would have an opposite sign as the coefficient of the surprise). We thus run the following regression:

$$\begin{aligned} \Delta Y_t = & \alpha_6 + \beta_6 MS_t^{EXPdecision} + \phi_6 MS_t^{EXPfuture} + \delta_6 MS_t^{EXPdecision} * SENT_t \\ & + \omega_6 MS_t^{EXPfuture} * SENT_t + \psi_6 SENT_t + \gamma_6 X_t, \end{aligned} \quad (6)$$

where $SENT_t$ is the media sentiment index considered, $MS_t^{EXPdecision}$ and $MS_t^{EXPfuture}$ relate to our media surprise index previously introduced, but now considering only expansionary surprises (as indicated by the superscript EXP). Estimates that consider only the expansionary surprises (without interaction terms) are provided in Online Appendix F in Table OA-8 and point to similar conclusions as the ones we drew before.

The results are displayed in Table 6. They are relatively striking for consumers: accounting for sentiment makes the coefficient related to the expansionary surprise in the monetary policy decision negative and highly statistically significant for consumers' economic expectations (column (9)). In all previous regressions, we ran (including results in Table OA-8), the coefficient for the decision surprise was always positive and statistically significant. The interaction term with the sentiment index is positive, suggesting that negative media reports associated with the monetary policy announcement can make the response of consumers to monetary policy surprises positive, as was observed until now. In fact, considering the values for the expansionary decision surprises and for the sentiment index at the times decision surprises arise, we can infer a positive reaction of consumers to monetary policy announcements in almost all cases, exactly as our results from the previous sections indicated.

As for firms, evidence on the role of the sentiment is more mixed. In two cases out of eight, the interaction term is highly statistically significant. It is the case only for prices expectations, for the industrial and the retail sector. In such cases, the coefficients imply that a surprising rate cut will decrease price expectations (as indicated by the coefficient of $MS^{EXPdecision}$), but will do so less if the tonality on the economy emanating from the reports is more negative. A potential interpretation is that firms may form their expectations with a supply-side view, seeing rate cuts as lowering borrowing costs, and that a negative environment may dampen this expectation. It is also possible that international considerations play a role, given that the effect observed concerns the two sectors that likely have the most exposure to international factors.⁵¹

The sentiment index in itself has a negative coefficient, statistically significant in the case of the industrial sector's expectations, indicating that a more negative sentiment on the economy, emanating from media reports on central bank announcements, decreases prices' expectations, considering all other aspects we controlled for as fixed. As compared to Table OA-8, the coefficients related to media decision surprises

51. Exposure to international factors in the industrial sector might be related to (fluctuating) oil prices, which impact the costs of production of firms and are typically sensitive to the overall economic conditions.

TABLE 6
ESTIMATES, EXPANSIONARY MEDIA SURPRISES, AND NEGATIVE SENTIMENT

Variable	Industry			Retail			Services			Construction			Consumers		
	demand (1)	prices (2)	demand (3)	prices (4)	demand (5)	prices (6)	empl. (7)	prices (8)	eco (9)	prices (10)					
Media surprise^{EXP}, decision (1)	1.472 (61.386)	191.812*** (50.751)	-31.350 (68.150)	135.295*** (33.355)	-89.844 (78.718)	-28.304 (30.536)	63.693 (49.052)	-33.524 (55.021)	-116.629*** (44.531)	-91.120 (70.152)					
Media surprise, future	1.673 (1.924)	0.484 (2.491)	-1.399 (2.127)	-2.205 (1.661)	1.346 (1.300)	-0.128 (0.761)	3.124 (2.003)	3.784* (2.185)	-1.606 (2.771)	3.883 (3.879)					
Media surprise^{EXP}, decision * Neg. sentiment (2)	634.362 (2430.830)	-7790.845*** (2024.254)	1469.435 (2622.591)	-5935.667*** (1299.770)	3889.487 (3126.035)	1170.975 (1208.762)	-2132.951 (1927.113)	1164.735 (2092.157)	5459.739*** (1809.767)	3612.247 (2973.510)					
Media surprise^{EXP}, future * Neg. sentiment	26.571 (77.611)	12.923 (102.963)	16.695 (83.497)	63.918 (70.574)	3.925 (59.562)	24.170 (31.622)	-129.087 (94.279)	-79.211 (94.408)	86.076 (100.453)	-215.030 (168.775)					
Neg. sentiment	25.526 (28.581)	-57.772* (34.399)	-25.932 (28.429)	-56.161 (37.214)	8.475 (20.633)	22.520 (13.936)	-36.704* (19.333)	-33.106 (25.572)	18.907 (26.786)	-68.067* (38.036)					
Baseline controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Lasso selected controls	0.764	-6.416***	-8.780***	-2.426	-0.538	-1.129	0.455	-9.799***	14.410***	7.851					
Dummy oct 2008	(2.148)	(2.362)	(2.177)	(1.922)	(2.219)	(0.993)	(1.755)	(2.496)	(2.763)	(5.364)					
Dummy nov 2008	-3.950***	-2.135	0.970	-13.725***	0.525	-2.535***	-7.775***	-3.038**	4.529***	0.213					
Dummy dec 2008	(1.111)	(1.917)	(1.202)	(1.850)	(0.992)	(0.513)	(0.804)	(1.297)	(1.132)	(3.712)					
constant	-1.963*	-3.624**	-6.891***	-3.467*	2.591**	-2.872***	1.875**	-4.049***	1.058	2.520					
	(1.183)	(1.645)	(0.967)	(1.766)	(1.188)	(0.604)	(0.836)	(1.207)	(0.966)	(2.398)					
	1.787**	1.251*	0.464	0.848	0.031	-0.371	0.731	0.931	-0.133	0.736					
	(0.830)	(0.655)	(0.539)	(0.644)	(0.424)	(0.315)	(0.386)	(0.604)	(0.506)	(0.702)					
<i>Wald test of joint significance of (1) and (2), p-value</i>	0.000	0.000	0.049	0.000	0.074	0.487	0.004	0.582	0.000	0.103					
R ²	0.277	0.223	0.390	0.339	0.285	0.181	0.351	0.309	0.594	0.160					
N	156	156	156	156	156	156	156	143	156	156					

NOTE: OLS estimates of the coefficients of equation (6), where the controls are the same as the ones used in Table 1. *Media surprise^{EXP}, decision* corresponds to the index of media surprises on the policy rate decision, *Media surprise^{EXP}, future* corresponds to the index of media surprises on the future monetary policy stance, both encompassing only expansionary surprises (indicated by the superscript *EXP*). *Neg. sentiment* is our index of sentiment on the economy of the media reports on monetary policy announcements, as provided by a VADER sentiment analysis. The Wald tests reported always have as a null hypothesis that the coefficients of variables (1) and (2) are jointly equal to zero. In parentheses are Huber-White standard errors. ***, **, * and * represent statistical significance at 1%, 5%, and 10%, respectively.

naturally see their amplitude change with the inclusion of the interaction terms, and lose their statistical significance for the pairs industry–economy and construction–economy. However, Wald tests of joint significance that we performed (shown in the last rows of Table 6) strongly reject the null that the media surprise and the interaction term are jointly equal to zero, specifically for these two pairs.

We performed robustness tests for the above results, by initially using the control variables suggested by Bauer and Swanson (2023) and found that the conclusions were unchanged. We also ran “placebo tests” using the volume of news coverage variable (as another positive variable) instead of the media sentiment index (*SENT*) when interacting with the expansionary monetary policy surprises. The results were in essence similar to those obtained in Section 6.2, leading to a positive and statistically significant coefficient for $MS_t^{EXPdecision}$ in the case of consumers’ economic expectations in particular. We also tested whether sentiment plays a role for investors’ responses, using the same specification as the one used above for firms and consumers, but did not find any statistically significant coefficient for the interactive term or the sentiment index alone. That may suggest that the sentiment of the report matters only for the response of less informed agents. Finally, we used our initial financial monetary policy surprises as the $MS^{EXPdecision}$ and $MS^{EXPfuture}$ variables despite the drawbacks this approach may have. The same picture as the one shown by Table 6 emerged: the coefficients for $MS^{EXPdecision}$ and its interaction term were statistically significant and with the same sign for the three pairs we mentioned here. However, these estimates also suggested that consumers’ inflation expectations react to monetary policy announcements, in the same way as their economic expectations do, that is, with a negative response dampened by the negative tonality of the media report on the economy.⁵²

Overall, the analysis of this section suggests that the tonality on the economy of the media reports on monetary policy announcements matters for nonfinancial agents, especially for consumers. One could interpret this result as evidence for the role of an information effect that is driven by media coverage. Such information effect could be specific to less informed agents, a fact aligned with the conjecture of Coibion, Gorodnichenko, and Weber (2022) that consumers may respond to the economic message underlying a monetary policy announcement.

7. CONCLUSION

In this paper, we have asked whether monetary policy announcements affect firms’ and consumers’ expectations. This issue is of particular importance for monetary policy effectiveness: for policy announcements to be effective, theory requires them to impact expectations. However, there is dissonant evidence on this question. The key

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

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 consumers 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” were consistently conveyed as such in the media.

Our results showed that monetary policy surprises do affect firms’ and consumers’ expectations, but that the media treatment is the key element. 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 consumers’ 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 and Swanson (2023), 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 consumers and firms.

We found in our baseline estimates that media-consistent monetary policy surprises were positively linked to firms’ and consumers’ 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 and 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 robust evidence that the tonality of the media reports on monetary policy announcement represents a key aspect for consumers’ economic expectations: the sign of their responses to the policy rate decisions changes when we consider the negativity of the media reports vis-à-vis the economic situation.

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 macro-economic 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 consumers to monetary policy announcements. Third, our re-

sults strongly suggest that researchers and policymakers must take into consideration how monetary policy announcements are conveyed in the media. This is important, in particular, with respect to the content about the economic outlook accompanying the report on monetary policy announcements.

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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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Figure OA- 1: Economic and price expectations data for France (in level)

Figure OA- 2: Media surprises index

Figure OA- 3: Media attention to the policy rate decision (upper panel) and to the future monetary policy stance (lower panel)

Table OA- 1: List of the pool of candidate control variables, LASSO selected

Table OA- 2: List of the other control variables mentioned in the tables of estimates (set X_1)

Table OA- 3: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (first part)

Table OA- 3: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (second part)

Table OA- 4: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (first part)

Table OA- 4: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (second part)

Table OA- 5: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (first part)

Table OA- 5: Monetary surprises and expectations, baseline estimates of model 1 and 2 for each sector considered (second part)

Table OA- 6: Estimates, investor sentiment, and dummy variable specification (first part)

Table OA- 6: Estimates, dummy variable specification (second part)

Table OA- 7: Estimates, media surprises index and media attention

Table OA- 8: Estimates, expansionary media surprises

Figure OA- 4: “Word cloud” of the selected economic terms

Supporting Information