

# Bank of England

## Do firm expectations respond to monetary policy announcements?

**Staff Working Paper No. 1,014**

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**Federico Di Pace, Giacomo Mangiante and Riccardo Masolo**

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## Do firm expectations respond to monetary policy announcements?

Federico Di Pace,<sup>(1)</sup> Giacomo Mangiante<sup>(2)</sup> and Riccardo Masolo<sup>(3)</sup>

### Abstract

We study whether firms' expectations react to the Bank of England's monetary policy announcements by comparing the responses to the Decision Maker Panel survey filed immediately before and after a Monetary Policy Committee meeting. On the one hand, we find that firms' expectations and uncertainty about their own business for the most part do not respond to high-frequency monetary policy surprises. On the other hand, announced changes in the monetary policy rate induce firms to revise their price expectations, with rate hikes inducing a reduction in price expectations and uncertainty surrounding them.

**Key words:** Central bank communication, firm expectations, high-frequency identification, survey data.

**JEL classification:** D84, E52, E58.

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# 1 Introduction

Understanding how expectations respond to announcements by the monetary authorities is pivotal for the transmission of monetary policy. Recently, the profession has devoted greater attention to distinguishing between different economic agents, e.g., market participants, households, firms, and professionals (Reis, 2020; Coibion et al., 2020). Financial markets react swiftly to monetary policy communications. This has been documented by Kuttner (2001) and the vast literature that ensued. However, traders are not the only decision-makers in the economy. Responses by households and firms are arguably more relevant to assessing the macroeconomic effects of policy intervention. Firms set prices, and ultimately determine inflation.

In this paper, we study whether firm expectations respond to the Bank of England (BoE)'s monetary policy announcements and, if so, how. We contrast U.K. firms' survey responses filed in the days immediately preceding an MPC meeting to those submitted in its aftermath. We find that announcements of interest rate *changes* cause a significant movement in price expectations, and the uncertainty surrounding them. An interest rate hike leads to a reduction in price expectations, in line with what economic theory predicts in response to a contractionary monetary policy shock. That is, in general, not the case if we use the conventional definition of policy surprise, defined as the the change in the 3-month Sterling future price in a short window around the policy announcement – Cesa-Bianchi, Thwaites, and Vicendoa (2020) and references therein.

In sum, firms do not respond to monetary announcements the same way financial markets do. Announcements that resulted in sizeable monetary policy *surprises* but did not involve any interest rate adjustment do not affect firms' expectations. At the same time, firms' expectations do react to policy rate *changes*, even though they may well have been anticipated by financial markets.

To evaluate whether firms' expectations respond to monetary policy announcements we use the U.K. survey Decision Maker Panel (DMP). The DMP has data on firms' expectations and uncertainty about their own future sales, price, employment, and investment (Bloom et al., 2018). To isolate the effects of the monetary announcements, we exploit the date on which different firms filed their answers. By comparing the responses of those firms which responded immediately before to those which responded after a Monetary Policy Committee (MPC) meeting of the Bank of England, we can test whether the expectations are influenced by monetary policy decisions. We find that firms' expectations do not significantly react to monetary policy surprises. The results hold controlling for the size of the shock and other firms' observable characteristics.

However, firm expectations and uncertainty strongly respond to the MPC announcements of interest rate *changes*. This is consistent with Google Trends data showing that MPC announcements of changes in rates associate with spikes in attention by the general public, while that is not the case when no change in policy rates is announced. The decrease in interest rate announced on the 11th of March 2020 resulted in a sizeable increase in price expectations of around 1 percentage point (pp) whereas the policy tightening of the 16th of December 2021 and the 17th of March 2022 led to a decrease in price expectations of 1.6 and 1.8 pp respectively in line with the economic theory. All three changes caused a reduction in the level of price uncertainty.

**Related Literature.** This paper contributes to two strands of the literature. First, the results complement the large body of empirical evidence on the effects of monetary policy announcements on expectations that rely on event studies. Lamla and Vinogradov (2019), Rast (2021), De Fiore, Lombardi, and Schuffels (2022) and Binder, Campbell, and Ryngaert (2022) focus on the response of the households' expectations. Lamla and Vinogradov (2019) run their own survey around Federal Open Market Committee (FOMC) meetings and document that the announcements have no measurable effect on average beliefs but make people more likely to receive news about the central bank's policy. Rast (2021) uses the GfK survey and finds that policy rate announcements lead to significant adjustments in household inflation expectations, unlike those about forward guidance and quantitative easing. De Fiore, Lombardi, and Schuffels (2022) rely on the responses from the New York Fed's Survey of Consumer Expectations before and after FOMC meetings and find that only the expectations about interest rates are affected. Binder, Campbell, and Ryngaert (2022) use the same survey to evaluate how household inflation expectations respond to FOMC announcements, macroeconomic data releases, and news related to politics and the Covid-19 pandemic.

Similarly, Lewis, Makridis, and Karel (2019) use daily survey data from Gallup to assess how households' beliefs about economic conditions are influenced by monetary policy: changes in the federal funds target rate have a significant and instantaneous effect on economic confidence. Claus and Nguyen (2020) apply a latent factor model to consumer survey data from the Australian CASiE survey to document that expectations about economic conditions, unemployment, and readiness to spend adjust in the direction predicted by standard models following a monetary policy shock.

More closely related to our paper, Enders, Hunnekes, and Muller (2019) study whether firm expectations respond to policy surprises and find that many of the ECB's announcements of non-conventional policies did not shift expectations significantly. Bottone and Rosolia (2019) use the Bank of Italy's quarterly Survey of Inflation and Growth Expectations and show that firms' pricing plans are not affected by monetary policy shocks. In line with this evidence, we confirm that on average monetary announcements have limited influence on firm expectations. However, we also show that changes in the monetary policy rate are able to significantly alter the expectations in the direction predicted by economic theory and reduce the uncertainty around them.

We also contribute to the literature on how different economic agents form their expectations and respond to shocks. Andre et al. (2022) study how agents expect different shocks to transmit to the macroeconomy. They provide 6,500 U.S. households and 1,500 experts with identical information about the parameters of the shocks and document that their beliefs about the directional effects and the propagation channels of shocks are widely dispersed. Reis (2020) focuses on the discrepancy between market prices and people's long-run inflation expectations. This discrepancy is found to have large business-cycle fluctuations, to be related to monetary policy, and to be driven by disagreement across groups in the population. Candia, Coibion, and Gorodnichenko (2022) compare U.S. firms' inflation expectations to those of households and professional forecasters and show that U.S. managers have far from anchored expectations and that they are poorly informed about recent aggregate inflation dynamics or monetary policy. The heterogeneous response of households and firms to shocks is eval-

uated by Mikosch et al. (2022) as well. They show that an exogenous increase in the perceived uncertainty of the exchange rate leads to an increase in firms’ demand for a report about exchange rate developments, but not households’.

We expand this literature by showing that financial markets and firms do not respond the same way to monetary policy announcements. Unlike markets, firms’ expectations react significantly and sizeably only to MPC announcements of interest rate *changes*.

The remainder of the paper is organized as follows. Section 2 details the data which we use in the paper. In section 3 we describe the empirical specification that we adopt to evaluate the effects of the monetary announcements on firms’ expectations. Section 4 reports the main results of the analysis. Finally, section 5 concludes.

## 2 Data

**Decision Maker Panel.** Most of the analysis relies on firm survey data from the Decision Maker Panel – Bloom et al. (2019a), Bloom et al. (2019b) and Altig et al. (2020). The DMP was launched in August 2016 by the Bank of England, the University of Nottingham, and Stanford University and it is now one of the largest regular business surveys, with a panel of 8,000 firms and around 3,000 responding in any given month.<sup>1</sup> The respondents of the survey are the Financial Officers from small, medium, and large U.K. companies operating in a broad range of sectors, and the survey is designed to be representative of the population of U.K. businesses.

We focus on the questions regarding subjective expectations about future growth in prices, sales, employment, and investment :

- i. *Please assign a percentage likelihood (probability) to the % changes in your AVERAGE PRICES (EMPLOYMENT) you entered*
- ii. *Looking a year ahead from the last quarter, by what % amount do you expect your SALES REVENUE (CAPITAL EXPENDITURE) to have changed in each of the following scenarios?” (with five scenarios provided; i) lowest, ii) low, iii) middle, iv) high, v) highest)*

For each firm, we have its lowest, low, medium, high, and highest expectations and the probabilities associated with them (Altig et al., 2019). We can thus compute the firm’s expected value and the uncertainty surrounding it.

Each respondent  $i$  supplies future growth rates, which we refer to as  $\Delta z_{i,t}$ . For each variable she provides five values,  $\Delta z_{i,t,j}$  at support points  $j = 1, 2, 3, 4, 5$ , and the associated probabilities,  $p_{i,t,j}$ . We calculate the respondent’s mean expectation of the growth rate, for each period, as:

$$\text{Mean}_{i,t}(\Delta z_{i,t,j}) = \sum_{j=1}^N p_{i,t,j} \cdot \Delta z_{i,t,j}, \quad (1)$$

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<sup>1</sup>More information about the representativeness of the data and the structure of the survey can be found here.

and the relative subjective uncertainty as the standard deviation,

$$SD_{i,t}(\Delta z_{i,t,j}) = \left[ \sum_{j=1}^N p_{i,t,j} (\Delta z_{i,t,j} - \text{Mean}_{i,t}(\Delta z_{i,t,j}))^2 \right]^{1/2}. \quad (2)$$

Finally, the DMP survey provides a rich set of firm-level characteristics, like their size and sector, which we use as controls.

**Monetary policy surprises.** We use the monetary policy surprises computed by Cesa-Bianchi, Thwaites, and Vicendoa (2020), based on the high-frequency identification approach developed by Gurkaynak, Sack, and Swanson (2005). The surprises are the changes in the price of 3-month Sterling futures contracts expiring 2 quarters ahead in a 30 minutes window around the announcements of the Monetary Policy Committee of the Bank of England.<sup>2</sup>

In the left panel of Figure 1 we plot the time series of the BoE Bank Rate. Despite the DMP survey only starting in 2016, we are able to capture important monetary events. Since 2016 the Bank Rate has been adjusted several times to respond to different events related to the Brexit referendum, Covid, and the recent increase in the inflation rate. This is reflected in the evolution over time of the monetary policy shocks, reported in the right panel of Figure 1. From 2016 onward the magnitude and the volatility of the surprises in the Bank Rate have correspondingly increased, relative to the early 2010s.

**Google Trends.** Google trends measure the search interest for certain topics/keywords. We use Google Trends data to assess whether the general public interest in the activities of the BoE increases in correspondence with monetary policy announcements.

### 3 Estimation Strategy and Identification

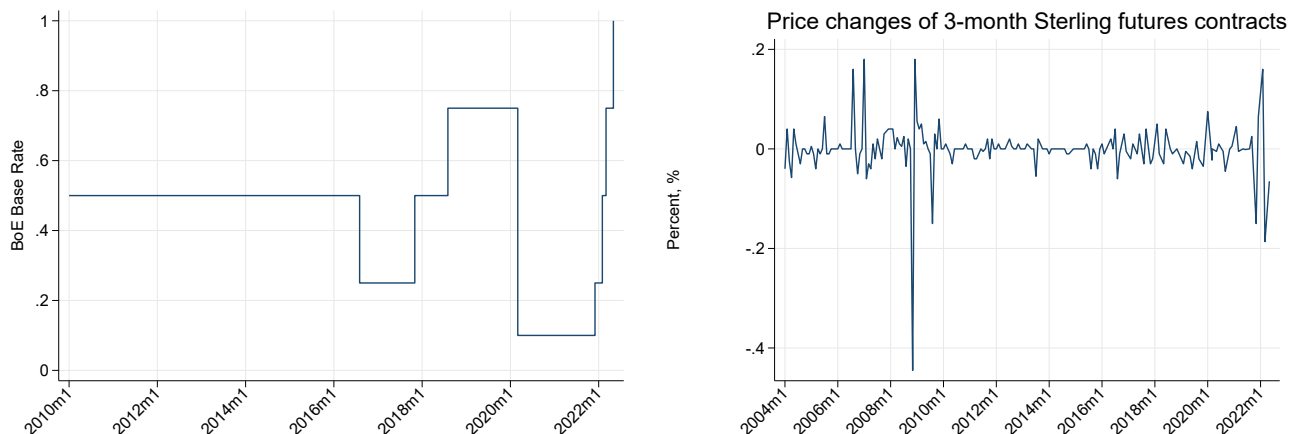
We estimate the treatment effect of monetary policy announcements by comparing the expectations of the survey respondents right before the MPC announcement with those right after, along the lines of Rast (2021) and Lamla and Vinogradov (2019).

DMP surveys are conducted monthly over a period of 2 to 3 weeks. Firms can respond at any time during that period. We focus on the monetary policy announcements that take place during the time window in which the DMP survey is administered and contrast the responses of firms that submitted their responses right before the announcement to those that did in the aftermath.<sup>3</sup>

<sup>2</sup>The list of MPC meetings for which at least one of the expectations measures is available is reported in Table (.8) of the Appendix. From 2021 onward the Libor-based futures are not available anymore, so Sonia-based futures are used instead.

<sup>3</sup>We exclude the responses that have been filed on the days of an announcement as we do not observe the exact time of the submission.

Figure 1: Bank of England Base Rate and monetary policy surprises



Notes: The left panel plots the Bank of England Base Rate over time. The vertical axis is in annual percentage points. The right panel reports monetary policy surprises, computed as the changes in the second front contract of the 3-month Sterling future, the 3-to-6 month ahead expectation about the 3-month Libor, in a 30-minute window around monetary policy events.

In particular, we estimate the following regression specification:

$$y_{i,t} = \alpha + \beta D_{i,t} s_t + X_{i,t} + \epsilon_{i,t}, \quad (3)$$

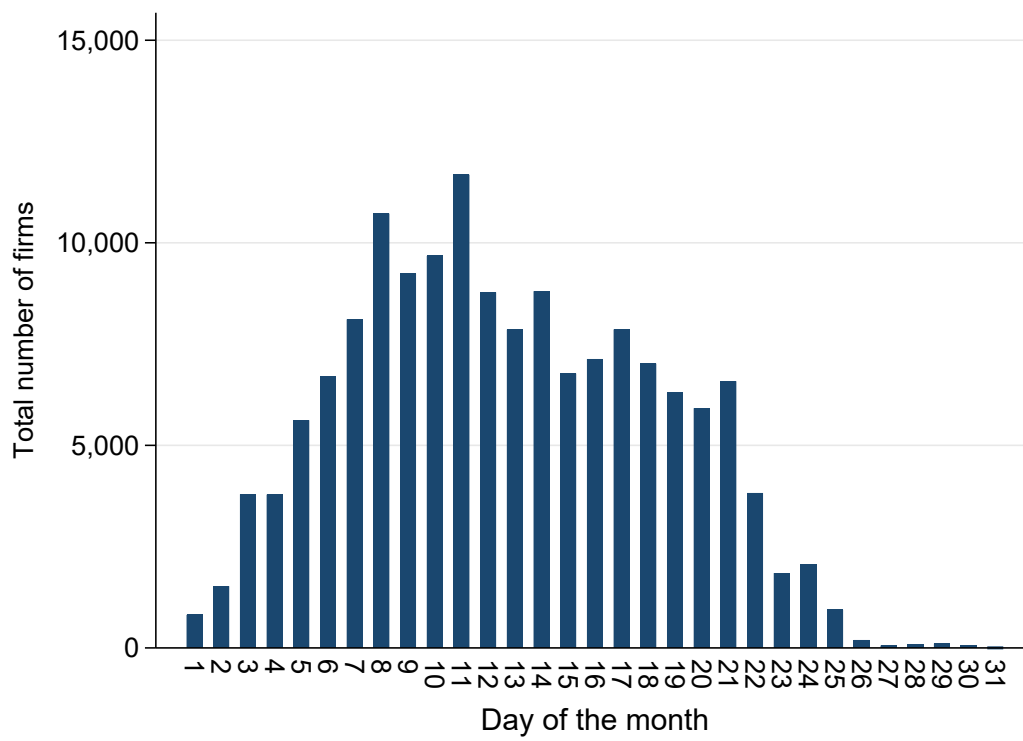
where  $D_{i,t}$  is a dummy equal to 1 if the firm responds after the announcement (as a baseline we use a symmetric time window around the MPC announcements of 5 days),  $s_t$  represents the MP surprises, and  $X_{i,t}$  is the matrix of control variables, which includes sector and wave fixed effects. By wave, we refer to the monthly administering of the survey. A wave is completed within a month, so we could equivalently label it as monthly fixed effect. Standard errors are clustered at wave level.<sup>4</sup>

In Figure 2, we report the total number of respondents for each day of the month. The majority of firms submit their responses in the second week of the month, while only a few file their answers during the last week. So if an announcement is made towards the end of the month, we may not be able to include it in our analysis as no firm's observations fall within the 5-day window around the announcement.

More important for our identification strategy is that the date on which firms file their responses does not depend systematically on firm characteristics or on the timing of the policy announcement. In Section 4.2 we test this assumption and find that the probability of answering the survey before or after the MPC announcements is unrelated to firms' observable characteristics.

<sup>4</sup>In Section 4.2.1 we interact the term  $D_{i,t} s_t$  with firm-level characteristics that may influence the reaction to monetary policy news, to isolate elements of heterogeneity in firm responses.

Figure 2: Total number of firms submitting their answers to the DMP survey by day of the month





## 4 Baseline Results

In this section, we report the main results of our empirical analysis. First, we show that monetary surprises have no impact on firms' expectations about their own business. Second, we find that the general public attention to the BoE's activities spikes during MPC meetings if a change in interest rate is announced. Third, we demonstrate that firms' expectations and uncertainty significantly respond to the announcements of interest rate changes. Overall, the results suggest that the firms react to monetary policy announcements only if they involve an interest rate adjustment.

### 4.1 Do firms respond to monetary policy surprises?

We start by evaluating whether firms' expectations react to monetary *surprises* as defined by the reaction of financial markets. We estimate equation (3) with firm expectations and uncertainty as the dependent variable. The monetary policy shocks are the surprises computed by Cesa-Bianchi, Thwaites, and Vicendoa (2020).

Table 1 reports the coefficients of interest from equation (3), considering the 12-month ahead price and employment growth, the 4-quarter ahead of sales and investment growth as well as their relative subjective uncertainty, as the dependent variable.

Table 1: MPC announcements and firm expectations and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise x Dummy mpc	4.409 (2.988)	2.684 (2.370)	5.109 (4.903)	1.076 (5.776)	1.265 (3.496)	1.158 (1.947)	-13.51 (27.09)	28.94 (21.29)
Constant	2.954*** (0.00956)	2.239*** (0.00759)	8.456*** (0.0166)	6.946*** (0.0195)	0.835*** (0.0155)	6.751*** (0.00862)	16.18*** (0.0968)	48.00*** (0.0761)
Observations	5263	5263	6254	6254	6898	6898	6615	6615
R <sup>2</sup>	0.070	0.038	0.055	0.041	0.059	0.035	0.034	0.019
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The coefficients measure by how much the expectations (and uncertainty levels) of firms that respond to the survey after an hypothetical monetary policy surprise of 1 percentage point (pp) differ from those that filed their answers beforehand. None is significant. Moreover, it is important to note that the standard deviation of the surprises is around 0.05 pp so a one standard deviation shock increases price expectations by 0.23 pp. Therefore, the effects are not only statistically but also economically insignificant.

These results can be the manifestation of three separate phenomena. Firms could simply be oblivious of monetary policy announcements. Financial market surprises could be a poor proxy for what represents a policy surprise to firms. Finally, it could be that firms do not respond to central bank announcements despite being aware of it or they respond nonlinearly in a way that makes the linear coefficient nonsignificant. We investigate the merits of each of these possible explanations.

Table 2: MPC announcements and firm expectations and uncertainty, bins approach

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise bottom 1/3 x Dummy mpc	6.398*** (0.708)	4.523*** (1.289)	5.836 (4.937)	0.438 (5.586)	4.344* (2.161)	0.514 (1.093)	14.92 (31.74)	55.10*** (12.27)
Surprise middle 1/3 x Dummy mpc	-70.33 (71.06)	39.79 (34.97)	-318.0 (268.9)	-154.3 (97.17)	-59.49*** (21.05)	-33.05 (200.0)	-1980.3 (1349.0)	-468.5 (639.5)
Surprise top 1/3 x Dummy mpc	-4.982 (11.87)	-6.865*** (2.151)	3.786 (12.12)	5.873 (22.77)	-12.99 (11.78)	4.557 (9.276)	-120.4** (50.58)	-80.44** (37.08)
Constant	3.113*** (0.173)	2.416*** (0.0391)	8.441*** (0.208)	6.841*** (0.351)	1.074*** (0.165)	6.688*** (0.131)	17.87*** (0.904)	49.91*** (0.567)
Observations	5263	5263	6254	6254	6898	6898	6615	6615
R <sup>2</sup>	0.070	0.039	0.055	0.041	0.059	0.035	0.034	0.019
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

We start by considering the possibility that firms respond differently to different monetary policy shocks. If that were the case, a linear model would not be appropriate as it would conflate different responses into a single coefficient. We thus sort the monetary surprises from 2016m8 (when the DMP survey becomes available) onward according to their size and we break them into terciles,  $b \in \{\text{bottom, middle, top}\}$ . It follows that the bottom (top) bin includes only large expansionary (contractionary) surprises, i.e., negative (positive) monetary policy shocks. We then estimate the following model:

$$y_{i,t} = \alpha + \sum_{b=1}^3 \beta_b D_{i,t} s_{t,b} + X_{i,t} + \epsilon_{i,t} \quad (4)$$

where  $s_{t,b}$  assumes the value of the monetary surprise in case it falls into bin  $b$  and zero otherwise. Table 2 reports our estimates.

Most of the coefficients are again insignificant. One exception is the positive price response pertaining to the bottom tercile of the surprises. As we discuss more in detail below, the result is driven by the announcement of the 17th of March 2022. The BoE increased its interest rate leading to a decrease in firms' price expectations. However, the interest rate increase was smaller than what was anticipated by the financial markets resulting in a negative surprise. The coefficient becomes insignificant once this announcement is removed from the sample<sup>5</sup>.

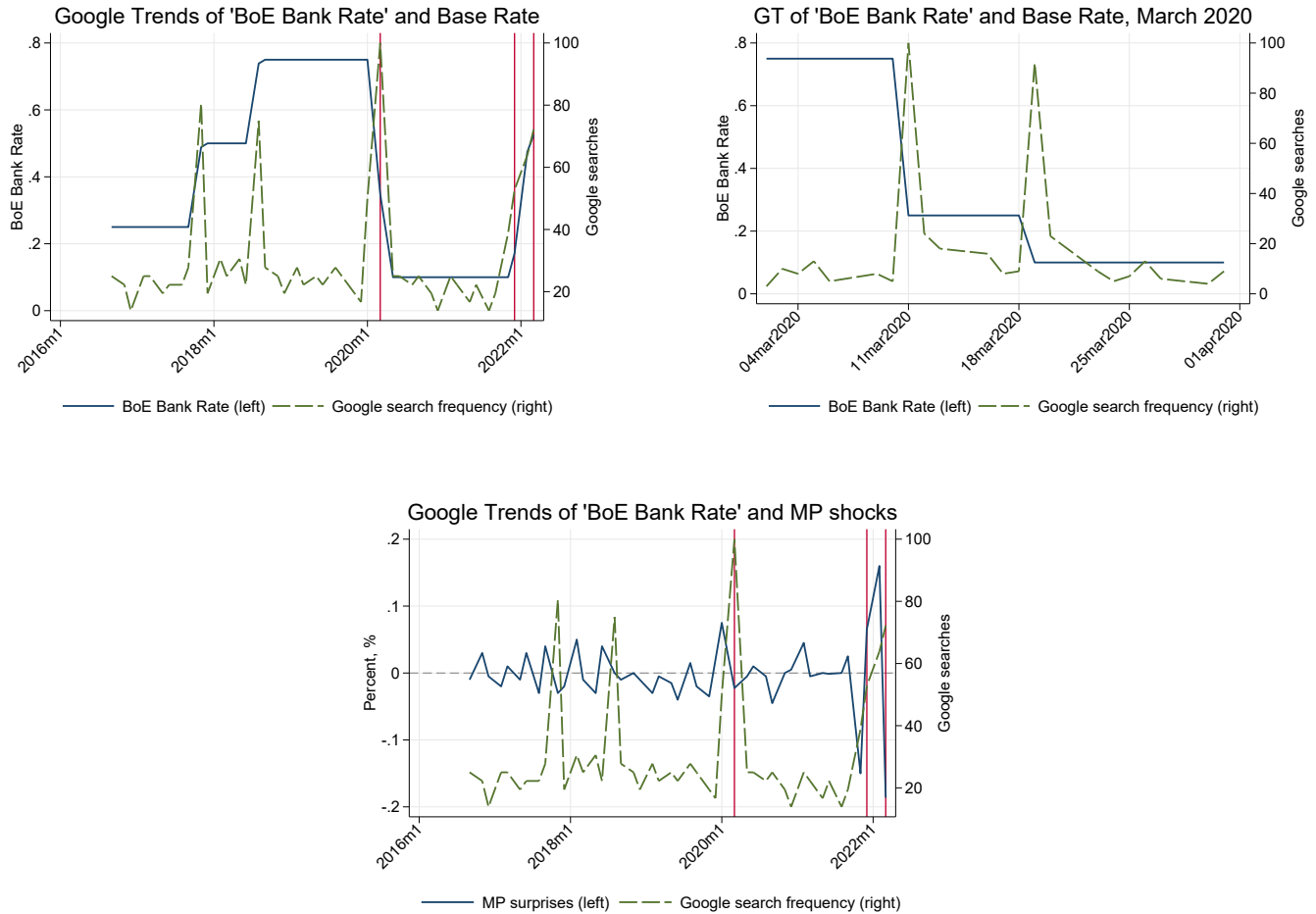
Overall, it appears that firms do not respond to monetary policy surprises. To evaluate whether this is due to the fact that firms do not pay attention at all to the MPC announcements we turn to Google Trends (GT) data to investigate what type of announcements, if any, capture attention the most.

The top left panel of Figure 3 shows the Google searches for "BoE Bank Rate" (right axis) and the actual Bank Rate at monthly frequency (left axis) – the top right panel zooms into March 2020, the one month in which two separate policy announcements were made.<sup>6</sup> Google searches for the term "BoE Bank Rate" spike when an MPC announcement corresponds to an interest rate *change*. The interest in the activity of the central bank rises on

<sup>5</sup>See Table 4.

<sup>6</sup>The time series are standardized such that the maximum value for the time period considered is equal to 100.

Figure 3: BoE Bank Rate, Google searches, and monetary policy surprises



*Notes:* The top left panel shows the time series of the Bank of England Base Rate and the relative Google search index at a monthly frequency. The top right panel reports the same variables at daily frequency for March 2020. The bottom right panel confronts Google searches with monetary surprises. The red vertical lines are the MPC meetings which were scheduled in the middle of the month and are then part of the analysis.

the exact day of the announcement, suggesting that the communication is effective at capturing the attention of the general public.

The bottom panel of Figure 3 overlays monetary policy surprises (Cesa-Bianchi, Thwaites, and Vicendoa, 2020) (left axis) to the Google Trend series (right axis) instead. As one can notice, there is no clear relationship between the size of the shocks and the level of attention by the general public. Some announcements which involved a change in interest rate, e.g., on the 17th of March 2022, were almost perfectly anticipated by the markets resulting in almost zero surprises despite sizeably increasing the general public attention. Therefore, news of rate changes reaches the public and stirs its interest, irrespective of whether the rate moves represent a

surprise to financial market participants. Conversely, market-based surprises do not make the news and do not capture the attention of the general public.

Google trend data suggest that interest rate *changes* may be more *salient* than high-frequency surprises. We thus estimate a series of regressions that study the response of expectations and uncertainty to the MPC announcements which involved a rate change. Since the DMP survey has been launched, the BoE has changed the policy rate 7 times. Out of these 7 times, 3 times were announced in the middle of the month when the DMP survey is administered allowing us to compare how firms' expectations adjusted in response. The announcements happened on the 11th of March 2020, the 16th of December 2021, and the 17th of March 2022. The vertical red lines in Figure 3 indicate the three meetings.

As reported on the top right panel of Figure 3, on the 11th of March 2020 the BoE announced a sizeable decrease in the Base Rate from 0.75 percentage points to 0.25 to stimulate the economy in the Covid period. On the 16th of December 2021, the monetary authority adopted a more active stance against the surge in the inflation rate by increasing the interest rate from 0.1 percentage point to 0.25 and on the 17th of March 2022 from 0.5 to 0.75. Interestingly, the first interest-rate hike corresponds to a large positive market-based surprise: markets had not fully priced in the interest-rate increase. The second one to a negative surprise of almost 20bps: market participants were expecting a larger increase in the policy rate. The three announcements were extensively covered in the media given the important economic challenges they were responding to<sup>7</sup>.

Table 3: Individual MPC announcements and firm expectations and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Meeting 11/03/2020 x Dummy mpc	1.044*** (0.00959)	-0.594*** (0.0255)	-0.837*** (0.0696)	-1.943*** (0.138)	-1.763*** (0.0255)	0.926*** (0.0538)	0.774 (0.951)	2.386** (0.381)
Meeting 16/12/2021 x Dummy mpc	-1.594*** (0.0595)	-0.301*** (0.0106)	0.918 (0.320)	2.773*** (0.220)	-0.0799 (0.245)	-0.551* (0.159)	4.126 (2.967)	-1.908* (0.491)
Meeting 17/03/2022 x Dummy mpc	-1.840*** (0.0985)	-0.617*** (0.0587)	-2.077* (0.490)	-1.498** (0.228)	-1.013* (0.302)	0.529** (0.0652)	5.410 (3.548)	-7.628*** (0.319)
Constant	3.721*** (0.0222)	2.654*** (0.0138)	7.315*** (0.0430)	7.916*** (0.0109)	2.108*** (0.0861)	6.036*** (0.00774)	2.037** (0.377)	46.61*** (0.136)
Observations	402	402	486	486	553	553	540	540
R <sup>2</sup>	0.124	0.059	0.053	0.045	0.089	0.062	0.037	0.039
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors in parentheses  
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 3 presents the results of the expectations and uncertainty variables regressed on announcement-specific treatment indicators. The coefficients can be interpreted as the mean difference (controlling for wave and announcement fixed effects) between the expectations of those surveyed before the respective MPC announcement and those surveyed afterward.

The monetary policy loosening of March 2020 leads to an increase in price expectations, and the two tightening episodes to a reduction. Estimates are statistically significant across the board and economically meaningful too. For instance, before the MPC announcement to increase the interest rate by 0.25 percentage points (pp) on

<sup>7</sup>Since around those dates many other central banks were taking similar decisions for this exercise we narrow the window considered from 5 days to 2 to reduce the probability to capture the impact of events other than the BoE announcements.

the 17th of March 2022 the average expectation for price growth was around 6.1 pp, after the announcement it fell to 4.8 pp. All changes, cause a reduction in the level of price uncertainty. The average uncertainty before the announcement on the 17th of March was around 3.25 percent and fell to 2.2 afterward.

The expectations on sales and employment were negatively adjusted in response to the interest rate hike on the 17th of March 2022. The announcement of December 2021 had negligible effects on sales, employment, and investment expectations. Finally, the interest rate cut of March 2020 lead to a reduction in expected sales and employment. The contractionary response of the real variables could be explained by the fact that the announcement happened amidst daily news concerning the pandemic, which induced firms to reduce their expectations for sales and employment downward.

Our evidence rules out the hypothesis that firms are unaware of monetary policy action. Interest rate *changes* garner a high level of attention from the general public and firms adjust their price expectations in their aftermath. The expectations are adjusted in a consistent manner and in the direction we would expect if we considered the rate *change* to be a close proxy to the shock. The combination of the central bank intervention and the media coverage tends to reduce the level of price uncertainty. This is true irrespective of the sign and magnitude of the high-frequency market surprise.

The most likely cause of the lack of comovement between market-based monetary policy surprises and firm expectations is that financial market surprises are a poor proxy for what constitutes a surprise to firms. This is reinforced by the finding that the results in Table 2 hinge on the large negative market surprise relative to the March 2022 policy announcement. In Table 4 we repeat the same estimation excluding the three meetings we consider in Table 3. The significant response of price expectations to large expansionary shocks disappears once we remove the large negative market surprise recorded in March 2022. It should be noted that nothing in the policy discussion surrounding the March 2022 meeting leads us to believe there was a significant *forward guidance* component to the policy decision. We ascribe the negative market surprise to markets expecting a larger increase in policy rates. The response of firm price expectations, on the other hand, is consistent with firms interpreting the rate change as a tightening in the monetary policy stance.

## 4.2 Robustness checks

### 4.2.1 Firm characteristics

We investigate whether firms heterogeneously respond to monetary policy news based on their observable characteristics. In other words, we test whether the insignificant response to market-based surprises is the result of compensating effects across different firm types.

We focus on the firms' size, i.e., the number of employees, their sector, and their age. We classify a firm as small if it has less than 50 employees, medium if between 50 and 250, and large if it employs more than 250 people. We then estimate equation (3) interacting the categorical variable of the firm size with the post-announcement dummy and the monetary surprises.

Table 4: MPC announcements and firm expectations and uncertainty, bins approach excluding meetings with policy changes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise bottom 1/3 x Dummy mpc	5.914 (6.952)	-1.203 (10.44)	-26.59 (28.18)	-36.23 (22.72)	5.694 (19.57)	6.845 (8.942)	130.9 (213.9)	101.1 (76.22)
Surprise middle 1/3 x Dummy mpc	-70.06 (69.41)	40.07 (35.00)	-314.7 (266.9)	-153.6 (97.74)	-57.70** (22.07)	-33.30 (200.5)	-1998.5 (1354.1)	-466.9 (644.8)
Surprise top 1/3 x Dummy mpc	12.35* (6.997)	-4.826 (3.427)	1.710 (24.88)	-32.94*** (11.08)	-25.20 (20.09)	17.47 (12.48)	-164.7** (76.54)	-80.95 (68.54)
Constant	2.726*** (0.153)	2.256*** (0.177)	7.818*** (0.593)	6.769*** (0.404)	1.127*** (0.416)	6.659*** (0.227)	20.57*** (3.618)	50.78*** (1.542)
Observations	5010	5010	5953	5953	6581	6581	6347	6347
R <sup>2</sup>	0.059	0.035	0.057	0.044	0.057	0.035	0.035	0.018
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	32	32	33	33	33	33	33	33

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The results are reported in Table 5, where the omitted group is that of small firms. While there are systematic differences in the level of expectations across groups, there are no significant differences in the responses of price expectations.<sup>8</sup> The response of firm expectations to monetary policy announcements is largely independent of their size.

Table 5: MPC announcements and firm expectations and uncertainty, by size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Medium (50-250)	-0.524** (0.216)	-0.484*** (0.0872)	-0.808 (0.556)	-1.931*** (0.393)	-0.204 (0.296)	-3.158*** (0.272)	-5.922** (2.652)	-8.834*** (0.918)
Large (above 250)	-0.853*** (0.171)	-0.953*** (0.0984)	-2.905*** (0.739)	-3.727*** (0.348)	-0.572* (0.299)	-5.117*** (0.245)	-20.58*** (3.225)	-24.85*** (0.870)
Surprise x Dummy mpc	5.991 (4.392)	0.176 (3.055)	3.564 (6.932)	2.647 (6.817)	-1.620 (3.444)	4.097 (3.906)	-43.69 (31.51)	12.87 (37.77)
Medium (50-250) × Surprise x Dummy mpc	0.825 (2.298)	0.448 (0.607)	4.117 (6.280)	-0.773 (7.302)	2.781 (2.354)	-7.351 (4.406)	-38.14 (40.98)	-21.18 (16.91)
Large (above 250) × Surprise x Dummy mpc	1.340 (1.366)	0.739 (1.461)	-6.683 (8.191)	-3.826** (1.667)	4.462** (2.013)	-5.306 (4.014)	7.721 (23.49)	-21.25** (9.525)
Constant	3.451*** (0.139)	2.722*** (0.0624)	9.547*** (0.386)	8.837*** (0.256)	1.068*** (0.195)	9.504*** (0.181)	24.37*** (1.739)	58.83*** (0.555)
Observations	4504	4504	5361	5361	6898	6898	5793	5793
R <sup>2</sup>	0.080	0.057	0.064	0.063	0.060	0.092	0.041	0.096
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 6 shows the results of the same regression but interacting the announcement dummy and the monetary surprises with a dummy equal to one if the firm belongs to the financial sector. Monetary surprises have a differential effect on employment prospects only. The coefficients on all the other interactions are not significant.

Finally, we assess whether firm age drives differences in the responses of firm expectations. We interact the post dummy variable and the monetary shocks with the age of the firm obtained from Bureau van Dijk (BvD). The coefficients from Table 7 suggest that age does not influence firms' responsiveness to the average monetary

<sup>8</sup>Large firms display some peculiarity in the responses of sales and employment.

Table 6: MPC announcements and firm expectations and uncertainty, finance sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Finance	-1.049*** (0.289)	0.173 (0.132)	0.758 (0.701)	1.790*** (0.572)	1.615*** (0.541)	1.065*** (0.327)	-11.69** (4.463)	-1.546 (1.567)
Surprise x Dummy mpc	4.613 (3.327)	2.663 (2.663)	5.545 (5.608)	0.0982 (6.132)	3.551 (3.552)	0.665 (2.102)	-8.954 (30.41)	28.73 (22.30)
Finance × Surprise x Dummy mpc	-2.209 (5.956)	-1.971 (3.454)	-12.75 (11.45)	2.690 (14.31)	-13.79*** (3.356)	4.777 (3.729)	13.49 (61.27)	16.36 (15.62)
Constant	3.018*** (0.0216)	2.228*** (0.00923)	8.395*** (0.0570)	6.804*** (0.0456)	0.722*** (0.0450)	6.674*** (0.0255)	16.89*** (0.278)	48.10*** (0.126)
Observations	5263	5263	6254	6254	6898	6898	6615	6615
R <sup>2</sup>	0.056	0.021	0.047	0.027	0.051	0.017	0.032	0.011
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses  
<sup>\*</sup>  $p < 0.10$ , <sup>\*\*</sup>  $p < 0.05$ , <sup>\*\*\*</sup>  $p < 0.01$

announcement. Overall, this section documents that the observable characteristics considered, i.e., size, sector, and age, play at best a minor role in explaining the responsiveness of firm expectations to monetary surprises.

Table 7: MPC announcements and firm expectations and uncertainty, by age

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Log Age	-0.0731 (0.0945)	-0.284*** (0.0393)	-2.258*** (0.256)	-0.892*** (0.145)	-1.190*** (0.144)	-0.910*** (0.110)	-3.506** (1.592)	-0.854* (0.492)
Surprise x Dummy mpc	4.037 (8.198)	6.666 (4.507)	10.43 (8.961)	8.144 (9.975)	15.30* (8.566)	-1.376 (3.451)	-55.78 (62.38)	11.12 (50.22)
Log Age × Surprise x Dummy mpc	0.112 (2.526)	-1.183 (0.899)	-1.659 (2.750)	-2.094 (2.247)	-4.186 (2.553)	0.938 (0.712)	16.59 (17.29)	5.212 (12.86)
Constant	3.198*** (0.293)	3.138*** (0.122)	15.54*** (0.798)	9.749*** (0.452)	4.594*** (0.448)	9.559*** (0.342)	27.02*** (4.977)	50.74*** (1.533)
Observations	5186	5186	6154	6154	6745	6745	6521	6521
R <sup>2</sup>	0.069	0.046	0.065	0.048	0.069	0.043	0.034	0.019
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses  
<sup>\*</sup>  $p < 0.10$ , <sup>\*\*</sup>  $p < 0.05$ , <sup>\*\*\*</sup>  $p < 0.01$

## 4.2.2 Sampling and specification

The identification strategy we adopt crucially relies on firms responding randomly to the survey within the month. As in Bottone and Rosolia (2019), we test this assumption by plotting the predicted probability of answering before or after the MPC announcement in Figure A.1. The predicted probabilities are estimated with a probit model for the event of returning the questionnaire after the monetary event on dummies for industry and size class. The two distributions are essentially identical. This suggests that the decision to submit the survey responses before or after the announcements is unrelated to the observable characteristics considered.

We then evaluate whether controlling for the lagged value of the dependent variable affects our results.<sup>9</sup> We report the results using the monetary surprises from Cesa-Bianchi, Thwaites, and Viccondoa (2020) in Table A.1. The time dimension of the panel is short, so controlling for a lag of the dependent variable reduces the number of

<sup>9</sup>We lag the dependent variable by 3 months as firms are surveyed once every 3 months.

observations by almost half. Most coefficients on the monetary policy surprise remain not significant, with the notable exception of that on price expectations. Even in this case, however, the result is entirely driven by the MPC meeting on the 17th of March 2022, when firms decreased their price expectations after the announcement of a rate increase that markets perceived as an expansionary shock instead. Excluding this meeting from the analysis makes the coefficient not significant.

Our empirical strategy also rests on the window size around the announcement. The smaller the window, the less likely economic news other than monetary policy announcements can pollute our estimates. At the same time, a shorter window reduces the number of respondents and increases noise.

In our baseline, the treatment group is represented by firms filing survey responses up to 5 days after the announcements. Correspondingly, firms in the control group will have filed their responses 5 days prior to the announcement. The window sizes vary quite significantly across papers. Enders, Hunnekes, and Muller (2019) opt for a 2-day window, while De Fiore, Lombardi, and Schuffels (2022) consider a 21-day window.

In our robustness checks, we consider a 2-day and a 10-day window. Reducing the size of the window from 5 days to 2 days excludes 3 monetary events which fall outside the new interval considered.<sup>10</sup> However, as it can be seen in Table (A.2), it has basically no effects on the estimated coefficients. Increasing the size of the window from 5 days to 10 days includes 8 more events that now fall inside the interval considered. Table (A.3) reports the results. The only remarkable result of these two estimations is the significant coefficient on price changes. But just as above, this hinges on the negative market surprise from March 2022.

Some monetary announcements occur at the beginning or at the end of the month. It might be the case that they are still included in the analysis although the size of the control and treated groups respectively is quite small. As a further robustness check, we now consider only the monetary events which happen in the middle of the month, i.e., from the 10th to the 20th, and for which we have both a large control and treated group. The number of announcements considered decreases from 34 to 19 for price expectations and from 35 to 20 for the other variables. The results are shown in Table (A.4). The new specification does not remarkably alter the findings of the main analysis.

Finally, one might be concerned that other important announcements/releases might happen near the monetary events confounding the results. In particular, the U.K. employment rate and CPI releases by the Office for National Statistics (ONS) might affect firms' prices and employment expectations. Therefore, we create a time series of the dates when these two documents are published and we test whether firms that filled the survey after the release have different expectations from those which filled the survey before the release.

Table (A.5) and Table (A.6) report the results from the baseline specification using as control variable a dummy that equals 1 if the firm responded to the survey within 5 days after the release and 0 if the firm responded within 5 days before the release. The size of the coefficients is extremely close to zero suggesting that the ONS releases have basically no effect on firms' expectations.

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<sup>10</sup>A 2-day window will rule out announcements that take place 3 or more days prior to the survey beginning to be administered for the month.



## 5 Conclusion

To what extent central banks' announcements are able to affect expectations is critical to the transmission of monetary policy to inflation. The ability to influence expectations, and ultimately actual decisions, is considered one of the most important policy tools available to monetary authorities. However, the empirical evidence on the effects of real-world announcements on expectations is still limited.

In this paper, we study whether firms' expectations respond to monetary policy announcements from the BoE. We do so by comparing the responses to the DMP survey filled before with those after an MPC meeting. Similarly to what is documented by most of the existing literature, we show that firms' expectations do not sizeably respond to monetary policy announcements when we consider high-frequency surprises as a proxy for monetary policy. At the same time, if we focus on meetings in which rates are *changed*, then we find that firm price expectations do respond to announcements.

Our findings suggest that central banks' announcements can influence expectations. However, different economic agents might pay attention to different kinds of announcements and heterogeneously respond to them. Market-based monetary policy shocks seem to not be the best proxy for what represents a monetary policy surprise to firms. Therefore, it is crucial that monetary authorities take this into account when designing their communication strategy.

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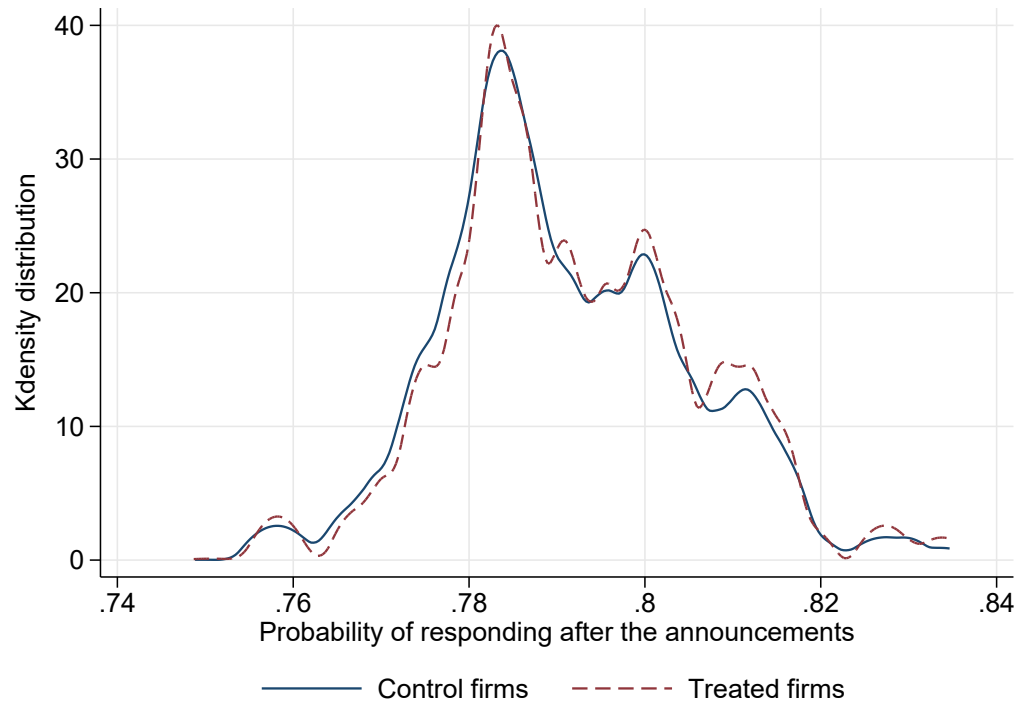
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Table .8: List of MPC meetings

Year	Month	Day	Observations
2016	11	3	74
2016	12	15	202
2017	2	2	116
2017	3	16	175
2017	5	11	234
2017	6	15	234
2017	9	14	313
2017	12	14	289
2018	2	8	271
2018	3	22	208
2018	5	10	331
2018	6	21	283
2018	9	13	595
2018	12	20	433
2019	2	7	585
2019	3	21	377
2019	6	20	333
2019	9	19	322
2019	11	7	637
2019	12	19	363
2020	5	7	348
2020	6	18	328
2020	8	6	604
2020	9	17	281
2020	11	5	546
2020	12	17	359
2021	2	4	577
2021	3	18	410
2021	5	6	602
2021	6	24	217
2021	8	5	558
2021	9	23	219
2021	11	4	522
2021	12	16	321
2022	2	3	529
2022	3	17	347

## A Robustness checks

Figure A.1: Predicted probability of responding after the announcement, control vs treated



*Notes:* The plot shows the predicted probabilities of responding to the survey before or after a monetary announcement for the control and treated firms, i.e., those which actually filed the survey before and after the announcements. The predicted probabilities are estimated with a probit model for the event of returning the questionnaire after the monetary event on dummies for industry and size class.

Table A.1: MPC announcements and firms' expectations and uncertainty controlling for lag

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise x Dummy mpc	6.168*** (1.737)	1.344 (1.156)	26.98* (13.77)	-5.588 (5.130)	0.902 (3.866)	-2.907 (2.248)	-9.246 (48.90)	-9.383 (13.31)
Lag expected price growth	0.485*** (0.0265)							
Lag price uncertainty		0.575*** (0.0496)						
Lag expected sales growth			0.349*** (0.0504)					
Lag sales uncertainty				0.623*** (0.0715)				
Lag expected emp growth					0.497*** (0.0208)			
Lag emp uncertainty						0.631*** (0.0392)		
Constant	1.616*** (0.0699)	0.925*** (0.108)	5.424*** (0.372)	2.483*** (0.491)	0.857*** (0.0203)	2.222*** (0.264)	12.29*** (0.290)	28.54*** (0.926)
Observations	3188	3188	3970	3970	4652	4652	4546	4546
R <sup>2</sup>	0.311	0.379	0.168	0.375	0.308	0.431	0.107	0.193
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	34	34	35	35	35	35	35	35

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.2: MPC announcements and firms' expectations and uncertainty, 2-day window

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise x Dummy mpc	6.592* (3.710)	2.487 (1.510)	4.924 (8.635)	7.517** (3.638)	4.322* (2.549)	-1.908 (2.079)	-10.44 (37.86)	16.18 (25.33)
Constant	3.045*** (0.0161)	2.289*** (0.00656)	8.832*** (0.0412)	7.142*** (0.0173)	1.120*** (0.0103)	6.615*** (0.00841)	15.50*** (0.157)	47.64*** (0.105)
Observations	3033	3033	3603	3603	4079	4079	3875	3875
R <sup>2</sup>	0.072	0.039	0.052	0.042	0.048	0.041	0.035	0.022
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Window	2 days	2 days	2 days	2 days	2 days	2 days	2 days	2 days
Number of meetings	32	32	33	33	33	33	33	33

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.3: MPC announcements and firms' expectations and uncertainty, 10-day window

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise x Dummy mpc	7.490*** (2.731)	3.951*** (1.397)	3.533 (5.399)	2.326 (3.421)	2.615 (2.748)	1.758 (3.028)	9.830 (36.62)	23.07 (23.95)
Constant	2.917*** (0.00387)	2.209*** (0.00198)	8.128*** (0.00824)	6.757*** (0.00522)	0.812*** (0.00388)	6.782*** (0.00427)	15.57*** (0.0541)	48.56*** (0.0354)
Observations	13402	13402	15833	15833	18067	18067	16927	16927
R <sup>2</sup>	0.073	0.033	0.047	0.044	0.060	0.030	0.025	0.015
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Window	10 days	10 days	10 days	10 days	10 days	10 days	10 days	10 days
Number of meetings	43	43	43	43	44	44	43	43

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.4: MPC announcements in the middle of the month and firms' expectations and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
Surprise x Dummy mpc	5.029 (3.008)	3.546* (2.043)	7.883*** (2.623)	4.149 (5.025)	2.522 (3.399)	0.600 (1.657)	-8.233 (22.51)	26.92 (20.82)
Constant	2.772*** (0.0259)	2.205*** (0.0176)	7.935*** (0.0252)	6.844*** (0.0482)	0.403*** (0.0334)	6.621*** (0.0163)	15.58*** (0.191)	48.10*** (0.177)
Observations	3052	3052	3588	3588	4018	4018	3796	3796
R <sup>2</sup>	0.067	0.046	0.064	0.048	0.074	0.039	0.048	0.025
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
Number of meetings	19	19	20	20	20	20	20	20

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.5: ONS employment releases and firms' expectations and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
ONS emp. dummy	0.00597 (0.0681)	-0.0214 (0.0420)	0.108 (0.227)	0.0145 (0.129)	0.00683 (0.137)	0.00193 (0.140)	-1.354 (0.925)	-1.356*** (0.464)
Constant	2.754*** (0.0298)	2.183*** (0.0184)	7.391*** (0.0997)	6.632*** (0.0566)	0.561*** (0.0592)	6.853*** (0.0606)	14.43*** (0.406)	47.37*** (0.203)
Observations	16928	16928	20035	20035	22364	22364	21850	21850
R <sup>2</sup>	0.065	0.031	0.051	0.042	0.064	0.031	0.024	0.011
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
ONS emp. releases	65	65	65	65	65	65	65	65

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A.6: ONS inflation releases and firms' expectations and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Expected price growth	Price uncertainty	Expected sales growth	Sales uncertainty	Expected emp growth	Emp. uncertainty	Expected inv. growth	Inv. uncertainty
ONS infl. dummy	-0.0208 (0.0721)	-0.0384 (0.0393)	0.0936 (0.236)	-0.0392 (0.143)	-0.0463 (0.117)	0.155 (0.108)	1.646 (1.440)	-1.180** (0.532)
Constant	2.745*** (0.0378)	2.149*** (0.0206)	7.072*** (0.124)	6.420*** (0.0753)	0.801*** (0.0603)	6.483*** (0.0560)	11.30*** (0.768)	46.73*** (0.284)
Observations	14471	14471	17081	17081	18937	18937	18232	18232
R <sup>2</sup>	0.061	0.034	0.043	0.041	0.056	0.024	0.020	0.015
Sector FE	YES	YES	YES	YES	YES	YES	YES	YES
Wave FE	YES	YES	YES	YES	YES	YES	YES	YES
ONS infl. releases	68	68	68	68	68	68	68	68

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$