Do Firms Adjust Their Employment Plans in Response to Monetary Policy Announcements? Evidence from German Survey Data

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Abstract

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Keywords: Monetary policy, ECB, employment plans, firm expectations, firm survey data

JEL classification: E24, E52, E58

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1 Introduction

The question of how monetary policy affects the economy has been central to macroeconomic research for decades. Much of the literature examines the impact of monetary policy on aggregate outcomes such as output, inflation, and unemployment, typically using time series models to estimate dynamic responses to structural monetary policy shocks (see, e.g., Christiano, Eichenbaum, and Evans, 1999; Coibion, 2012; Miranda-Agrippino and Ricco, 2021). Recently, however, a new strand of literature has exploited the timing of responses in survey data to identify the causal effects of unexpected monetary policy changes on firms' and individuals' expectations (see Di Pace, Mangiante, and Masolo, 2025; Enders, Hünnekes, and Müller, 2019; Rast, 2024). These studies provide valuable insights into how monetary policy transmits to the individual and firm levels. However, thus far, this micro-level evidence has been limited to the effects of monetary policy on price and output expectations.

This paper contributes to the literature by examining a different transmission channel, namely, firms' employment plans, as captured by one-year-ahead employment expectations. Using high-frequency monetary policy shocks and firm-level survey data from Germany, I investigate how firms revise their labor market plans in response to unexpected changes of monetary policy. These employment plans are forward-looking indicators of future labor market conditions, reflecting firms' assessments of future demand, prices, wage adjustments, and credit availability, all of which are subject to monetary policy shocks (Amberg, Jansson, Klein, and Picco, 2022; Gertler and Karadi, 2015; Groiss, 2023; Miranda-Agrippino and Ricco, 2021). Additionally, I consider the responses of firm-level vacancy rate as an alternative forward-looking labor adjustment measure. Studying how firms adjust their employment plans and vacancy postings in response to monetary policy shocks provides a broader understanding of how firms perceive and internalize such shocks. Firms would only change their employment plans if they perceive these shocks as lasting and relevant enough to influence decisions about this costly-to-adjust input factor. Understanding this margin of adjustment thus deepens our knowledge of how monetary policy affects the real economy at an early stage. Furthermore, understanding the employment channel is important due to ECB's secondary mandate of full employment and balanced growth.

The identification strategy follows Di Pace et al. (2025) and Enders et al. (2019). It relies on the information advantage of firms surveyed after a monetary policy announcement (the treatment group) compared to those surveyed just before the announcement (the control group). Hence, I identify the effects of monetary policy shocks by comparing firms' expectations a few days after the announcement with those a few days before. The identification assumption is that there are no correlated events within the narrow set of days around monetary policy announcements. However, as firms form expectations about such announcements prior to their occurrence, it is necessary to extract the surprise component of these announcements to measure the causal effects of monetary policy. To this end, I use intraday changes in reference interest rates around monetary policy announcement events, as constructed from high-frequency data by Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019) as well as high-frequency standard and central bank information monetary shocks of Jarociński and Karadi (2020), discussed further in Section 2.

I apply this design to data from the IAB Job Vacancy Survey, which offers several methodological advantages. Crucially, in the subsample of the Job Vacancy Survey used for the study, interviews are conducted via telephone, and the date of the interview is randomly assigned from the firm's perspective. This mitigates concerns about self-selection into the treatment group, a potential issue in prior studies based on self-chosen online survey responses (see Bachmann, 2019). Additionally, the data provides rich information on firms that can be used to ensure that the treatment and control groups do not differ in terms of a wide range of observable characteristics; this has not been addressed in some previous studies (see Bachmann, 2019).

My findings show that an unexpected monetary tightening by 10 basis points increases the probability that a firm expects to reduce employment by 1.7–2.7 percentage points, lowers the probability of expected employment increases by 2.7–4.8 percentage points, and reduces the average expected employment growth by approximately 0.5–0.8 percentage points. Given the high frequency of ECB announcements and the fact that I capture only the surprise component, these effects are economically meaningful. They imply that firms monitor monetary policy closely and adjust their expectations in a manner comparable to that of financial market participants. Furthermore, I find no evidence that firms respond to Delphic monetary policy shocks as measured by central bank information shocks of Jarociński and Karadi (2020). In other words, firms respond to unexpected interest rate hikes but not to the ECB's private information on the future path of the economy, which may be partially disclosed during a monetary policy announcement (see Enders et al., 2019; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021). Conversely, I observe no effects of any measure of monetary policy shocks on firms' vacancy rates.

Additional analyses reveal interesting heterogeneities in the response to monetary policy shocks. First, relief from lower-than-expected monetary policy tightening tends to have a more pronounced effect on firms' employment expectations than does greater-than-expected tightening. Second, negative effects on employment expectations predominantly stem from the period after the outbreak of the pandemic. This finding suggests that firms pay particular attention to monetary policy in periods of high economic turmoil. Moreover, small firms are more strongly affected by monetary policy shocks. Separately, I observe little difference in the response of manufacturing and service firms.

Furthermore, using the comprehensive nature of the data, I demonstrate that firms' employment expectations are predictive of actual employment changes, confirming the interpretation of such expectations as genuine employment plans. Accordingly, changes in these expectations in response to monetary policy are likely to translate to real adjustments in employment. Additionally, employment plans predict future firm-level vacancy rates. Thus, while I observe no direct instantaneous effect of monetary policy shocks on the vacancy rate, this measure is likely affected with a delay through employment plans.

The results of this study have valuable policy implications. It is apparent that central banks need to consider labor market responses to monetary policy and communication. This study is the first to provide causal, micro-level evidence of how firms adjust their employment plans in response to monetary policy shocks. While labor market adjustments are well understood as a transmission channel, the responses of firms' employment plans represent a forward-looking dimension of this mechanism that has not been studied so far. By affecting future labor demand, monetary policy can shape the trajectory of employment and income dynamics, which in turn feed back into consumption, inflation expectations, and overall economic activity. Ignoring employment plans would miss a critical early margin of adjustment. Furthermore, when firms' lowered employment plans result in higher unemployment rates as a consequence of a tightening monetary policy, this may prompt the government to increase spending, thereby undermining monetary policy.

Moreover, this study extends our knowledge of how firms revise their expectations after a monetary policy shock in general. I observe clear linear effects of the surprise component on employment expectations. While previous studies have provided valuable insights regarding firms' responses to monetary policy shocks at the firm level, their results are less clear-cut. They either argue that firms do not form expectations as complex as those of financial markets (Di Pace et al., 2025) or that the effects are nonlinear due to the potential Delphic nature of large monetary policy shocks (Enders et al., 2019). I cannot confirm this evidence with regard to firms' labor market expectations. Thus, from a labor market perspective, there is no reason to make small, gradual changes to the policy rate to quiet the Delphic component, as argued by Enders et al. (2019). One potential reason for the clear linear results is the rare feature of the data used in this study, which does not allow firms to choose their survey response dates. Note, however, that the results of this paper are not directly comparable to those of previous studies, because of different outcome variables and methodological approaches.

Related Literature This paper mainly contributes to two strands of literature. First, it relates to analyses of transmission of monetary policy in the labor market. Many studies include unemployment and/or wages as outcome variables when analyzing the effects of monetary policy shocks (see, e.g., Christiano, Eichenbaum, and Evans, 2005; Colciago and Silvestrini, 2022; Miranda-Agrippino and Ricco, 2021). Consistently with theory, these studies typically report that contractionary monetary policy shocks lead to a temporary increase in unemployment (Miranda-Agrippino and Ricco, 2021) and a temporary decrease in real wages (Colciago and Silvestrini, 2022). My paper contributes to this literature by focusing on the transmission channel of firm-level employment plans, an aspect that has received little attention so far.

Second, this paper builds on the literature identifying the effects of monetary policy shocks by exploiting the survey response date in micro-data. Some studies use this approach to investigate the impact on individual or household expectations (see Binder, Campbell, and Ryngaert, 2024; De Fiore, Lombardi, and Schuffels, 2022; Lamla and Vinogradov, 2019; Rast, 2024), while others investigate how firms revise their expectations (see Bottone and Rosolia, 2019; Di Pace et al., 2025; Enders et al., 2019). Considering firm-level data, this paper contributes to the latter strand of literature. The findings of these firm-level studies are mixed. While Bottone and Rosolia (2019) observe that Italian firms respond to the surprise component of monetary policy announcements by lowering CPI inflation expectations but not the expected change in their own prices, Di Pace et al. (2025) note that UK firms reduce their own expected price changes in response to announced policy rate changes but not to the surprise component of monetary policy announcements. Enders et al. (2019), on the other hand, report that German firms adjust their own price and output expectations in response to the surprise component of monetary policy shocks in a nonlinear way.

More broadly, this paper relates to the literature on expectation formation that adopts a macroeconomic perspective. Many studies in this field use survey data to measure micro-level expectations and their determinants (see Coibion, Gorodnichenko, and Kamdar, 2018). This literature largely focuses on inflation and output expectations. Yet, Boneva, Cloyne, Weale, and Wieladek (2020) also consider employment expectations, though they do not link such expectations to monetary policy shocks.

The paper is structured as follows. In Section 2, I introduce the IAB Job Vacancy Survey and the Euro Area Monetary Policy Event-Study Database as the main data sources. Section 3 outlines the identification strategy, and Section 4 presents the main results. Section 5 tests the validity of results using placebo checks. Section 6 discusses the implications of the main results, and Section 7 explores whether different monetary policy shocks have different effects. Section 8 concludes the paper.

2 Data

As outlined above, this paper uses the IAB Job Vacancy Survey (see Diegmann, Gürtzgen, Kovalenko, Kubis, Pirralha, Pohlan, Popp, and Vetter, 2025). The observational units of this survey are establishments. For clarity, I refer to these establishments as firms. The IAB Job Vacancy Survey contains information on hires, separations, vacancies, employment expectations, etc., for German firms. Firms are surveyed quarterly, with a comprehensive main survey conducted in the fourth quarter of each year. In Q1, Q2 and Q3 of the following year, shorter follow-up surveys are conducted with a randomly selected subset of the initially surveyed firms. Therefore, firms that appear in follow-up surveys are generally surveyed four times and can be tracked over the course of a year. However, a new set of firms is randomly drawn for each main survey in Q4 such that the dataset constitutes a repeated cross-section at yearly intervals.

The survey began in 1989 on a yearly basis. From 2006 onward, the survey included quarterly follow-up interviews. However, the analysis uses only data from 2017 to 2023 to ensure a consistent set of control variables. This period also includes the most severe monetary policy shocks since the formation of the European Monetary Union and is thus particularly suitable for measuring monetary policy effects. Furthermore, only private firms are included in the sample, as public firms are unlikely to be affected by monetary policy.

Crucially for this analysis, the follow-up surveys are based on telephone interviews, and the dates of interviews are not chosen by the firms. Interviewers call firms via software that randomly selects telephone numbers from a database. Thus, the interview date is essentially random. This is a rare feature of firm surveys; it provides a natural experiment for evaluating the effects of specific events, such as monetary policy announcements. An exception is the main survey in Q4, which is based on paper or online questionnaires, where firms choose their response dates. Therefore, the analysis only considers follow-up surveys from Q1 to Q3 to ensure that firms' response dates are unaffected by monetary policy events. Consequently, monetary policy announcements in the last quarter of the year cannot be used for estimation.[1]

Using these data, I construct four measures of employment expectations that are based on the following survey questions: "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" and the follow-up question, "By how many persons will employment increase in the next 12 months?" or "By how many persons will employment decrease in the next 12 months?", respectively. Based on the first survey question, I compute indicators of the expected employment decrease and increase as well as an ordinal measure with an expected decrease, no change and an increase as possible outcomes. Using the second question and the reported current employment level, I compute the one-year-ahead expected employment growth rate. To mitigate the impact of outliers, I winsorize the expected employment growth rate at the 1st and 99th percentiles.

A further outcome variable of this analysis is the vacancy rate, which is based on the following survey questions: "Are you currently searching for employees to be hired immediately or as soon as possible?" and "In addition to the immediate vacancies, are you currently looking for employees to be hired at a later date?" In the calculation of the firm-level

[1] There are two other reasons not to use Q4 data points besides the potentially nonrandom response date. First, firms may take several days to complete the lengthy questionnaire in Q4. Therefore, the response date in Q4 only provides an approximate indication of when firms answered the questions about expectations and vacancies. Second, the questions concerning expectations differ slightly in Q4 compared to other quarters.

vacancy rate, the number of open vacancies is the sum of the count of vacancies to be filled immediately and those to be filled at a later date, reflecting vacancies with different time horizons. Thus, I compute the vacancy rate as follows:

$$\text{vacancy rate}_{i,t} = \frac{\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t}}{\text{number of employees}_{i,t} + (\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t})}$$

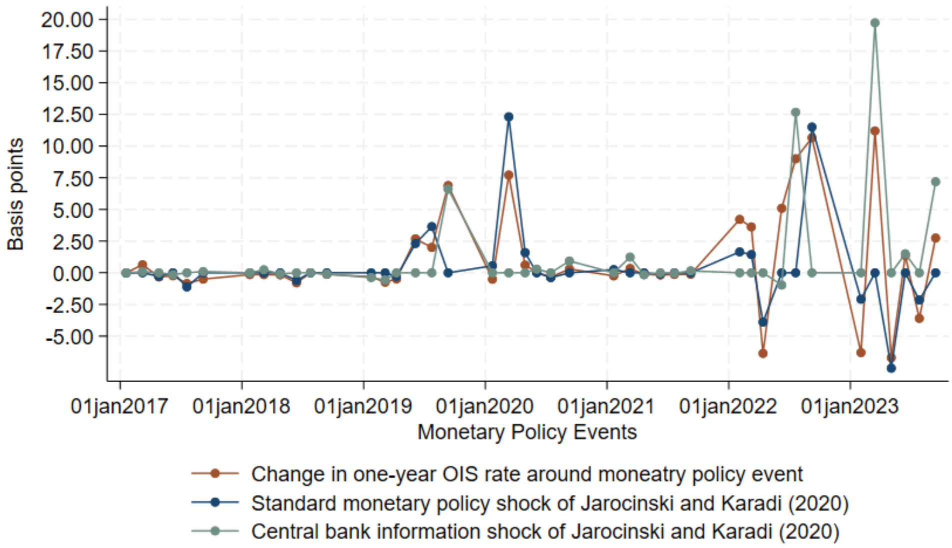
For the purposes of this paper, it is crucial to measure the surprise component of monetary policy announcements, since both the control and treatment groups form expectations about upcoming monetary policy and may adjust their employment plans accordingly. Therefore, I use changes in reference interest rates around monetary policy events, as recorded in the Euro Area Monetary Policy Event-Study Database (EA-MPD), to measure monetary policy surprises. Following Kuttner (2001) and Gürkaynak, Sack, and Swanson (2005), Altavilla et al. (2019) compile this database using intraday tick data. Changes in a broad set of interest rates are computed around the press release window (1:25 pm – 2:10 pm), the press conference window (2:15 pm – 3:50 pm), and the full monetary policy event window (1:25 pm – 3:50 pm). This analysis uses changes in one-year overnight index swaps (the OIS rate) around the full monetary policy event window as the main measure of monetary policy surprises (henceforth referred to as the OIS shock). Assuming that firms do not have more precise information about future ECB monetary policy than financial markets do, these interest rate changes provide a valid measure of the unanticipated component of the monetary policy announcement from the firms' perspective.

However, a potential problem of using the monetary policy shocks of Altavilla et al. (2019) is that they do not distinguish between Odyssean and Delphic monetary policy shocks, which may have different effects on firms' expectations (see, e.g., Campbell, Evans, Fisher, and Justiniano, 2012; Andrade and Ferroni, 2021; Jarociński, 2024). While Odyssean monetary policy shocks contain forward guidance regarding the future policy rate, Delphic monetary policy shocks contain forward guidance regarding macroeconomic forecasts and appropriate future policy rate adjustments. The former provides information on policy rate intentions, while the latter provides information on how the central bank plans to respond to projected macroeconomic developments. Similarly, Jarociński and Karadi (2020) distinguish between standard monetary policy shocks (henceforth MP shocks) and central bank information shocks (henceforth CBI shocks). A contractionary MP shock simultaneously increases interest rates and decreases stock market valuation. Conversely, a CBI shock moves interest rates and stock market valuation in the same direction. The idea is that CBI shocks reveal the central bank's private information about the projected path of the economy. For example, a surprising monetary tightening might reveal that the central bank projects the economy to be more stable than is commonly believed. Thus, CBI shocks are similar in nature to Delphic monetary policy shocks.

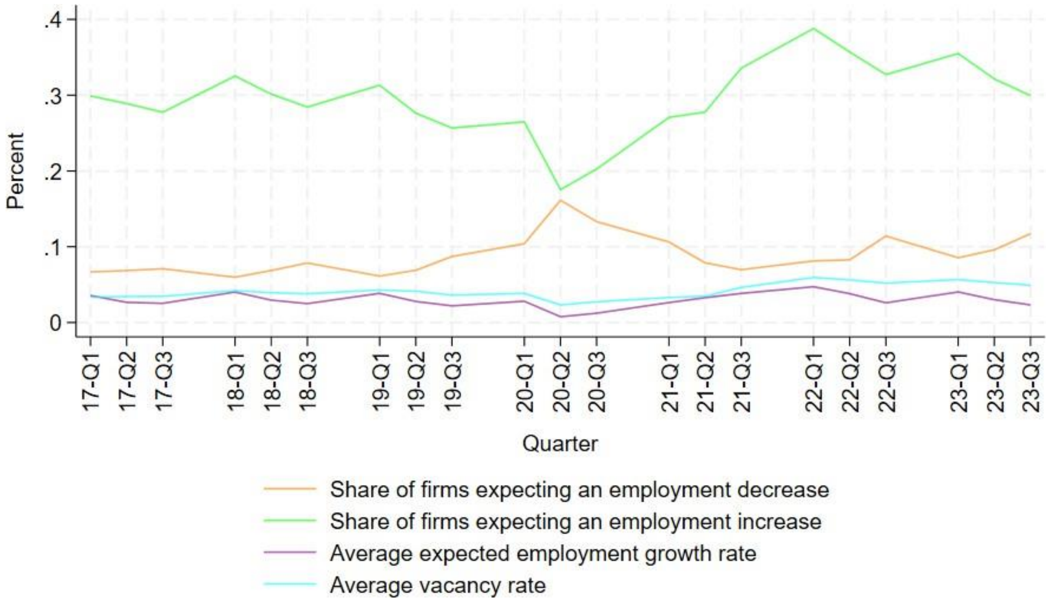
To provide a better understanding of the potential mechanisms, I estimate the effects of the MP and CBI shocks of Jarociński and Karadi (2020) on firms' employment expectations alongside the monetary policy shocks of Altavilla et al. (2019). Jarociński and Karadi (2020) disentangle these two types of monetary policy shocks using high-frequency changes in interest rates and stock market indices around monetary policy announcements. Using sign restrictions, they define MP shocks as being characterized by negative co-movement of interest rates and stock market prices, whereas CBI shocks are characterized by positive co-movement. I use these constructed monetary policy shocks, based on the so-called 'poor man's sign restrictions' approach, to evaluate how German firms' employment expectations respond to both types of shocks.

Figure 1: Descriptive statistics of the main variables

(a) Monetary policy shocks on announcement dates



(b) Time series of employment expectation measures



Notes: Changes in the one-year OIS rate due to monetary policy announcements are taken from the Euro Area Monetary Policy Event-Study Database constructed by Altavilla et al. (2019). Standard monetary policy and central bank information shocks are based on the 'poor man's sign restrictions' approach of Jarociński and Karadi (2020). The expected employment increase, decrease and ordered employment change are based on the IAB Job Vacancy Survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" The firm-level vacancy rate is computed as follows:

$$\text{vacancy rate}_{i,t} = \frac{\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t}}{\text{number of employees}_{i,t} + (\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t})}$$

Figure 1 displays the main variables considered in this paper. Panel 1a shows the OIS, MP, and CBI shocks due to monetary policy announcements, and Panel 1b displays the development of employment expectation measures and the vacancy rate over time (only Q1, Q2, and Q3 are depicted, as expectations in Q4 are not part of the analysis). There were substantial monetary policy shocks in 2019, 2020, 2022 and 2023. In 2019, the German economy showed signs of a recession (see German Council of Economic Experts, 2019), and some financial market participants might have expected an expansionary monetary policy, which did not materialize. Consequently, there were large spikes in the OIS rate change series, which were driven by both MP and CBI shocks. Similarly, following the outbreak of the pandemic and the subsequent economic turmoil, financial markets might have expected more expansionary monetary policy announcements, resulting in a noticeable MP shock. Starting in 2022, inflation became a major concern for the ECB, leading to large monetary policy shocks as the ECB attempted to combat rapid price growth. During this period, there were both negative and positive spikes, reflecting financial market expectations of more or less contractionary monetary policy announcements, respectively. The financial markets did not perceive the announcements during this period homogeneously, as there were MP and CBI shocks. In contrast, prior to 2019, monetary policy shocks were quite small, as the period was characterized by macroeconomic stability and low inflation rates.

Presumably for the same reason, there was little variation in the expectation measures and the average vacancy rate prior to 2019. Following the economic downturn in 2019, the expectation indicators and the average vacancy rate began to decline, reaching a low point after the outbreak of the pandemic. While these measures started to recover quickly, they declined again after Russia attacked Ukraine due to the subsequent economic turmoil. As I will demonstrate in this paper, such periods of economic turmoil with substantial monetary policy shocks are crucial for identifying the impact of monetary policy shocks.

3 Identification Strategy

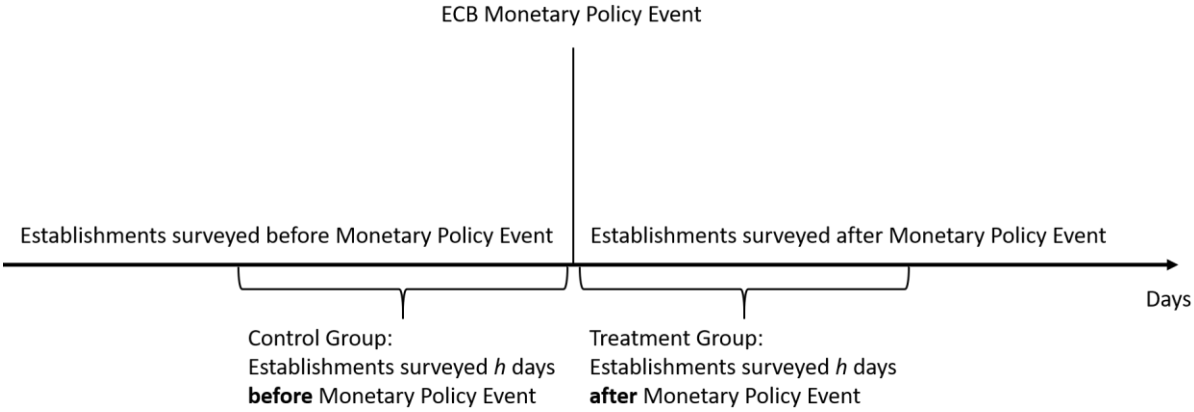
To identify the causal effects of monetary policy shocks on employment expectations at the firm level, I exploit the random interview dates of firms surveyed in Q1, Q2, and Q3. Figure 2 illustrates the timing of the events used for identification. The ECB makes monetary policy announcements approximately every six weeks during the estimation period (marked as "ECB Monetary Policy Event" in Figure 2). These announcements are usually made on Thursdays.[2] Firms that are surveyed *h* days before an announcement may have formed expectations about the upcoming monetary policy stance but are unaware of the surprise component of the actual announcement. Conversely, firms surveyed *h* days after an announcement do include the monetary policy surprise component in their information set and therefore have an information advantage.

Accordingly, I assign firms surveyed after the announcement to the treatment group, and those surveyed before to the control group. Note that firms surveyed on the day of the monetary policy event are not included in either group. As the survey is conducted quarterly, there are typically two monetary policy announcements per survey wave. Firms are surveyed throughout the quarter. This allows me to consider both monetary policy announcements within a quarter. Thus, in a quarter with two monetary policy events, two sets of firms within a survey wave are assigned to the

[2] On April 10, 2019, a monetary policy event occurred on a Wednesday instead of a Thursday. However, this does not affect the identification of monetary policy effects.

treatment and control groups based on the dates they were surveyed.[3] To control for differences in the questionnaires between survey waves, I include survey wave fixed effects (that also control for business cycle effects and other shocks). I also provide a robustness check, controlling for meeting fixed effects instead of survey wave fixed effects, to exclude the possibility that the results are biased due to time aggregation issues.

Figure 2: Timing of events



Notes: Own depiction, based on Di Pace et al. (2025).

Keeping h small ensures that the treatment group does not have any other information advantages. Consequently, differences in employment expectations between the control and treatment groups can credibly be attributed to monetary policy surprises. I set h = 5 days, not counting weekend days, so that the set of days around the monetary policy announcement is reasonably small, while the number of observations is high enough to warrant reliable estimation results. Another advantage of setting h = 5 days is that the treatment and control groups include all working days of the week. Hence, the estimation does not pick up weekday effects, if there are any.

Accordingly, I estimate the following equations:

$$y_{i.t} = \beta_0 + \beta_1 T_{i.t} + \beta_2 T_{i.t} \varepsilon_t^{ois} + X_{i.t} + u_{i.t} \tag{1}$$

and

$$y_{i,t} = \alpha_0 + \alpha_1 T_{i,t} + \alpha_2 T_{i,t} \varepsilon_t^{mp} + \alpha_3 T_{i,t} \varepsilon_t^{cbi} + X_{i,t} + u_{i,t}, \tag{2}$$

where $y_{i,t}$ is the outcome variable (measures of employment expectations and vacancy rate) of firm i in quarter t. $T_{i,t}$ is a dummy variable equal to 1 if the firm is surveyed h days after a monetary policy event and 0 if the firm is surveyed h days before an event. The term ε_t^{ois} is a monetary policy shock (the OIS shock) based on the changes in the one-year OIS rate following a monetary policy event, as described in Section 2. Accordingly, ε_t^{mp} and ε_t^{cbi} are the MP and CBI shocks, respectively, of Jarociński and Karadi (2020). $X_{i,t}$ are firm-level control variables,

[3] For example, there were two monetary policy events held in the first quarter of 2021, namely, on January 21 and March 11. Therefore, within the 2021 Q1 survey wave, there are two separate sets of treatment and control groups, containing firms surveyed around the former and latter dates.

and $u_{i,t}$ represents the regression's residuals. The parameters of interest, β_2, α_2, and α_3, identify the effects of OIS, MP, and CBI shocks, respectively, on the outcome variable.

In addition to the assumption that there are no correlated events within the short period around the monetary policy announcement, firms must also not be able to pick the interview date in response to a monetary policy shock. This assumption is warranted by the assignment of interview dates, which cannot be chosen by the firms. Additionally, I use the comprehensive survey of firms in Q4 to demonstrate that before monetary policy shocks became realized, firms in the treatment and control groups did not differ across a broad set of observable characteristics. The mean values and t tests for differences between the treatment and control groups are presented in Table 1 (measured in Q4 before the respective monetary policy announcement). More specifically, the shares of firms expecting an increase, no change, or a decrease in employment in the following year as well as the one-year average expected employment growth rate do not differ between the treatment and control groups. The same is true regarding the vacancy rate, the realized one-year employment growth rate, the hiring rate, the separation rate and indicators of industrial relations, as well as the employment composition. Thus, there is no indication that the firms in the treatment group are a selected group. The groups are also well balanced in terms of sample size, which underscores that there is no selection into treatment.

Table 1: Observable characteristics of firms in the treatment and control groups before monetary policy events

	Treatment group 0	Treatment group 1	t Test's p value
N	18,079 (50.1%)	18,040 (49.9%)	
Dummy: Q4 expected empl. increase	0.315 (0.464)	0.311 (0.463)	0.466
Dummy: Q4 expected no change in empl.	0.598 (0.490)	0.601 (0.490)	0.484
Dummy: Q4 expected empl. decrease	0.088 (0.283)	0.088 (0.283)	0.985
Q4 expected employment growth	0.032 (0.106)	0.031 (0.106)	0.419
Q4 vacancy rate	0.044 (0.092)	0.044 (0.095)	0.467
Q4 empl. growth rate (rel. previous year)	0.026 (0.269)	0.025 (0.257)	0.750
Q4 hiring rate	0.142 (0.393)	0.141 (0.292)	0.839
Q4 separation rate	0.158 (1.990)	0.161 (2.032)	0.885
Q4 works councils	0.184 (0.388)	0.190 (0.393)	0.140
Q4 collective agreement	0.365 (0.481)	0.368 (0.482)	0.489
Q4 share: employees s.t. social ins. contr.	0.824 (0.195)	0.822 (0.200)	0.265
Q4 share: marginal employees	0.130 (0.163)	0.133 (0.169)	0.120
Q4 share: part-time employees	0.203 (0.218)	0.205 (0.220)	0.504
Q4 share: temporary employees	0.085 (0.160)	0.088 (0.165)	0.140
Q4 share: apprentices	0.085 (0.171)	0.086 (0.174)	0.725
Q4 share: females	0.368 (0.256)	0.368 (0.258)	0.878

Notes: The table displays the mean values of the respective variables. Standard deviations are shown in parentheses. Treatment group: firms surveyed 5 days after a monetary policy event. Control group: firms surveyed 5 days before a monetary policy event. Expectation measures are based on the question in the main questionnaire in Q4: "How do you expect the size of your workforce to develop until September of the *following year?*" Data: IAB Job Vacancy Survey, 2016–2022.

In Appendix A, I provide the same descriptive statistics around monetary policy announcements in Q4 to demonstrate that using the data points of Q4 could be problematic because firms choose their responses unilaterally in this part of the survey. Table A.1 presents striking evidence that firms responding before and after a monetary policy announcement in Q4 are likely not comparable, as there are statistically significant differences in many observable characteristics between the two groups. Hence, the self-chosen response date cannot be considered random. Using these data points for the analysis of interest could violate the identifying assumption described above and therefore could bias the estimates.

To estimate Equations (1) and (2) with the ordinal variables, the outcomes of which are "expected employment decrease", "expected no change in employment", and "expected employment increase" as the dependent variables, I use an ordinal probit model. The estimations with the dependent variables "expected employment increase", "expected employment decrease" and "(continuous) expected employment growth rate" are based on OLS. In each specification, I control for the realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), existence of a collective agreement, workers' council and survey waves' fixed effects.[4]

4 Results

First, I discuss the effects of the OIS shock, displayed in Table 2. These effects can be regarded as a combination of MP and CBI shocks, which I discuss subsequently. The parameter of the interaction term between the treatment dummy ($T_{i,t}$) and the OIS rate change around the monetary policy announcement event provides an estimate of the causal effects. The effects are scaled to correspond to a change by 10 basis points in this monetary policy shock measure. As depicted in Figure 1, the economy experienced shocks of this magnitude regularly during the inflation surge between 2022 and 2023. The first column of Table 2 shows that an OIS shock of 10 basis points increases the probability of a firm expecting an employment loss within the next 12 months by 1.7 percentage points, which is statistically significant. Column 2 implies that an OIS shock of 10 basis points reduces the probability of reporting an expected increase in employment in the next 12 months by 2.7 percentage points. Similarly, the marginal effects (not included in Table 2) of the ordered probit estimation in Column 3 indicate that a contractionary OIS shock of 10 basis points increases the probability of firms expecting a decline in employment by 1.3 percentage points and that of expecting no change in employment by 1.8 percentage points, and reduces the probability of expecting an increased employment by 3.1 percentage points.

Column 4 of Table 2 shows the estimated impact on firms' expected employment growth rates. The estimate has the expected sign but is statistically significant only at the 10% level. The probable reason for the lower significance level is that firms find it difficult to predict the exact magnitude of employment changes due to many uncertain factors, such as future shocks, labor supply and unforeseeable employee losses. Therefore, the continuous expected growth measure is probably quite noisy. Nevertheless, an OIS shock of 10 basis points due to a contractionary monetary policy announcement implies a decrease in the expected one-year growth rate of 0.5 percentage points. Given that the average expected growth rate in the estimation sample is 3.1%,[5] this indicates that the treatment group reports an expected growth rate that is 16.1% lower than

[4] Since the survey is conducted quarterly, the survey waves' fixed effects are quarterly time fixed effects. I use these fixed effects to control for changes in the survey's design and the effects of the business cycle. Below, I also provide a robustness check, considering ECB meeting fixed effects.

[5] Note that this value is not equivalent to its counterpart in Table 1 since the latter is measured in Q4 of the respective previous year.

that of the control group following an OIS shock of 10 basis points after a monetary policy announcement.

Table 2: Effects of monetary policy announcements on employment expectations

Expected empl.	(1) decrease	(2) increase	(3) change (ordered)	(4) growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.017**	-0.027**	-0.092***	-0.005*
	(0.007)	(0.011)	(0.029)	(0.003)
r2	0.024	0.063	0.026	0.061
N	36119	36119	36119	35361

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy variable, and $T_{i,t}\varepsilon_t$ is an interaction term between the treatment dummy and the change, in basis points, in the one-year overnight index swap around monetary policy announcement events. The coefficients are scaled to correspond to a change by 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. The estimates of control variables are displayed in Table A.2 in the Appendix. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2017–2023.

As indicated in Section 2, the effects of OIS shocks may contain both interest rate and information effects. Table 3 presents the disentangled effects in the form of MP and CBI shocks. As expected, MP shocks affect firms' employment expectations negatively: they increase the probability of firms expecting employment losses, reduce the probability of firms expecting employment gains and decrease the firms' employment growth expectations statistically significantly. The effects are somewhat larger than those of an OIS shock, probably because OIS shocks are dampened by information effects. This view is consistent with the result that CBI shocks do not statistically significantly affect employment expectations. Thus, I do not find evidence that firms respond to the ECB's private information on the projected path of the economy that is potentially revealed during a monetary policy announcement. In other words, this analysis provides no evidence that firms respond to Delphic monetary policy shocks, but they respond to textbook monetary policy shocks, suggesting that interest rate changes are more important for firms' employment plans than the potentially revealed private information of the ECB is.

Table 3: Effects of standard and information monetary policy shocks on employment expectations

Expected empl.	(1) decrease	(2) increase	(3) change (ordered)	(4) growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	0.027***	-0,048***	-0.155***	-0.008**
	(0.010)	(0.014)	(0.039)	(0.004)
$T_{i,t}\varepsilon_t^{cbi}$	0.005	-0.010	-0.032	0.000
	(0.007)	(0.011)	(0.029)	(0.003)
r2	0.024	0.064	0.026	0.062
N	36119	36119	36119	35361

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy variable. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Estimates of control variables are displayed in Table A.3 in the Appendix. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1.
Data: IAB Job Vacancy Survey, 2017–2023.

Furthermore, the IAB Job Vacancy Survey provides rich data that enables me to estimate the effect of monetary policy announcements on the vacancy rate at the firm level. However, neither the OIS nor MP or CBI shocks affect the vacancy rate significantly, neither statistically nor economically, as shown in Table 4. Therefore, there is no evidence that firms adjust vacancies immediately following a surprise monetary policy announcement.

Overall, the one-year employment expectations of German firms clearly respond to monetary policy announcements in a manner consistent with conventional wisdom. These results are novel and important, as they have relevant implications for the actions of the ECB: firms not only pay attention to monetary policy announcements but also change their plans regarding the production factor of labor if an announcement implies a surprisingly pronounced monetary tightening or expansion. Therefore, firms consider these monetary policy surprises to have lasting effects on the economy in the medium term. Otherwise, it would not be optimal to change plans regarding costly labor adjustments in the coming year. Furthermore, the results suggest that firms form expectations comparable to those of financial markets.

Table 4: Effects of monetary policy announcements on vacancy rates

	Vacancy Rate	
$T_{i,t}$	0.001	0.001
	(0.001)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.001	
	(0.002)	
$T_{i,t}\varepsilon_t^{mp}$		-0.001
		(0.003)
$T_{i,t}\varepsilon_t^{cbi}$		0.003
		(0.002)
r2	0.14	0.14
N	36483	36483

Notes: $vacancy\ rate_{i,t} = \frac{vacancies\ to\ be\ filled\ immediately_{i,t} + vacancies\ to\ be\ filled\ at\ a\ later\ date_{i,t}}{number\ of\ employees_{i,t} + (vacancies\ to\ be\ filled\ immediately_{i,t} + vacancies\ to\ be\ filled\ at\ a\ later\ date_{i,t})}$. $T_{i,t}$ is a treatment dummy, and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the change, in basis points, in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively, of Jarociński and Karadi (2020). The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Estimates of control variables are displayed in Table A.4 in the Appendix. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2017–2023.

Enders et al. (2019), in a related study, find evidence that Delphic, rather than Odyssean, shocks matter for firms' expectations. However, the results of this study imply the opposite. One reason for this discrepancy may be the type of expectations considered. Central bank information shocks may be particularly important for output and inflation expectations, studied by Enders et al. (2019), while interest rate changes may be important for employment expectations due to longer-term, costly adjustments. Another possible reason is that previous studies could not identify the interest rate effect because the treatment group was not randomly selected. This could be the case if interest rate-sensitive firms do not have the capacity to respond to the survey in a timely manner before or after a monetary policy announcement. In this way, some of the actually affected firms may be excluded from the treatment or control groups. The data of this study does not suffer from these potential shortcomings.

Furthermore, the estimated effects on employment plans align with those of standard DSGE models incorporating labor market frictions (Blanchard and Galí, 2010; Christoffel, Kuester, and Linzert, 2009; Krause, Lopez-Salido, and Lubik, 2008; Walsh, 2005). In these models, firms consider the expected future returns of hiring when deciding to adjust employment. Changes in monetary policy affect these decisions by impacting firms' discount rates, making labor adjustments resemble investment decisions. In other words, monetary policy shocks affect the value of employment. Thus, these models predict that firms' employment plans would adjust immediately after such a shock.

It is more difficult to reconcile the finding of no response of the vacancy rate to monetary policy shocks. If monetary policy shocks affect the value of employment, firms should adjust their job postings accordingly. One possible explanation for why firms do not immediately adjust the vacancy rate after a monetary policy shock is the existence of labor adjustment costs, as emphasized by Coles and Kelishomi (2018) and Broer, Druedahl, Harmenberg, and Öberg (2025). These costs prevent firms from posting vacancies immediately after receiving new information. Thus, since the applied identification scheme requires an immediate response, this analysis cannot document a response of the vacancy rate. In other words, the time period covered by the estimation window is too short to detect significant changes in the vacancy rate. Nevertheless, I illustrate below that the vacancy response is likely more dynamic.

Robustness These results are robust to a battery of checks. First, rather than using changes in the one-year OIS rate, I re-estimate the results of Table 2 using changes in the one-, three- and six-month OIS rates, as well as changes in the one-year German bond rate and the actual change in the interest rate of the main refinancing operations. The latter is not a measure of the surprise component, but largely reflects the expected change in the policy rate. The results of these checks are presented in Table B.1 in the Appendix.

The effects of a monetary policy announcement on employment expectations are quite similar across the different measures of monetary policy surprises. Hence, the estimated effects are not driven by a specific interest rate measure. However, if I consider the actual change in the interest rate of the main refinancing operations, the estimated effects are virtually zero. This result implies that firms respond to the surprise component of monetary policy rather than to changes in the actual policy rate. Thus, their expectation formation about monetary policy is comparable to that of financial market participants.

Moreover, I perform two corrections of shock measures. Following Bauer and Swanson (2023), I correct the one-year OIS rate change around a monetary policy announcement for information that has been known before the announcement because this information may be predictive of OIS changes. More precisely, I regress the one-year OIS rate change on

- the logarithm of the change ("log change") of the previous day's Euro Stoxx 600 to its value 30 days earlier,
- the change in the previous day's slope of the yield curve relative to its value 30 days earlier,
- the log change in the previous month's raw material price index relative to its value three months earlier,
- the change in the previous month's unemployment rate relative to its value one year earlier, and
- the log change in the previous quarter's labor cost index relative to its value one year earlier.

These variables are real-time measures taken from the ECB's Real-Time Database.[6] I use the residuals of this regression as a corrected measure of a monetary policy shock on an announcement day. Using this measure in Equation (1) yields results that are very similar to those of using the uncorrected one-year OIS rate change (see Table B.1).

Following Cloyne and Hürtgen (2016), I also correct the announced changes in the actual policy rate for forecasts of real GDP growth, inflation and unemployment in the Euro area that were available

[6] The Stoxx Europe 600 series is taken from https://www.wsj.com/market-data/quotes/index/XX/XSTX/SXXP/historical-prices.

on the decision date. The forecasts originate from the ECB itself, as they certainly play a role in the monetary policy decision. I regress the announced changes in the actual policy rate on the nowcast, nowcast revision, one-year ahead forecast, the revision of one-year ahead forecast as well as two-year ahead forecast of real GDP, inflation, and unemployment and use the residuals of this regression as an additional monetary policy shock measure.[7] The results are qualitatively similar to the main results, but are not statistically significant. This result indicates again that the expectation formation of firms is rather complex and comparable to that of financial markets.

Furthermore, I check whether the results hold if I estimate the effects with different time windows around monetary policy events. More precisely, I re-estimate the effects with $h = 4$ and $h = 6$ days (i.e., the control and treatment groups consist of firms interviewed $h \in \{4; 6\}$ days before and after, respectively, the monetary policy event). The effects are robust to these checks, as shown in Table B.2 in the Appendix. However, if $h = 4$, some of the estimates lack statistical significance because of the inevitably smaller sample size.

I also check whether the results are robust to extending the sample to include waves from 2013 onward. The data does not contain interview dates preceding 2013. Thus, the analysis cannot be conducted prior to 2013. Using these additional data points incurs the cost of not being able to control for works councils and collective agreements, which are important determinants of hiring and separations in Germany. Therefore, these factors presumably impact how firms' employment plans respond to monetary policy shocks and should therefore be controlled for. Nevertheless, the results of this robustness check in Table B.3 are similar to the main estimates. However, the coefficients are smaller and, in some cases, lack statistical significance. As I demonstrate in Section 7, the reason is that before 2020, monetary policy shocks barely affected employment expectations.

Another concern may be the use of survey wave fixed effects, given that the survey is conducted quarterly and that there are usually two ECB monetary policy events in one quarter. Therefore, I test the robustness of the results by considering ECB meeting fixed effects instead of survey wave fixed effects. Table B.4 implies that the estimates are similar to those in the main results. However, some of the coefficients lose statistical significance due to the additional estimation noise. Focusing on the period from 2020 to 2023, when firms paid the most attention to monetary policy, yields coefficients that are similar to the main results and are statistically significant (see Table B.5).

Furthermore, to exclude the possibility that the extensive use of short-time work during the pandemic confounded the results, I additionally control for this labor market intervention. I use data on the number of workers in short-time employment at the 2-digit industry level, provided by the Federal Employment Agency, to compute the share of workers in this scheme at the industry level. Controlling for this additional variable does not affect the main outcomes (see Table B.6).

Finally, I replace the dependent variable with changes in expectations relative to the previous quarter, following Enders et al. (2019). This check is particularly important for assessing whether firms indeed update their expectations in response to a monetary policy shock. Following Enders et al. (2019), I compute the changes in expectations for the discrete outcome variable as follows: a firm that changes its expectation from an increase in employment to a decrease is assigned a value of -2 (and vice versa for a positive change), a firm that changes its expectation from an increase in employment to no change is assigned a value of -1 (and vice versa for a positive

[7] Unemployment forecasts are available since December 5, 2013. Therefore, earlier data points cannot be used for the correction.

change), and a firm that does not change its expectations is assigned a value of 0. The expected employment growth rate is the change in percentage points relative to the previous quarter.[8] The results of this robustness check are displayed in Table B.7 in the Appendix. These estimates are again quite similar to the main effects and confirm that the main results are trustworthy estimates of the impact of monetary policy shocks on firms' employment expectations. Furthermore, since I estimate the effects on firms' changes in expectations, these results imply that firms indeed revise their expectations in response to monetary policy surprises.

5 Placebo analysis

To validate the research design and ensure that it does not produce spurious results, I conduct two placebo tests. These tests demonstrate that the main results cannot be reproduced with random interview dates or random monetary policy shocks. In other words, the placebo tests confirm that only firms interviewed after a monetary policy announcement adjust their expectations and that such firms do so only if they are surprised by the announced monetary policy.

In the first placebo test, I randomly allocate firms to the control and treatment groups by randomly reshuffling the interview dates within survey waves (see Rast, 2024). More precisely, I assign each firm a random interview date, where the set of possible dates consists of interview dates from the same survey wave. In this check, the monetary policy announcement dates remain the same, but the assignment to the treatment and control groups is artificial. Using these random interview dates, I re-estimate the effects of monetary policy announcements on artificially treated and control firms across 500 repetitions. Note that the placebo estimation samples consist of many firms that were neither in the actual control nor the treatment groups because their interview dates were outside of the five-day window before or after a monetary policy announcement.

The second placebo test consists of drawing 500 random OIS, MP, and CBI shocks from a normal distribution with the mean and standard deviation matching those of the actual shocks and re-estimating Equation 1 and Equation 2 with these artificial shocks (see Rast, 2024). In this test, firms that have actually been treated experience a random shock and should not respond if they truly care about the surprise component of the monetary policy announcement. Therefore, this test also evaluates whether firms respond merely to the announcement date rather than to the content of the ECB's announcement.[9]

In Figure 3, I display the distributions of coefficients after randomly reshuffling interview dates, and Figure 4 shows the distributions of coefficients for randomly drawn OIS rate changes. For all specifications of both placebo analyses, the distributions of coefficients are roughly symmetric around zero, with zero being the point of central tendency. The actual OIS and MP shocks' coefficients of the main estimation (see Tables 2 and 3, respectively) are at the extremes

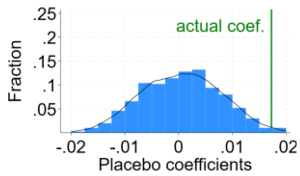
[8] Note that to compute the employment expectation changes for Q1, I need to use the expectations in Q4 of the previous year. However, the survey question regarding employment expectations differs slightly from the subsequent Q1, Q2 and Q3 surveys: instead of asking for the expected employment change one year ahead (as in Q1, Q2 and Q3), the Q4 survey asks firms about the expected employment changes until September of the next year. Thus, there is a slight inconsistency in the computed employment expectations' change in Q1. However, since I control for quarter fixed effects, this does not pose a concern.

[9] Another way to test whether firms merely respond to the announcement date is to regress the expectation measures on the treatment dummy alone (along with the usual control variables). The results of this regression are shown in Table A.5 in the Appendix. Since the treatment dummy's coefficient is never statistically significant, there is no indication that firms respond to the announcement date.

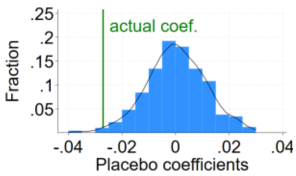
of the corresponding placebo distributions. Therefore, there is no indication that the main results could be reproduced using artificially treated and untreated firms or random OIS or MP shocks.

Figure 3: Distribution of placebo test coefficients after reshuffling the interview dates

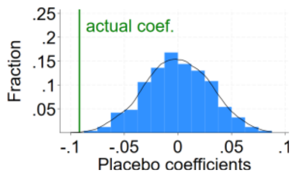
(a) OIS shock → expected employment decrease



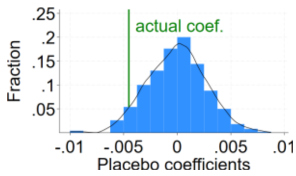
(b) OIS shock → expected employment increase



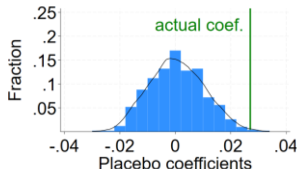
(c) OIS shock → expected employment change (ordered)



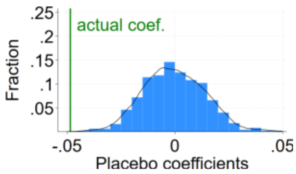
(d) OIS shock → expected employment growth



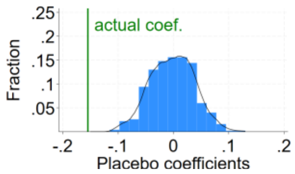
(e) MP shock → expected employment decrease



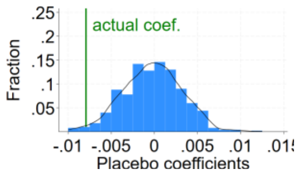
(f) MP shock → expected employment increase



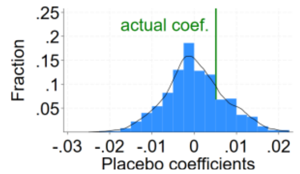
(g) MP shock → expected employment change (ordered)



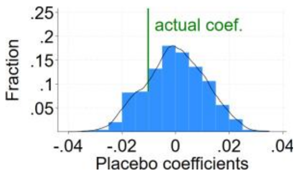
(h) MP shock → expected employment growth



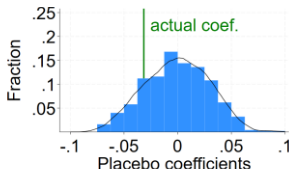
(i) CBI shock → expected employment decrease



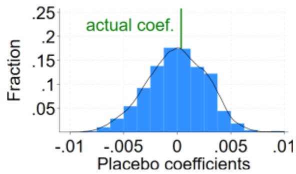
(j) CBI shock → expected employment increase



(k) CBI shock → expected employment change (ordered)



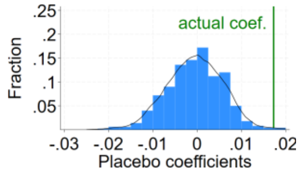
(l) CBI shock → expected employment growth



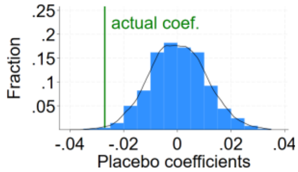
Notes: The figure displays the distribution of effects of the interaction term between the treatment dummy and each of the OIS, MP, and CBI shocks around monetary policy announcement events on four measures of expected employment change. OIS shock: the change, in basis points, in the one-year overnight index swap around a monetary policy announcement. MP shock: the standard monetary policy shock of Jarociński and Karadi (2020). CBI shock: the central bank information shock of Jarociński and Karadi (2020). Coefficient estimates are based on 500 repetitions of randomly reshuffled firms' interview dates within the survey waves. The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Data:
IAB Job Vacancy Survey, 2017–2023.

Figure 4: Distribution of placebo test coefficients with random monetary policy shocks

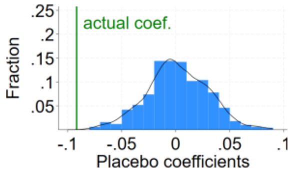
(a) OIS shock → expected employment decrease



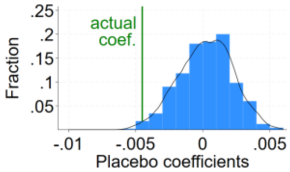
(b) OIS shock → expected employment increase



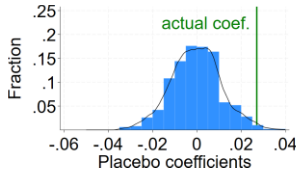
(c) OIS shock → expected employment change (ordered)



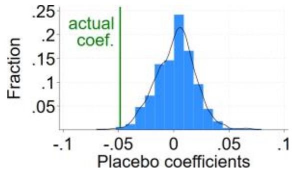
(d) OIS shock → expected employment growth



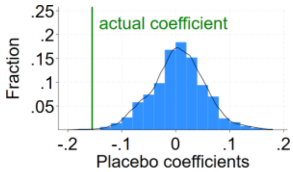
(e) MP shock → expected employment decrease



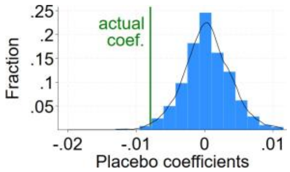
(f) MP shock → expected employment increase



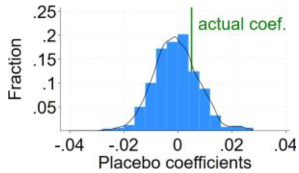
(g) MP shock → expected employment change (ordered)



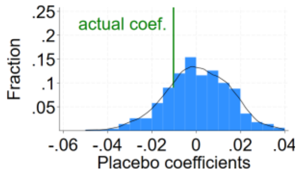
(h) MP shock → expected employment growth



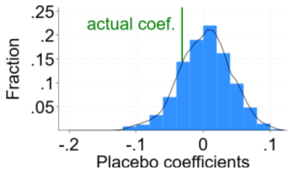
(i) CBI shock → expected employment decrease



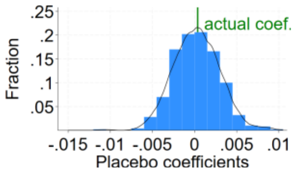
(j) CBI shock → expected employment increase



(k) CBI shock → expected employment change (ordered)



(l) CBI shock → expected employment growth



Notes: The figure displays the distribution of effects of the interaction term between the treatment dummy and 500 randomly drawn monetary policy shocks on four measures of expected employment change. These shocks are drawn from a normal distribution with a mean and a standard deviation that correspond to the respective monetary policy shocks' measure around monetary policy announcements between 2017 and 2023. OIS shock: the change, in basis points, in the one-year overnight index swap around a monetary policy announcement. MP shock: the standard monetary policy shock of Jarociński and Karadi (2020). CBI shock: the central bank information shock of Jarociński and Karadi (2020). The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Data: IAB Job Vacancy Survey, 2017–2023.

On the other hand, the actual CBI shock coefficients are quite close to the mean of their respective distributions, which again suggests that CBI shocks do not affect employment expectations. Thus, these placebo tests confirm that it is truly the firms' receipt of the information treatment that changes their expectations, and that the interest rate surprise of the monetary policy announcement is important to the firms.

Finally, Table 5 shows the mean values of the estimated coefficients and the proportion of p-values that are below the 5% level for both types of placebo tests. As Figures 3 and 4 suggest, the mean values of coefficients are virtually zero in both placebo tests. In the placebo test with reshuffled interview dates, approximately 5% of coefficients are statistically significant, indicating that there are no systematically falsely identified effects. In the placebo test with randomly drawn shocks, the proportion of statistically significant coefficients somewhat exceeds 5%. Note, however, that approximately half of the coefficients with p values below the 5% level have the sign opposite to that of the actual coefficient. Thus, this proportion of significant coefficients with the correct sign is quite low, which also suggests that the research design provides valid estimates of effects of monetary policy.

Table 5: Placebo analysis: Means of coefficients and shares of p values above the 5% level

	OIS shock Reshuffled int. dates	Random OIS shock
Expected empl. decrease	0.000	-0.001
$\mathbb{1}$ (p value > 0.05)	0.052	0.070
Expected empl. increase	0.000	0.000
$\mathbb{1}$ p value > 0.05)	0.056	0.092
Expected empl. change (ordered)	-0.000	0.002
$\mathbb{1}$ (p value > 0.05)	0.062	0.096
Expected empl. growth	-0.000	0.000
$\mathbb{1}$ (p value > 0.05)	0.052	0.024

	MP shock Reshuffled int. dates	Random MP shock
Expected empl. decrease	0.001	-0.000
$\mathbb{1}$ (p value > 0.05)	0.050	0.094
Expected empl. increase	-0.000	0.002
$\mathbb{1}$ (p value > 0.05)	0.042	0.090
Expected empl. change (ordered)	-0.002	0.004
$\mathbb{1}$ (p value > 0.05)	0.058	0.1100
Expected empl. growth	-0.000	0.000
$\mathbb{1}$ (p value > 0.05)	0.046	0.044

	CBI shock Reshuffled int. dates	Random CBI shock
Expected empl. decrease	0.000	-0.001
$\mathbb{1}$ (p value > 0.05)	0.062	0.088
Expected empl. increase	-0.000	0.0001
$\mathbb{1}$ (p value > 0.05)	0.042	0.108
Expected empl. change (ordered)	-0.001	0.003
$\mathbb{1}$ (p value > 0.05)	0.036	0.126
Expected empl. growth	-0.000	0.000
$\mathbb{1}$ (p value > 0.05)	0.054	0.040

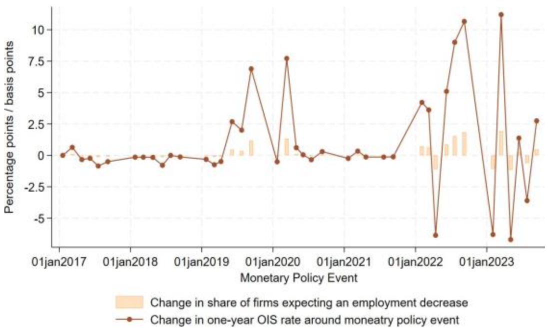
Notes: The displayed values are based on 500 estimates with randomly reshuffled firms' interview dates (within quarters) and 500 randomly drawn monetary policy shocks. The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Data: IAB Job Vacancy Survey, 2017–2023.

6 Implications of the results

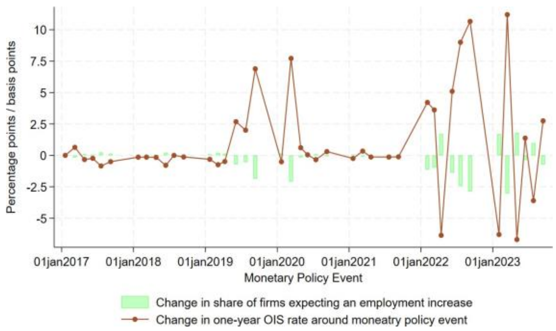
To elaborate on the implications of the results, I compute the changes in the shares of firms expecting employment to decrease, remain unchanged (only in the ordered probit model), and increase, as well as the change in the average expected growth rate due to the monetary policy shocks around the respective announcement dates. These changes are based on the estimates in Table 2 and are computed within the estimation sample. Hence, they represent the change in firms' expectations before and after each monetary policy announcement driven by the surprise component of the announcement measured by OIS changes. Figure 5 displays these counterfactual computations (Figure 5a is based on column (1) of Table 2, Figure 5b on column (2), Figure 5c on column (3), and Figure 5d on column (4)).

Figure 5: Changes in expectations due to monetary policy announcements

(a) Change in the share of firms expecting an employment decrease

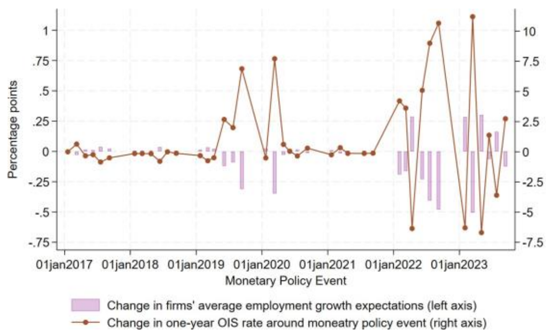


(b) Change in the share of firms expecting an employment increase



(c) Changes in the shares of firms expecting an employment decrease, no change, and an increase

(d) Change in firms' average employment growth expectations



Notes: Changes in expectations are based on the predictions of regression models of the respective expectation measure on the treatment dummy, the interaction between the treatment dummy and monetary policy shocks, and the following control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Monetary policy shocks, namely, changes in the one-year OIS rate due to monetary policy announcements, are taken from the Euro Area Monetary Policy Event-Study Database constructed by Altavilla et al. (2019). The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Data: IAB Job Vacancy Survey, 2017–2023.

The sizable changes in the OIS rate in 2019, 2020, 2022 and 2023 due to monetary policy announcements led to substantial adjustments in firms' employment expectations. For example, the unexpectedly pronounced tightening on September 8, 2022 increased the share of firms expecting employment losses by approximately 1.5 percentage points, increased the share of firms expecting no change by approximately 1.8 percentage points, and reduced the share of firms expecting employment gains by approximately 3.3 percentage points. The average expected growth rate declined by approximately 0.5 percentage points. Conversely, there were no significant effects of monetary policy announcements before 2019 because they contained virtually no surprises. MP shocks of Jarociński and Karadi (2020) have similar implications (see Figure A.1), while CBI shocks barely have any effects (see Figure A.2)

So far, I have established that firms' employment expectations indeed respond to monetary policy announcements. To provide a broader context for these findings, I evaluate how these expectation changes translate into actual employment changes. Using the main survey from Q4 of the IAB Job Vacancy Survey, I test how well firms' employment expectations predict realized employment changes. More precisely, the questionnaire in Q4 contains the question "How do you expect the size of your workforce to develop until September of the *next year?*" I can compare the responses to this question with the actual employment figures declared in Q3 of the following year, considering solely the subsample of respondents who completed the Q3 questionnaire in September.

Table 6: Expected and realized one-year employment changes

	Freq.	Percent
Expected employment decrease		
Realized decrease	700	61.19
Realized no change	229	20.02
Realized increase	215	18.79
Total	1144	100
No employment change expected		
Realized decrease	3556	44.87
Realized no change	2135	26.94
Realized increase	2235	28.20
Total	7926	100
Expected employment increase		
Realized decrease	1553	36.00
Realized no change	887	20.56
Realized increase	1874	43.44
Total	4314	100

Notes: The expected employment change is measured in Q4 by the survey question "How do you expect the size of your workforce to develop until September of the *next year*?" The realized employment change is measured in Q3 of the following year for firms that responded in September. Data: IAB Job Vacancy Survey, 2016–2023.

Table 6 shows the percentages of firms that experienced a decrease, no change or an increase in employment, broken down by those that expected an increase, no change or an increase in employment. I define the absence of change as the realized employment change being 3% or less in absolute terms. Employment increases and decreases are defined accordingly. Among the firms that expected a decrease in employment, 61% actually experienced decreases. This figure together with the estimated effects of an OIS shock implies that the share of firms experiencing an employment loss rises by 1 percentage point due to a change by 10 basis points in the OIS rate following a monetary policy announcement. Conversely, 43% of firms that experienced increased employment also expected an increase. Therefore, a change by 10 basis points in the OIS rate following a monetary policy announcement implies a reduction by 1.2 percentage points of the likelihood of experiencing an employment increase.

A more systematic approach to putting the effects of monetary policy announcements into perspective would be to estimate predictive models in which employment expectations are varied while other factors are held constant. Using the data from the main Q4 questionnaire and realized employment in September of the subsequent year, I estimate the following equation with different outcome variables:

$$\Delta N_{i,t} = \delta_0 + \delta_2 E_t\left[\Delta N_{i,t+1}\right] + X_{i,t} + v_{i,t}, \tag{3}$$

where $\Delta N_{i,t+1}$ is the realized employment change measured by the following variables: employment increase, employment decrease, ordered employment change and continuous employment growth between Q4 and September of the following year. $E_t[\Delta N_{i,t+1}]$ are different manifestations of Q4 employment change expectations, measured the same way as realized employment variables. $X_{i,t}$ are the usual control variables, and $v_{i,t}$ *is* the error term. The model with ordered employment changes is estimated using an ordered probit, and all other models are estimated using OLS.

The estimation results of these models are displayed in Table 7. There are meaningful associations between expected and realized employment changes. According to column (1), firms expecting a decrease in employment in Q4 have a probability of reducing employment within a year that is 17 percentage points higher, while those expecting an increase have a probability that is 10 percentage points lower than that of firms that expected no change. Column (2) shows that firms expecting an increase in employment have a probability of experiencing an increase that is 15 percentage points higher, while those expecting a decrease have a probability that is 10 percentage points lower than that of firms that expected no change in employment. The ordered probit model in column (3) suggests that firms expecting a decrease in employment are 15 percentage points more likely to experience a decrease, 1 percentage point less likely to experience no change, and 13 percentage points less likely to experience an increase. Conversely, firms expecting an increase in employment have a probability of experiencing a decrease that is 13 percentage points lower, a probability of experiencing no change that is 1 percentage point higher, and a probability of experiencing an increase that is 12 percentage points higher than those of firms expecting no change. Finally, an expected employment growth rate of 1% translates to a realized growth rate of approximately 0.5%.

These results clearly demonstrate that employment expectations are significant predictors of actual changes in firms' employment. Thus, firm expectations are not only firms' vague sentiment about the future but also the actual employment plans firms intend to implement. In other words, this analysis suggests that it is indeed valid to interpret employment expectations as firms' employment plans. Naturally, such plans can be revised, especially if firms are hit by shocks (e.g., monetary policy shocks, productivity shocks, or energy price shocks). Therefore, a one-to-one mapping of plans and realizations one year later is not to be expected.

Table 7: Associations of expected and realized one-year employment changes

Realized empl.	(1) decrease	(2) increase	(3) change (ordered)	(4) growth
Exp. empl. decrease	0.17***	-0.10***	-0.39***	
	(0.02)	(0.01)	(0.04)	
Exp. empl. increase	-0.10***	0.15***	0.34***	
	(0.01)	(0.01)	(0.02)	
Exp. empl. growth rate				0.49***
				(0.07)
r2	0.05	0.04	0.02	0.05
N	12127	12127	12127	11977

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop until September of the *next year*? Increase/No change/Decrease by about *x* individuals". Columns (1), (2), and (4) are estimated by OLS, and Column (3) is estimated by ordered probit. Control variables: past employment growth rate relative to the previous year, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Robust standard errors are displayed in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2016–2023.

Although monetary policy shocks have no effect on firm-level vacancy rates within the narrow estimation window, vacancies may be affected through changes in employment plans. To evaluate this mechanism, I regress firm-level vacancy rates in Q1–Q3 on employment expectations in Q4 of the previous year, controlling for Q4 vacancy rates (as well as the usual control variables). These estimations are performed separately for Q1–Q3 because the length of time between the measured vacancy rate and expectations presumably affects the magnitude of the association. The results in Table 8 imply that firms expecting an increase in employment indeed have higher vacancy rates in subsequent quarters. The implications of expected employment changes are consistent with this finding. However, expecting a decrease in employment does not result in lower vacancy rates. This may be due to replacement hiring.

Using the estimates of Tables 7 and 8 for a rough back-of-the-envelope calculation gives a sense of how changes in expectations due to a monetary policy announcement could translate into actual employment changes and changes in the vacancy rate. I compute these changes by multiplying the computed changes in expectations due to monetary policy announcements (Figure 5) by the coefficients that relate expectations to realized employment changes (Table 7) and changes in the vacancy rate (Table 8), respectively. I visualize these calculations in Figure 6. Notably, certain monetary policy shocks occurring during the inflationary period from 2022 to 2023 are linked to an increase of over 0.5 percentage points in the share of firms reporting declining employment, while the share of firms reporting rising employment diminishes by more than 0.5 percentage points. Given the unconditional shares of firms with increasing and decreasing employment of 32% and 43%, respectively, these adjustments are considerable. Similarly, the monetary policy announcements of this period translated into notable changes in the average employment growth rate. For instance, the large monetary policy shock in September 2022 is associated with a decline in the growth rate by approximately 0.25 percentage points.

Table 8: Associations between the expected employment change and future vacancies

Vacancy rate in	(1) Q1	(2) Q2	(3) Q3
Exp. empl. decrease	0.001	0.001	0.004***
	(0.001)	(0.001)	(0.001)
Exp. empl. increase	0.016***	0.011***	0.013***
	(0.001)	(0.001)	(0.001)
r2	0.29	0.28	0.25
N	42790	37715	38795

Vacancy rate in	Q1	Q2	Q3
Exp. empl. growth rate	0.092***	0.070***	0.063***
	(0.008)	(0.008)	(0.008)
r2	0.29	0.28	0.25
N	42350	37335	38435

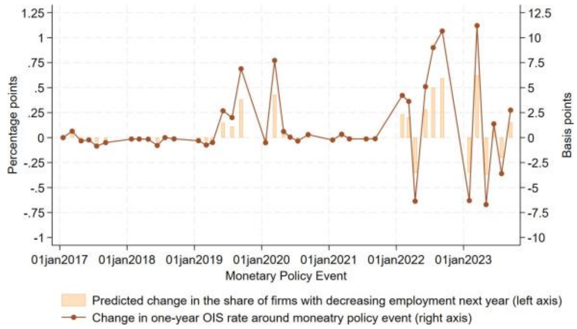
Notes: $\text{vacancy rate}_{i,t} = \frac{\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t}}{\text{number of employees}_{i,t} + (\text{vacancies to be filled immediately}_{i,t} + \text{vacancies to be filled at a later date}_{i,t})}$. The expected employment increase and decrease, and the expected employment growth rate are based on the survey question “How do you expect the size of your workforce to develop until September of the next year? Increase/No change/Decrease by about x individuals”. Control variables: past employment growth rate relative to the previous year, vacancy rate in Q4, firm size (6 categories), economic sector (24 categories), collective agreement, workers’ council and survey wave fixed effects. Robust standard errors are displayed in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2016–2023.

As already suggested by Table 8, the monetary policy announcements in the inflationary period 2022 to 2023 also notably impacted the average vacancy rate. The large shock of September 2022 is associated with a decline in the average vacancy rate by approximately 0.03 three quarters after the shock. The in-sample unconditional average vacancy rate is 0.4. Hence, monetary policy announcements impact the average vacancy rate after three quarters through the expectations channels in a meaningful way. The effects of the OIS shock are similar to those of MP shocks, which I present in Figure A.3 in the Appendix for clarity. As expected, the central bank information shocks translate to only small realized changes (see Figure A.4). Hence, the vacancy rate seems to respond in a dynamic way to monetary policy shocks. This finding aligns with the labor adjustment costs suggested by Coles and Kelishomi (2018) and Broer et al. (2025). These costs prevent an immediate response in the vacancy rate. However, over time, firms adjust vacancy postings according to the revised employment expectations.

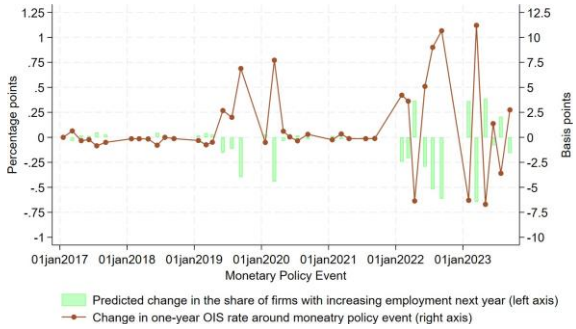
Another way to evaluate how monetary policy shocks affect realized employment changes is to regress employment growth between Q4 and Q3 of the subsequent year on the sum of monetary policy shocks between the date firms answered the questionnaire in Q4 and the interview date in Q3. However, note that some monetary policy shocks occur close to the interview date. Therefore, firms may not have had time to adjust employment levels. Consequently, this exercise does not reveal any statistically significant effects (see Table A.6).

Figure 6: Realized changes through expectations

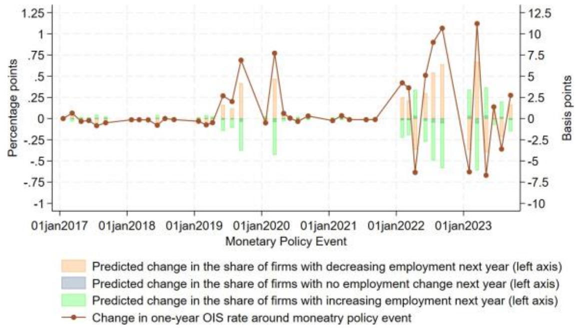
(a) Change in the share of firms with decreasing employment



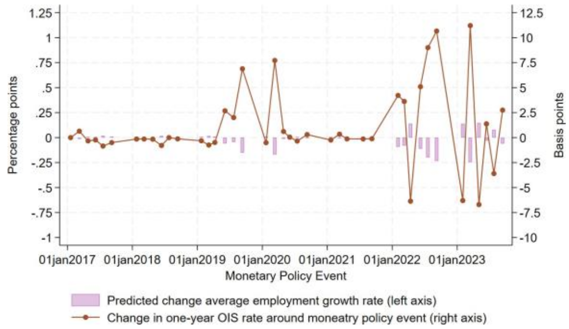
(b) Change in the share of firms with increasing employment



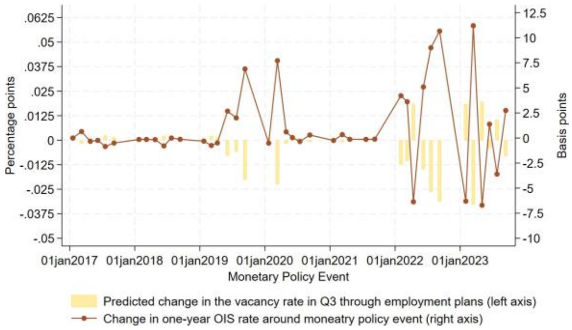
(c) Changes in the shares of firms with an employment decrease, no change, and an increase



(d) Change in the average employment growth rate



(e) Change in the average vacancy rate after three quarters



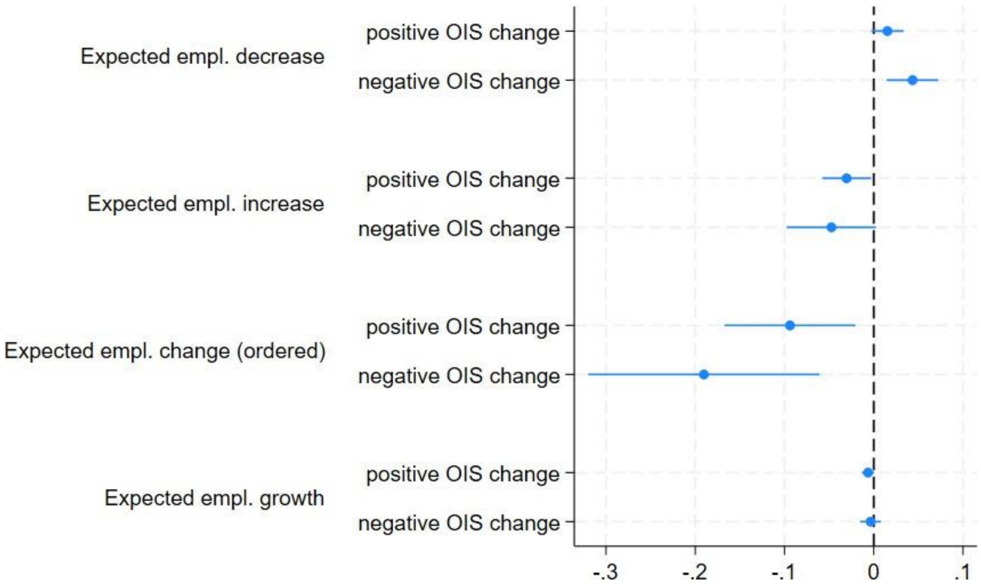
Notes: Predicted changes are based on regressions of monetary policy shocks on employment expectations, and employment expectations on realized employment changes. Monetary policy shocks, namely, changes in the one-year OIS rate due to monetary policy announcements, are taken from the Euro Area Monetary Policy Event-Study Database constructed by Altavilla et al. (2019). The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Data: IAB Job Vacancy Survey, 2017–2023.

7 Heterogeneity of monetary policy effects

To deepen the understanding of how monetary policy affects employment expectations, I analyze the responses to various types of announcements. Firms may respond differently to positive and negative monetary policy surprises. For example, firms' expectations regarding future changes in the policy rate may be overly optimistic or pessimistic. In such cases, the sign of the monetary policy surprise would determine the extent to which firms need to adjust their expectations. To evaluate whether there are differences in responses to positive and negative surprises, I re-estimate Equations (1) and (2) separately for positive and negative monetary policy shocks. In the analysis of positive monetary policy shocks, the interaction term becomes zero if the monetary policy shock was negative (and vice versa in the analysis of negative monetary policy shocks). This allows me to use the entire sample.

Figure 7 summarizes the results for positive and negative OIS shocks (the results for MP and CBI shocks are displayed in Figure A.5 and Figure A.6 in the Appendix). Considering the effects on discrete measures of employment change expectation gives the impression that negative monetary policy shocks (i.e., monetary policy announcements that are less contractionary or more expansionary than expected) affect firms' expectations more strongly than positive shocks do. However, the confidence bands of the coefficients overlap in each case.

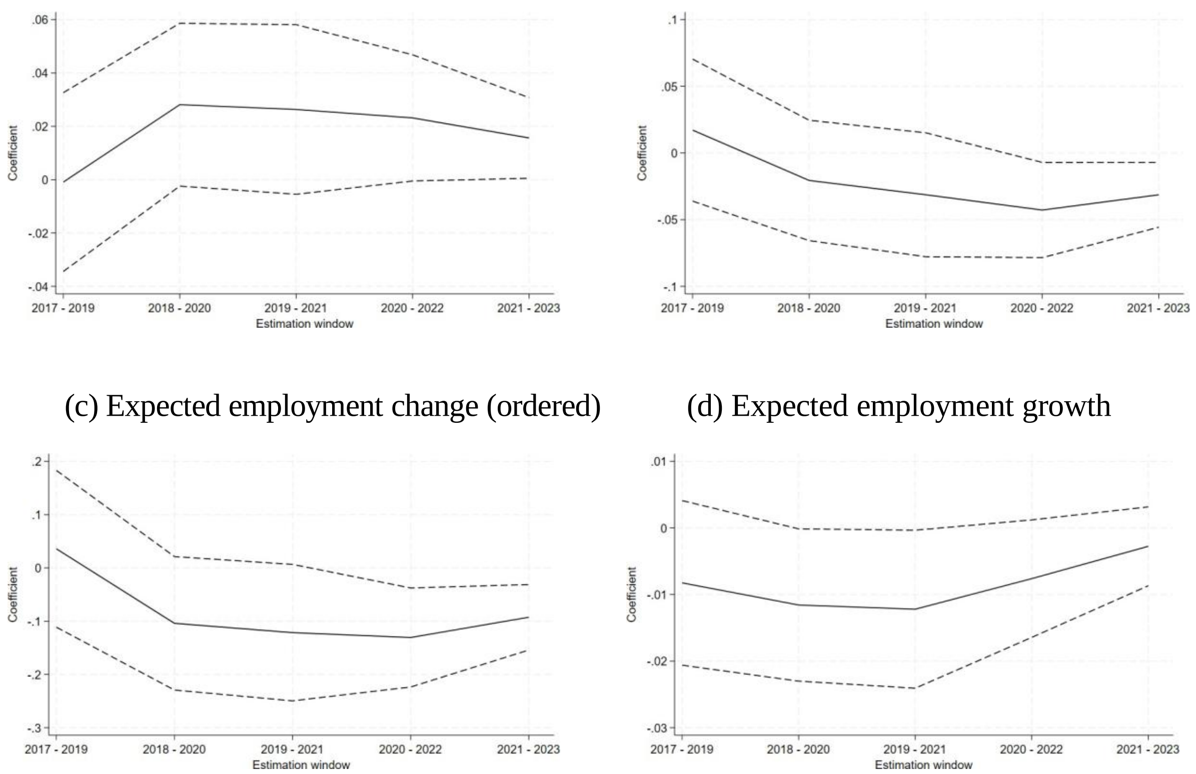
Figure 7: Effects of positive and negative monetary policy OIS shocks



Notes: The figure displays the estimated effects of interaction terms between the treatment dummy and positive/negative changes (in basis points) in the one-year overnight index swap around monetary policy announcement events on four measures of expected employment change. The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. The 95% confidence intervals (solid lines) are based on robust standard errors. Data: IAB Job Vacancy Survey, 2017–2023.

Another possible source of heterogeneity is the time period in which a monetary policy announcement occurs. In economically stable periods with moderate (expected) inflation rates, firms may pay little attention to these announcements, whereas the latter may become important in times of turmoil. This reasoning is consistent with Coibion, Gorodnichenko, Kumar, and Pedemonte (2020), who argue that individuals and firms in developed countries that experienced long periods of low inflation pay little attention to inflation dynamics and monetary policy. On the other hand, individuals and firms in high-inflation countries monitor inflation dynamics and monetary policy more closely. Such considerations may be particularly pronounced in the German context because Germany experienced a long period of economic stability prior to the pandemic. Afterward, the German economy was hit by a series of shocks, which resulted in greater economic turmoil with high inflation rates in some years.

Figure 8: Estimated OIS shock coefficient with three-year rolling windows; 2017–2023



(a) Expected employment decrease (b) Expected employment increase

(c) Expected employment change (ordered) (d) Expected employment growth

Notes: The figure shows the estimated effects of interaction terms between the treatment dummy and the change, in basis points, in the one-year overnight index swap around monetary policy announcement events on four measures of expected employment change for five time intervals (a rolling window). The expected employment increase, decrease, and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Point estimates are displayed as solid lines, while 95% confidence intervals based on robust standard errors are shown as dashed lines. Data: IAB Job Vacancy Survey, 2017–2023.

To estimate the effects over different time periods, I use a rolling window approach with three-year windows, starting from 2017 and ending in 2023. Using these time windows, I re-estimate Equations (1) for each subsample. Figure 8 displays the results of these estimations for OIS shocks.[10] Throughout the period before the onset of economic turmoil in Germany (2017–

[10] See Figures A.7 and A.8 for the results of the MP and CBI shocks, respectively.

2019), there were no statistically significant effects of monetary policy surprises on employment expectations. Following the outbreak of the pandemic and the subsequent economic downturn, these effects began to become more pronounced. Hence, the OIS shock's effects are statistically significant in the subperiods 2020–2022 and 2021–2023. Since 2020, Germany experienced a number of shocks featuring, i.a., high inflation rates in 2022 and 2023. Therefore, these results suggest that German firms pay more attention to monetary policy in times of economic turmoil and high inflation rates. The results for growth expectations are an exception to these observations. They mostly lack statistical significance. Considering that the main result for growth expectations was only significant at the 10% level for the OIS shock, it may be that the sample size is too small if only subperiods are considered.

So far, this paper has provided no evidence of significance of Delphic monetary policy shocks. However, Enders et al. (2019) argue that the Delphic nature of monetary policy shocks becomes important if monetary policy surprises are large. Using a cubic estimation specification, they show that for large positive and negative surprises, firms' expectation changes approach zero. Their results imply that firms interpret large monetary policy shocks as the central bank's revelation of its private information about the future path of the economy. Therefore, Enders et al. (2019) recommend adjusting the policy rate in small steps to avoid such unintended expectation responses. Borrowing the approach of Enders et al. (2019), I check if firms' employment expectations respond nonlinearly to monetary policy shocks by estimating the following equation:

$$y_{i,t} = \gamma_0 + \gamma_1 T_{i,t} + \gamma_2 T_{i,t}\varepsilon_t + \gamma_3 T_{i,t}\varepsilon_t^3 + X_{i,t} + u_{i,t}, \tag{4}$$

where the additional term ε_t^3 captures cubic changes in the one-year OIS rate around the monetary policy events. An alternative way to model the nonlinearity is to replace the cubic term ε_t^3 with a quadratic term that preserves the sign of the shock, i.e., $\varepsilon_t|\varepsilon_t|$ (see Ascari and Haber, 2022).

Table 9 presents the estimation results of both nonlinear specifications. Neither cubic nor sign-preserving quadratic terms are statistically significant, while results for the linear term are broadly similar to the main results. However, due to the additional noise introduced by the nonlinear terms, some linear effects lose their statistical significance. Nevertheless, these results imply that firms respond rather linearly to monetary policy shocks. In addition to the results concerning central bank information shocks, my findings suggest that Delphic monetary policy shocks are not relevant to firms' future employment plans.

Note, however, that the estimation period of Enders et al. (2019) differs from the time period considered in this paper. To eliminate the possibility that the nonlinearity only matters in economically calm periods, I re-estimate the nonlinear effects for the 2013–2019 subsample, which is closer to that considered in Enders et al. (2019). Yet, Table A.7 in the Appendix suggests that there is no nonlinearity in this subsample either.

Another interesting question is whether monetary policy shocks have heterogeneous effects on different firms. Therefore, I estimate the effects separately for the manufacturing and service sectors. Table A.8 in the Appendix suggests that OIS shocks affect both sectors similarly. MP shocks appear to impact manufacturing firms somewhat more strongly. Service firms also appear to be affected by CBI shocks. Interestingly, CBI shocks reduce service firms' employment plans. Hence, service firms respond not to the information contained in the monetary policy announcement but rather to an increase in the interest rate, similar to an MP shock. Furthermore, small firms (those with fewer than 50 employees) appear to be affected more strongly by monetary policy shocks than are large firms (those with at least 50 employees) (see Table A.9 in the Appendix). This finding is consistent with the traditional view that due to small firms' limited access to financial markets, monetary policy has a more severe impact on such firms (Durante, Ferrando, and Vermeulen, 2022; Gertler and Gilchrist, 1994).

Table 9: Nonlinear effects of monetary policy shocks on employment expectations

	(1)	(2)	(3)	(4)
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.002	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t$	0.031**	-0.016	-0.101*	-0.007
	(0.014)	(0.022)	(0.059)	(0.005)
$T_{i,t}\varepsilon_t^3$	-0.020	-0.015	0.012	0.004
	(0.018)	(0.027)	(0.073)	(0.007)
r2	0.024	0.063	0.026	0.062
N	36119	36119	36119	35361

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t$	0.038*	-0.011	-0.105	-0.009
	(0.022)	(0.035)	(0.093)	(0.008)
$T_{i,t}\varepsilon_t\lvert\varepsilon_t\rvert$	-0.026	-0.020	0.016	0.005
	(0.027)	(0.041)	(0.112)	(0.010)
r2	0.024	0.063	0.026	0.062
N	36119	36119	36119	35361

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy. $T_{i,t}\varepsilon_t$, $T_{i,t}\varepsilon_t^3$ and $T_{i,t}\varepsilon_t|\varepsilon_t|$ are interaction terms of the treatment dummy with the monetary policy surprises and a nonlinear specification of monetary policy surprises, respectively, based on the change, in basis points, in the one-year overnight index swap around the monetary policy announcement event. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2017–2023.

8 Conclusion

This paper provides new causal evidence on how firms form employment expectations after a monetary policy shock. Using high-frequency monetary surprises around ECB policy announcements and detailed firm-level survey data from the IAB Job Vacancy Survey, I show that an unexpected monetary tightening significantly reduces firms' one-year-ahead employment expectations. These effects are both statistically and economically significant, and imply that firms view monetary policy as having lasting real effects.

My findings contribute to the growing micro-level literature on the transmission of monetary policy through the revision of expectations of economic agents (Di Pace et al., 2025; Enders et al., 2019; Rast, 2024). The transmission channel I study is the revision of employment expectations, which can be regarded as a summary metric for firms' valuation of future changes in the real economy. Furthermore, I demonstrate that employment expectations generally translate into actual employment changes. This validates their interpretation as actual employment plans rather than mere sentiment.

Moreover, I observe that the response of firms' employment expectations is asymmetric and context-dependent. In particular, monetary policy surprises during periods of heightened economic turmoil, such as the post-pandemic era, have stronger effects. This result potentially hints at firms paying greater attention to monetary policy in economically difficult times. Additionally, I find no evidence that firms respond to Delphic components of monetary policy shocks; hence, considerations regarding the transmission of interest rate changes dominate employment plans. This finding is partly at odds with Enders et al. (2019).

These results have several policy implications. First, central banks should consider the anticipatory behavior of firms when assessing the labor market impact of monetary policy. Since employment plans precede actual hiring or layoffs, they provide an early signal of labor market adjustment and aggregate demand shifts. Second, if tighter monetary policy leads to firms cutting back on hiring, this could prompt countervailing fiscal measures aimed at stabilizing employment, potentially weakening the effectiveness of monetary transmission. Understanding this interplay could be crucial for coordinated macroeconomic policy.

Finally, my findings also speak to the quality and structure of survey data used in monetary transmission research. By using telephone-based interviews with randomly assigned survey dates, I rule out the self-selection bias and identify cleaner causal effects. Some of the previous studies could only exploit self-chosen survey dates, which might be subject to the self-selection bias. This might partially explain the differences in the results and implications from those of this study. This strengthens the case for investing in high-quality, high-frequency firm surveys to monitor policy transmission in real time.

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Appendix

A Additional descriptives and results

Table A.1: Observable characteristics of firms in treatment and control group in Q4

	Treatment group		t-Test
	0	1	p-val.
N	19,119 (56.1%)	14,988 (43.9%)	
Dummy: Q4 expected empl. increase	0.292 (0.455)	0.298 (0.457)	0.275
Dummy: Q4 expected no change in empl.	0.618 (0.486)	0.617 (0.486)	0.839
Dummy: Q4 expected empl. decrease	0.087 (0.282)	0.083 (0.276)	0.190
Q4 expected employment growth	0.028 (0.107)	0.028 (0.100)	0.475
Q4 vacancy rate	0.038 (0.086)	0.035 (0.082)	0.008
Q4 empl. growth rate (rel. previous year)	0.019 (0.284)	0.026 (0.285)	0.050
Q4 hiring rate	0.149 (0.489)	0.147 (0.330)	0.766
Q4 separation rate	0.162 (0.654)	0.182 (2.267)	0.258
Q4 works councils	0.243 (0.429)	0.281 (0.449)	0.000
Q4 collective agreement	0.410 (0.492)	0.430 (0.495)	0.002
Q4 share: employees s.t. social ins. contr.	0.818 (0.208)	0.833 (0.199)	0.000
Q4 share: marginal employees	0.137 (0.172)	0.126 (0.167)	0.000
Q4 share: part time employees	0.238 (0.247)	0.237 (0.247)	0.681
Q4 share: temporary employees	0.092 (0.164)	0.097 (0.167)	0.021
Q4 share: apprentices	0.071 (0.153)	0.079 (0.176)	0.000
Q4 share: females	0.419 (0.283)	0.415 (0.280)	0.173

Notes: The table displays mean values of the respective variables. Standard deviations are given in parenthesis. Treatment group: firms surveyed 5 days after a monetary policy event. Control group: firms surveyed 5 days before a monetary policy event. Expectation measures are based on the question in the main questionnaire in Q4: "How do you expect the size of your workforce will develop until September *following year*". Data: IAB-Job Vacancy Survey, 2016 - 2022.

Table A.2: Effects of monetary policy announcements on employment expectations - full table

	(1)	(2)	(3)	(4)
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.017**	-0.027**	-0.092***	-0.005*
	(0.007)	(0.011)	(0.029)	(0.003)
Collective agreement	0.015***	-0.037***	-0.107***	-0.004***
	(0.003)	(0.006)	(0.015)	(0.001)
Works council	0.024***	-0.024***	-0.099***	-0.009***
	(0.005)	(0.008)	(0.021)	(0.001)
East Germany	0.008**	-0.027***	-0.071***	-0.004***
	(0.003)	(0.005)	(0.013)	(0.001)

Size 10-19	0.011***	0.109***	0.197***	-0.007***
	(0.004)	(0.006)	(0.017)	(0.002)
Size 20-49	0.008**	0.158***	0.304***	-0.008***
	(0.004)	(0.006)	(0.017)	(0.002)
Size 50-199	0.012**	0.212***	0.406***	-.012***
	(0.005)	(0.008)	(0.021)	(0.002)
Size 200-499	0.078***	0.224***	0.290***	-.022***
	(0.011)	(0.015)	(0.044)	(0.003)
Size ≥ 500	0.103***	0.242***	0.274***	-0.031***
	(0.014)	(0.019)	(0.055)	(0.003)
Past growth	0.007**	0.029***	0.044***	-0.010***
	(0.003)	(0.005)	(0.013)	(0.002)
Sector B	-0.024**	0.044**	0.140***	0.006
	(0.012)	(0.018)	(0.048)	(0.005)
Sector C1	-0.022**	0.053***	0.153***	0.002
	(0.009)	(0.013)	(0.036)	(0.003)
Sector C2	0.005	0.042***	0.075**	-0.004
	(0.010)	(0.014)	(0.037)	(0.003)
Sector C3	-0.030***	0.098***	0.262***	0.013***
	(0.009)	(0.014)	(0.037)	(0.004)
Sector C4	-0.018*	0.097***	0.233***	0.007*
	(0.009)	(0.014)	(0.037)	(0.003)
Sector C5	-0.014	0.154***	0.342***	0.017***
	(0.009)	(0.014)	(0.037)	(0.003)
Sector D	-0.050***	0.103***	0.313***	0.009**
	(0.010)	(0.016)	(0.041)	(0.004)
Sector E	-0.063***	0.106***	0.346***	0.009***
	(0.009)	(0.014)	(0.036)	(0.003)
Sector F	-0.030***	0.125***	0.315***	0.017***
	(0.010)	(0.014)	(0.038)	(0.004)
Sector G	-0.014	0.062***	0.155***	0.004
	(0.010)	(0.014)	(0.037)	(0.004)
Sector H	-0.000	0.088***	0.179***	0.010**
	(0.010)	(0.015)	(0.040)	(0.004)
Sector I	0.006	0.126***	0.243***	0.020***
	(0.010)	(0.015)	(0.040)	(0.004)
Sector J	-0.032***	0.290***	0.661***	0.043***
	(0.009)	(0.015)	(0.041)	(0.004)
Sector K	0.042***	0.076***	0.068*	0.014***
	(0.011)	(0.015)	(0.041)	(0.004)
Sector L	-0.042***	0.082***	0.252***	0.003
	(0.009)	(0.014)	(0.037)	(0.003)
Sector M	-0.044***	0.194***	0.486***	0.021***
	(0.009)	(0.014)	(0.038)	(0.004)
Sector N1	-0.023**	0.158***	0.367***	0.025***
	(0.010)	(0.015)	(0.039)	(0.004)
Sector N2	-0.008	0.348***	0.727***	0.126***
	(0.011)	(0.016)	(0.047)	(0.007)

Sector R	-0.033***	0.056***	0.183***	0.009**
	(0.010)	(0.015)	(0.038)	(0.004)
Sector S	-0.034***	0.092***	0.256***	0.009***
	(0.010)	(0.014)	(0.037)	(0.004)
Survey waves fixed effects	√	√	√	√
Constant	0.065***	0.092***		0.032***
	(0.009)	(0.014)		(0.004)
r2	0.024	0.063	0.026	0.061
N	36119	36119	36119	35361

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. The coefficients are scaled to represent a 10 basis points change. Sectors are defined according to the German Classification of Economic Activities, Edition 2008. Sector A (ref. category): "agriculture, forestry". Sector B: "mining, ores and earths". Sector C1: "nutrition, textiles, clothing, furniture etc.". Sector C2: "wood, paper, printing". Sector C3: "chemistry, plastics, glass, construction materials". Sector C4: "metals, metal production". Sector C5: "machines, electronics, vehicles". Sector D: "energy utilities". Sector E: "water, waste management". Sector F: "construction". Sector G: "trade, retail, repairs". Sector H: "transport, warehouses". Sector I: "hospitality". Sector J: "information and communication". Sector K: "financial services, insurance". Sector L: "real estate". Sector M: "liberal professions, scientific and technical services". Sector N1 "other commercial services, without temporary employment agencies". Sector N2 "temporary employment agencies". Sector R: "art, entertainment, recreation". Sector S: "other services". Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table A.3: Effects of standard and information monetary policy shocks on employment expectations - full table

	(1)	(2)	(3)	(4)
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	0.027***	-0.048***	-0.155***	-0.008**
	(0.010)	(0.014)	(0.039)	(0.004)
$T_{i,t}\varepsilon_t^{cbi}$	0.005	-0.010	-0.032	0.000
	(0.007)	(0.011)	(0.029)	(0.003)
Collective agreement	0.015***	-0.037***	-0.106***	-0.004***
	(0.003)	(0.006)	(0.015)	(0.001)
Works council	0.024***	-0.024***	-0.099***	-0.009***
	(0.005)	(0.008)	(0.021)	(0.001)
East Germany	0.008**	-0.027***	-0.071***	-0.004***
	(0.003)	(0.005)	(0.013)	(0.001)
Size 10-19	0.011***	0.109***	0.198***	-0.007***
	(0.004)	(0.006)	(0.017)	(0.002)
Size 20-49	0.008**	0.158***	0.304***	-0.008***
	(0.004)	(0.006)	(0.017)	(0.002)
Size 50-199	0.012**	0.213***	0.407***	-0.012***
	(0.005)	(0.008)	(0.021)	(0.002)
Size 200-499	0.078***	0.224***	0.291***	-0.022***

	(0.011)	(0.015)	(0.044)	(0.003)
Size ≥ 500	0.103***	0.242***	0.275***	-0.030***
	(0.014)	(0.019)	(0.055)	(0.003)
Past growth	0.007**	0.029***	0.044***	-0.010***
	(0.003)	(0.005)	(0.013)	(0.002)
Sector B	-0.024**	0.045**	0.140***	0.006
	(0.012)	(0.018)	(0.048)	(0.005)
Sector C1	-0.022**	0.053***	0.153***	0.002
	(0.009)	(0.013)	(0.036)	(0.003)
Sector C2	0.005	0.042***	0.075**	-0.004
	(0.010)	(0.014)	(0.037)	(0.003)
Sector C3	-0.030***	0.098***	0.261***	0.013***
	(0.009)	(0.014)	(0.037)	(0.004)
Sector C4	-0.018*	0.097***	0.234***	0.007*
	(0.009)	(0.014)	(0.037)	(0.003)
Sector C5	-0.014	0.155***	0.342***	0.017***
	(0.009)	(0.014)	(0.037)	(0.003)
Sector D	-0.050***	0.103***	0.313***	0.009**
	(0.010)	(0.016)	(0.041)	(0.004)
Sector E	-0.063***	0.106***	0.347***	0.009***
	(0.009)	(0.014)	(0.036)	(0.003)
Sector F	-0.030***	0.125***	0.315***	0.017***
	(0.010)	(0.014)	(0.038)	(0.004)
Sector G	-0.014	0.062***	0.154***	0.004
	(0.010)	(0.014)	(0.037)	(0.004)
Sector H	-0.000	0.088***	0.179***	0.010**
	(0.010)	(0.015)	(0.040)	(0.004)
Sector I	0.006	0.126***	0.242***	0.020***
	(0.010)	(0.015)	(0.040)	(0.004)
Sector J	-0.032***	0.290***	0.661***	0.043***
	(0.009)	(0.015)	(0.041)	(0.004)
Sector K	0.042***	0.076***	0.068*	0.014***
	(0.011)	(0.015)	(0.041)	(0.004)
Sector L	-0.042***	0.081***	0.251***	0.003
	(0.009)	(0.014)	(0.037)	(0.003)
Sector M	-0.044***	0.194***	0.487***	0.021***
	(0.009)	(0.014)	(0.038)	(0.004)
Sector N1	-0.023**	0.158***	0.367***	0.025***
	(0.010)	(0.015)	(0.039)	(0.004)
Sector N2	-0.008	0.348***	0.727***	0.126***
	(0.011)	(0.016)	(0.047)	(0.007)
Sector R	-0.033***	0.056***	0.183***	0.009**
	(0.010)	(0.015)	(0.038)	(0.004)
Sector S	-0.034***	0.092***	0.256***	0.009***
	(0.010)	(0.014)	(0.037)	(0.004)
Survey waves fixed effects	√	√	√	√
Constant	0.065***	0.092***		0.032***
	(0.009)	(0.014)		(0.004)

r2	0.024	0.064	0.026	0.062
N	36119	36119	36119	35361

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to represent a 10 basis points change. Sectors are defined according to the German Classification of Economic Activities, Edition 2008. Sector A (ref. category): "agriculture, forestry". Sector B: "mining, ores and earths". Sector C1: "nutrition, textiles, clothing, furniture etc.". Sector C2: "wood, paper, printing". Sector C3: "chemistry, plastics, glass, construction materials". Sector C4: "metals, metal production". Sector C5: "machines, electronics, vehicles". Sector D: "energy utilities". Sector E: "water, waste management". Sector F: "construction". Sector G: "trade, retail, repairs". Sector H: "transport, warehouses". Sector I: "hospitality". Sector J: "information and communication". Sector K: "financial services, insurance". Sector L: "real estate". Sector M: "liberal professions, scientific and technical services". Sector N1 "other commercial services, without temporary employment agencies". Sector N2 "temporary employment agencies". Sector R: "art, entertainment, recreation". Sector S: "other services". Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table A.4: Effects of monetary policy announcements on vacancy rates - full table

	Vacancy Rate	
$T_{i,t}$	0.001	0.001
	(0.001)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.001	
	(0.002)	
$T_{i,t}\varepsilon_t^{mp}$		-0.001
		(0.003)
$T_{i,t}\varepsilon_t^{cbi}$		0.003
		(0.002)
Collective agreement	0.002∗∗	0.002∗∗
	(0.001)	(0.001)
Works council	- 0.009∗∗∗	-0.009∗∗∗
	(0.001)	(0.001)
East Germany	0.003∗∗∗	0.003∗∗∗
	(0.001)	(0.001)
Size 10-19	0.003∗	0.003∗
	(0.002)	(0.002)
Size 20-49	-0.003∗∗	-0.003∗∗
	(0.001)	(0.001)
Size 50-199	- 0.011∗∗∗	-0.011∗∗∗
	(0.002)	(0.002)
Size 200-499	- 0.018∗∗∗	-0.018∗∗∗
	(0.002)	(0.002)
Size ≥ 500	- 0.021∗∗∗	-0.021∗∗∗
	(0.002)	(0.002)

Past growth	-0.008***	-0.008***
	(0.002)	(0.002)
Sector B	-0.006**	-0.006**
	(0.003)	(0.003)
Sector C1	0.005**	0.005**
	(0.002)	(0.002)
Sector C2	-0.001	-0.001
	(0.002)	(0.002)
Sector C3	0.005*	0.005*
	(0.002)	(0.002)
Sector C4	0.010***	0.010***
	(0.002)	(0.002)
Sector C5	0.013***	0.013***
	(0.002)	(0.002)
Sector D	-0.003	-0.003
	(0.003)	(0.003)
Sector E	-0.002	-0.002
	(0.002)	(0.002)
Sector F	0.029***	0.029***
	(0.003)	(0.003)
Sector G	0.004	0.004
	(0.002)	(0.002)
Sector H	0.022***	0.022***
	(0.003)	(0.003)
Sector I	0.026***	0.026***
	(0.003)	(0.003)
Sector J	0.023***	0.023***
	(0.003)	(0.003)
Sector K	0.007**	0.007**
	(0.003)	(0.003)
Sector L	-0.008***	-0.008***
	(0.002)	(0.002)
Sector M	0.014***	0.014***
	(0.003)	(0.003)
Sector N1	0.025***	0.025***
	(0.003)	(0.003)
Sector N2	0.161***	0.161***
	(0.006)	(0.006)
Sector R	0.005*	0.005*
	(0.003)	(0.003)
Sector S	0.007***	0.007**
	(0.003)	(0.003)
Constant	0.022***	0.022***
	(0.003)	(0.003)
r2	0.14	0.14
N	36483	36483

Notes: $vacancy\ rate = \frac{vacancies\ to\ be\ filled\ immediately_{i,t} + vacancies\ to\ be\ filled\ at\ a\ later\ date_{i,t}}{number\ of\ employees_{i,t+}(vacancies\ to\ be\ filled\ immediately_{i,t} + vacancies\ to\ be\ filled\ at\ a\ later\ date_{i,t})} . T_{i,t}$ is a treatment dummy and is an$_t$ interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock of Jarociński and Karadi (2020), respectively. The coefficients are scaled to represent a 10 basis points change. Sectors are defined according to the German Classification of Economic Activities, Edition 2008. Sector A (ref. category): "agriculture, forestry". Sector B: "mining, ores and earths". Sector C1: "nutrition, textiles, clothing, furniture etc.". Sector C2: "wood, paper, printing". Sector C3: "chemistry, plastics, glass, construction materials". Sector C4: "metals, metal production". Sector C5: "machines, electronics, vehicles". Sector D: "energy utilities". Sector E: "water, waste management". Sector F: "construction". Sector G: "trade, retail, repairs". Sector H: "transport, warehouses". Sector I: "hospitality". Sector J: "information and communication". Sector K: "financial services, insurance". Sector L: "real estate". Sector M: "liberal professions, scientific and technical services". Sector N1 "other commercial services, without temporary employment agencies". Sector N2 "temporary employment agencies". Sector R: "art, entertainment, recreation". Sector S: "other services". Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table A.5: Effect of treatment dummy

	(1)	(2)	(3)	(4)
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	-0.002	-0.001	0.000
	(0.003)	(0.005)	(0.012)	(0.001)
N	36119	36119	36119	35361

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table A.6: Effect of sum of monetary policy shocks between survey dates in Q4 and Q3 of the subsequent year.

	Realized employment growth
$\sum \varepsilon_t$	0.0006
	(0.0008)
N	35,925

Notes: Realized employment growth: employment growth rate from Q4 to Q3 of the subsequent year. $\sum \varepsilon_t$ is the sum of monetary policy shocks between survey dates in Q4 and Q3 of the subsequent year. Monetary policy shocks: basis point change in the one-year overnight index swap around monetary policy announcement events. Control variables: realized employment growth rate relative to the previous year, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table A.7: Nonlinear effects of monetary policy shocks on employment expectations before 2020

Expected empl.	(1) decrease	(2) increase	(3) change (ordered)	(4) growth
$T_{i,t}$	-0.000	-0.006	-0.012	-0.001
	(0.002)	(0.004)	(0.010)	(0.001)
$T_{i,t}\varepsilon_t$	-0.014	0.009	0.051	0.002
	(0.013)	(0.020)	(0.057)	(0.005)
$T_{i,t}\varepsilon_t^3$	0.018	0.052	0.065	-0.005
	(0.048)	(0.074)	(0.208)	(0.017)
r2	0.020	0.056	0.023	0.042
N	54890	54890	54890	53817

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	0.000	-0.006	-0.012	-0.001
	(0.002)	(0.004)	(0.011)	(0.001)
$T_{i,t}\varepsilon_t$	-0.012	0.002	0.031	0.002
	(0.020)	(0.030)	(0.085)	(0.007)
$T_{i,t}\varepsilon_t\lvert\varepsilon_t\rvert$	0.004	0.044	0.081	-0.002
	(0.042)	(0.066)	(0.185)	(0.015)
r2	0.020	0.056	0.023	0.042
N	54890	54890	54890	53817

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy. $T_{i,t}\varepsilon_t$, $T_{i,t}\varepsilon_t$ and $T_{i,t}\varepsilon_t|\varepsilon_t|$ are interaction terms of the treatment dummy with the monetary policy surprises and a nonlinear specification of monetary policy surprises, respectively, based on the change, in basis points, in the one-year overnight index swap around the monetary policy announcement event. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2013–2019.

Table A.8: Heterogeneous effects by sector

	Manufacturing				Services			
Expected empl.	decrease	increase	change (ordered)	growth	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.002	-0.007	-0.011	-0.001	0.001	-0.002	-0.007	-0.001
	(0.006)	(0.009)	(0.024)	(0.002)	(0.004)	(0.007)	(0.018)	(0.002)
$T_{i,t}\varepsilon_t^{ois}$	0.035**	-0.032	-0.137**	-0.007*	0.020**	-0.032**	-0.106***	-0.005
	(0.014)	(0.020)	(0.055)	(0.004)	(0.010)	(0.015)	(0.040)	(0.004)
r2	0.029	0.051	0.023	0.026	0.027	0.074	0.031	0.076
N	10338	10338	10338	10089	18517	18517	18517	18086

	Manufacturing				Services			
Expected empl.	decrease	increase	change (ordered)	growth	decrease	increase	change (ordered)	growth
$T_{i,t}$	0.000	-0.009	-0.018	-0.001	0.000	-0.002	-0.004	-0.001
	(0.006)	(0.009)	(0.024)	(0.002)	(0.004)	(0.007)	(0.018)	(0.002)
$T_{i,t}\varepsilon_t^{mp}$	0.062***	-0.088***	-0.304***	-0.011*	0.021	-0.043**	-0.130**	-0.009*
	(0.020)	(0.026)	(0.074)	(0.006)	(0.014)	(0.020)	(0.055)	(0.006)
$T_{i,t}\varepsilon_t^{cbi}$	-0.004	0.011	0.032	0.000	0.020**	-0.022	-0.084**	-0.000
	(0.014)	(0.021)	(0.056)	(0.004)	(0.010)	(0.015)	(0.040)	(0.004)
r2	0.029	0.052	0.024	0.026	0.027	0.074	0.031	0.076
N	10338	10338	10338	10089	18517	18517	18517	18086

Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy, and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the change, in basis points, in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock of Jarociński and Karadi (2020), respectively. The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Manufacturing includes the sectors "nutrition, textiles, clothing, furniture, etc.", "wood, paper, printing", "chemistry, plastics, glass, construction materials", "metals, metal production", and "machines, electronics, vehicles" of the German Classification of Economic Activities, 2008 Edition. Services include the sectors "trade, retail, repairs", "transport, warehouses", "hospitality", "information and communication", "financial services, insurance", "real estate", "liberal professions, scientific and technical services", "other commercial services", "art, entertainment, recreation", and "other services" of the German Classification of Economic Activities, 2008 Edition. Data: IAB Job Vacancy Survey, 2017–2023.

Table A.9: Heterogeneous effects by firm size

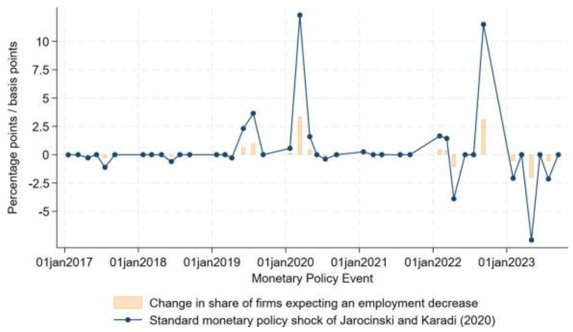
	Fewer than 50 employees				At least 50 employees			
Expected empl.	decrease	increase	change (ordered)	growth	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.002	0.001	0.006	0.001	-0.005	-0.001	0.006	-0.003*
	(0.003)	(0.006)	(0.015)	(0.001)	(0.007)	(0.011)	(0.025)	(0.002)
$T_{i,t}\varepsilon_t^{ois}$	0.017**	-0.038***	-0.119***	-0.006*	0.020	0.009	-0.022	-0.002
	(0.008)	(0.012)	(0.034)	(0.003)	(0.015)	(0.024)	(0.058)	(0.004)
r2	0.014	0.058	0.026	0.059	0.062	0.057	0.034	0.087
N	27177	27177	27177	26731	8942	8942	8942	8630

	Fewer than 50 employees				At least 50 employees			
Expected empl.	decrease	increase	change (ordered)	growth	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.002	0.001	0.006	0.001	-0.004	-0.000	0.006	-0.003*
	(0.003)	(0.006)	(0.015)	(0.001)	(0.007)	(0.011)	(0.026)	(0.002)
$T_{i,t}\varepsilon_t^{mp}$	0.027**	-0.057***	-0.180***	-0.010**	0.036	-0.012	-0.086	-0.002
	(0.011)	(0.016)	(0.045)	(0.004)	(0.024)	(0.033)	(0.086)	(0.006)
$T_{i,t}\varepsilon_t^{cbi}$	0.008	-0.013	-0.044	0.000	-0.003	0.001	0.007	0.001
	(0.008)	(0.012)	(0.035)	(0.003)	(0.015)	(0.023)	(0.056)	(0.003)
r2	0.014	0.058	0.026	0.059	0.062	0.057	0.034	0.087
N	27177	27177	27177	26731	8942	8942	8942	8630

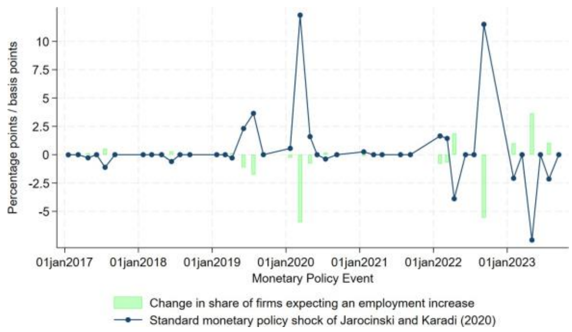
Notes: The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" $T_{i,t}$ is a treatment dummy, and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the change, in basis points, in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock of Jarociński and Karadi (2020), respectively. The coefficients are scaled to correspond to a change of 10 basis points. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Robust standard errors are shown in parentheses. Significance levels are indicated as follows: *** p<0.01, ** p<0.05, and * p<0.1. Data: IAB Job Vacancy Survey, 2017–2023.

Figure A.1: Change in expectations due to standard monetary policy shocks of Jarociński and Karadi (2020)

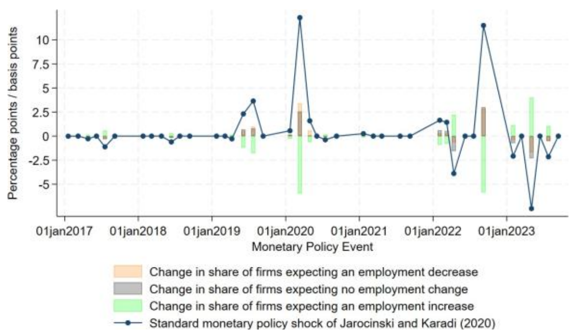
(a) Change in the share of firms expecting an employment decrease



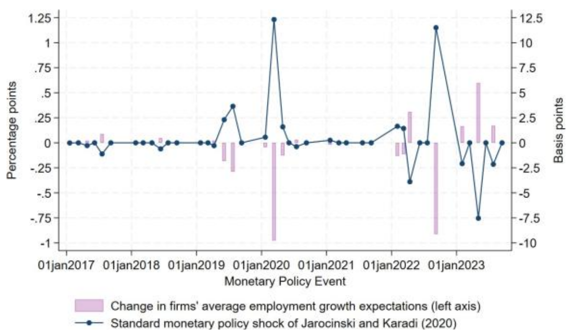
(b) Change in the share of firms expecting an employment increase



(c) Change in the share of firms expecting an employment decrease, no change, and increase



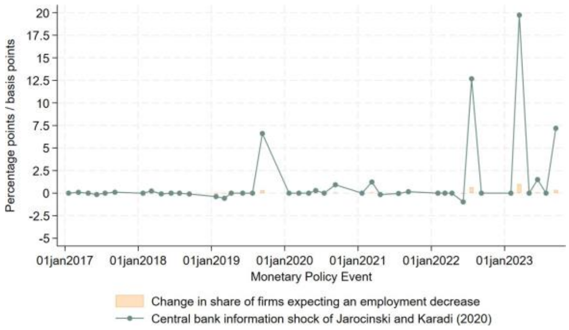
(d) Change in firms' average employment growth expectations



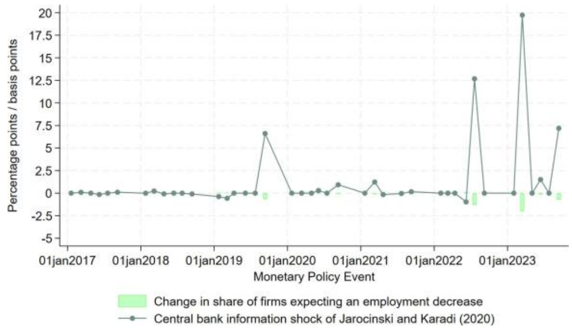
Notes: Changes in expectations are based on the predictions of regression models of the respective expectation measure on the treatment dummy, the interaction between the treatment dummy and monetary policy shocks, and the following control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Standard monetary policy shocks are taken from Jarociński and Karadi (2020). Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". Control variables: Data: IAB-Job Vacancy Survey, 2017 - 2023.

Figure A.2: Change in expectations due to central bank information shocks of Jarociński and Karadi (2020)

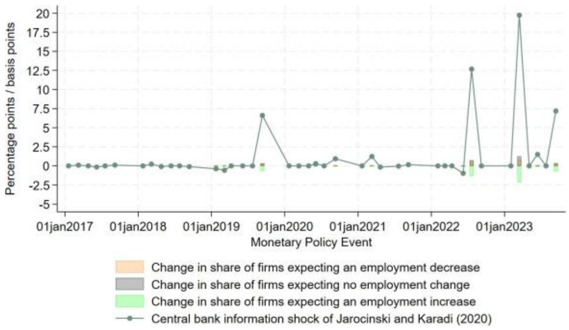
(a) Change in the share of firms expecting an employment decrease



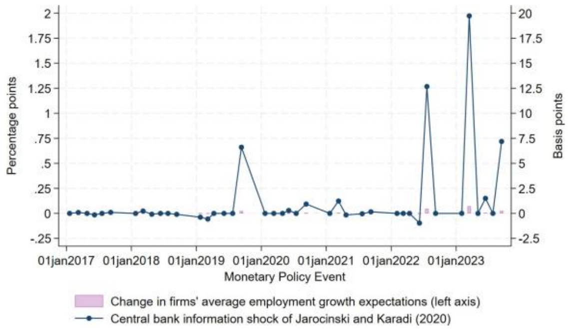
(b) Change in the share of firms expecting an employment increase



(c) Change in the share of firms expecting an employment decrease, no change, and increase



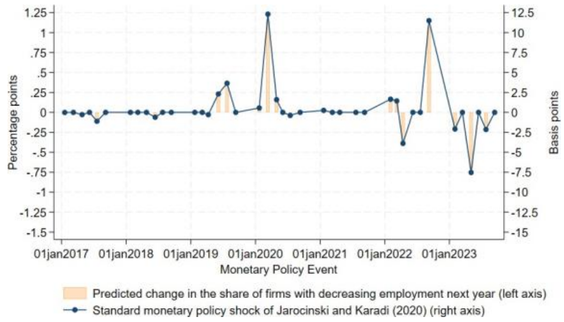
(d) Change in firms' average employment growth expectations



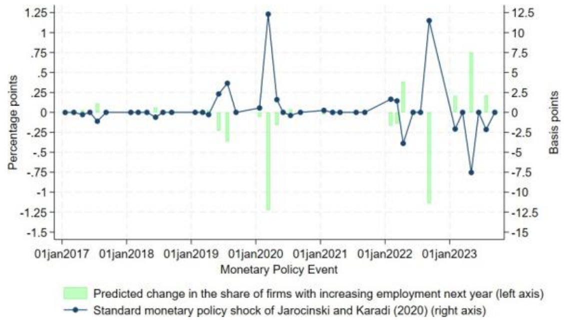
Notes: Changes in expectations are based on the predictions of regression models of the respective expectation measure on the treatment dummy, the interaction between the treatment dummy and monetary policy shocks, and the following control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Central bank information shocks are taken from Jarociński and Karadi (2020). Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". Control variables: Data: IAB-Job Vacancy Survey, 2017 - 2023.

Figure A.3: Realized changes through expectations after standard monetary policy shocks of Jarociński and Karadi (2020)

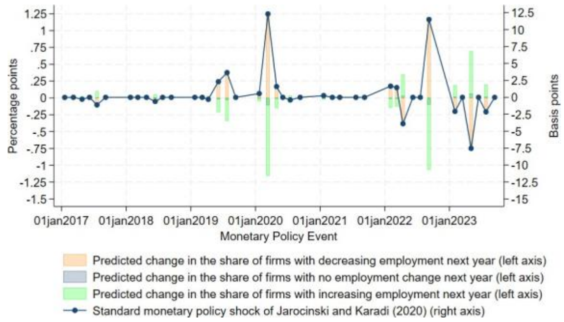
(a) Change in the share of firms with decreasing employment



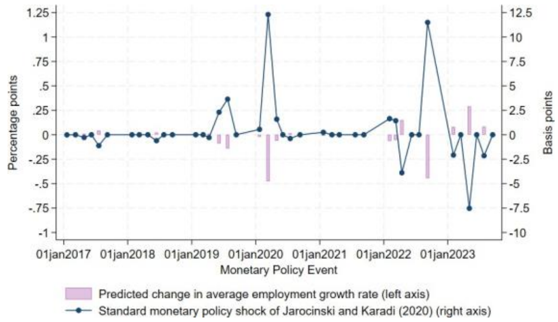
(b) Change in the share of firms with increasing employment



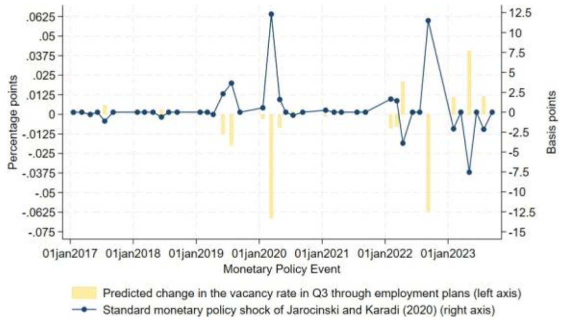
(c) Change in the share of firms with an employment decrease, no change, and increase



(d) Change in the average employment growth rate



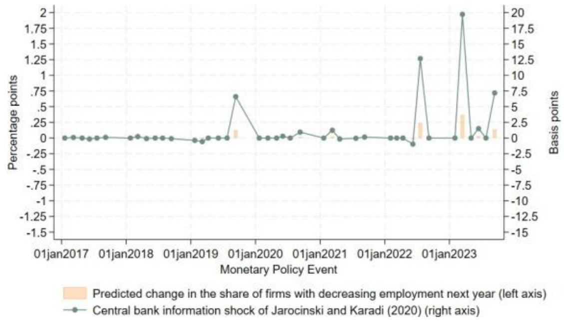
(e) Change in the average vacancy rate after three quarters



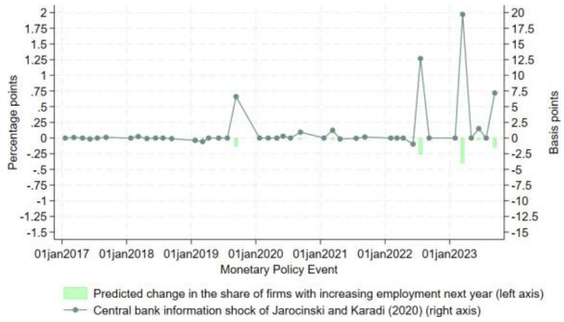
Notes: Predicted changes are based on regressions of standard monetary policy shocks on employment expectations and employment expectations on realized employment changes. Standard monetary policy shocks are taken from Jarociński and Karadi (2020). Expected employment increase, decrease and ordered employment change are based on the survey question “How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?”. Expected employment growth rate is computed using responses to the question “By how many persons will employment increase/decrease in the next 12 months?”. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Figure A.4: Realized changes through expectations after central bank information shocks of Jarociński and Karadi (2020)

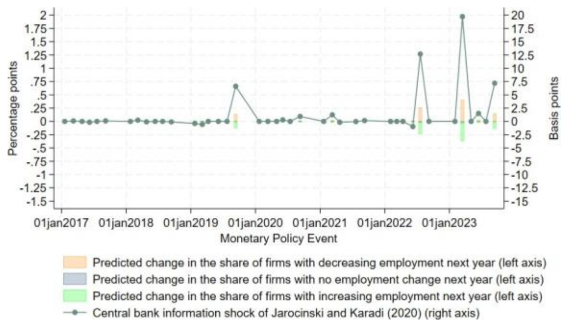
(a) Change in the share of firms with decreasing employment



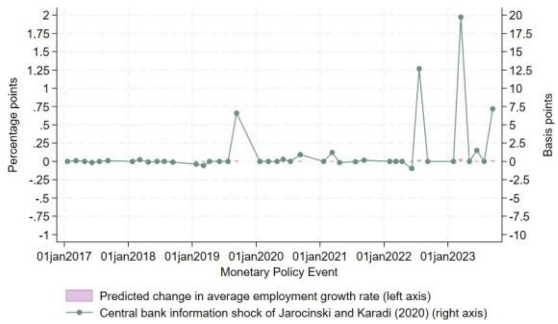
(b) Change in the share of firms with increasing employment



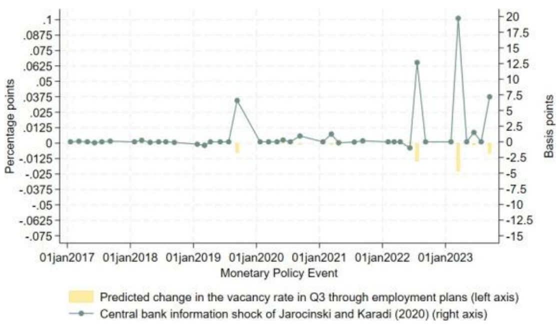
(c) Change in the share of firms with an employment decrease, no change, and increase



(d) Change in the average employment growth rate

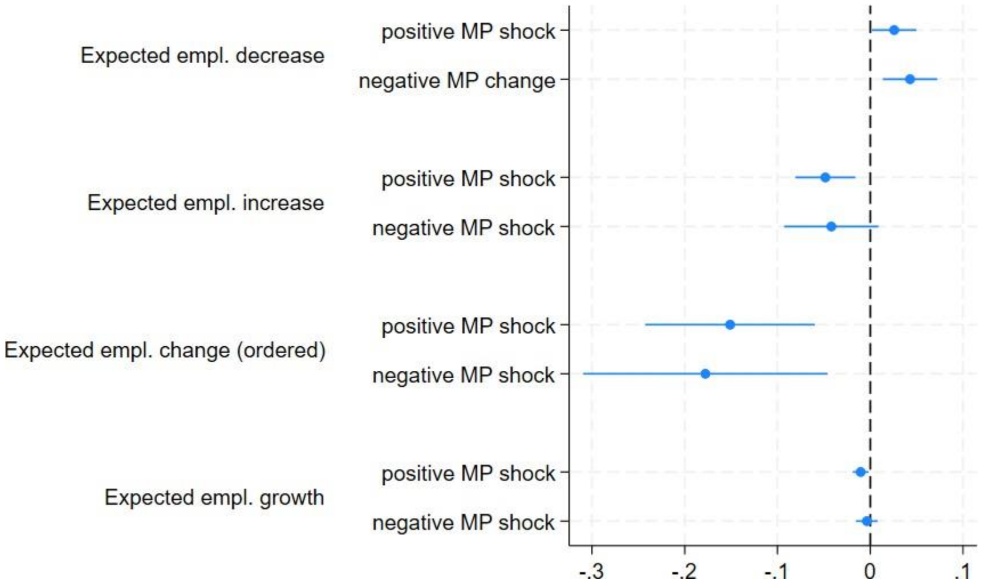


(e) Change in the average vacancy rate after three quarters



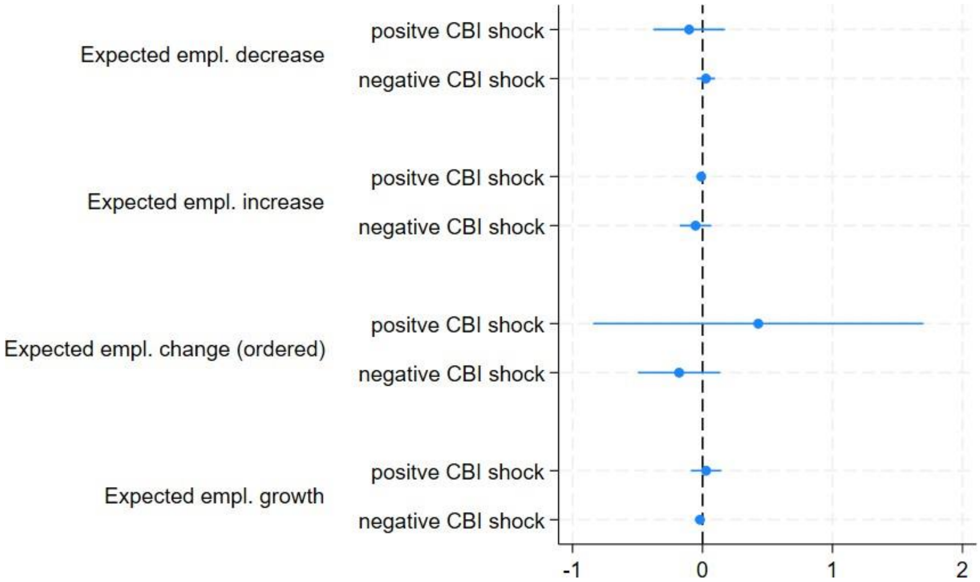
Notes: Predicted changes are based on regressions of central bank information shocks on employment expectations and employment expectations on realized employment changes. Central bank information policy shocks are taken from Jarociński and Karadi (2020). Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?" . Data: IAB-Job Vacancy Survey, 2017 - 2023.

Figure A.5: Effects of positive and negative MP shocks on employment expectations



Notes: The figure displays the estimated effects of interaction terms between the treatment dummy and positive/negative standard monetary policy shock of Jarociński and Karadi (2020) on four measures of expected employment change. The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. The 95% confidence intervals (solid lines) are based on robust standard errors. Data: IAB Job Vacancy Survey, 2017–2023.

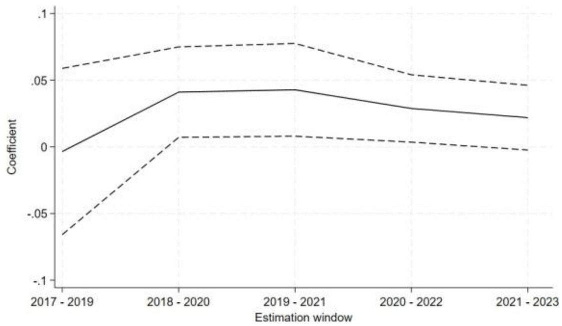
Figure A.6: Effects of positive and negative CBI shocks on employment expectations



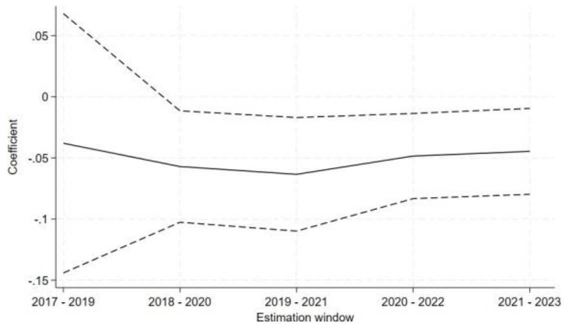
Notes: The figure displays the estimated effects of interaction terms between the treatment dummy and positive/negative central bank information shocks of Jarociński and Karadi (2020) on four measures of expected employment change. The expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. The 95% confidence intervals (solid lines) are based on robust standard errors. Data: IAB Job Vacancy Survey, 2017–2023.

Figure A.7: Estimated MP shock coefficient with three-year rolling windows; 2017–2023

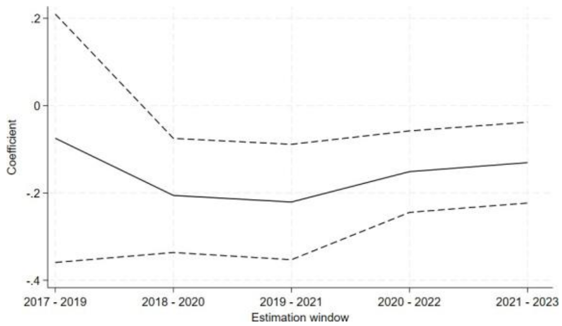
(a) Expected employment decrease



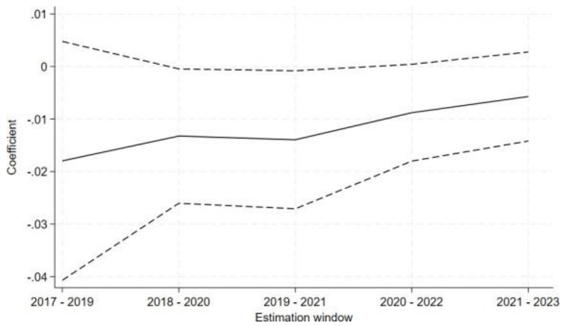
(b) Expected employment increase



(c) Expected employment change (ordered)



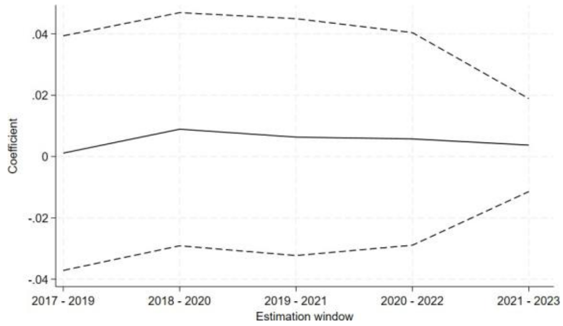
(d) Expected employment growth



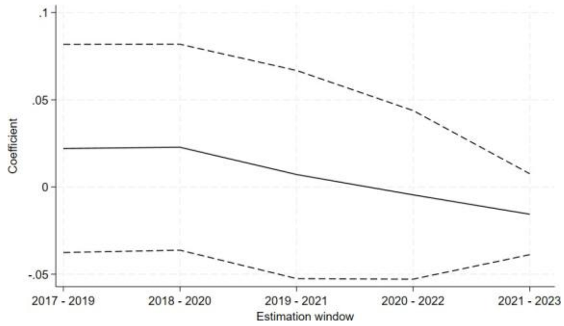
Notes: The figure displays the estimated effects of interaction terms between the treatment dummy and the standard monetary policy shock of Jarociński and Karadi (2020) on four measures of expected employment change for five time intervals (a rolling window). The expected employment increase, decrease, and ordered employment change are based on the survey question "How do you expect the size of your workforce to develop within the next 12 months? Increase, remain unchanged or decrease?" The expected employment growth rate is computed using responses to the question "By how many persons will employment increase or decrease in the next 12 months?" Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, workers' council and survey wave fixed effects. Point estimates are displayed as solid lines, while 95% confidence intervals based on robust standard errors are shown as dashed lines. Data: IAB Job Vacancy Survey, 2017–2023.

Figure A.8: Estimated CBI shock coefficient with three-years rolling windows 2017 - 2023

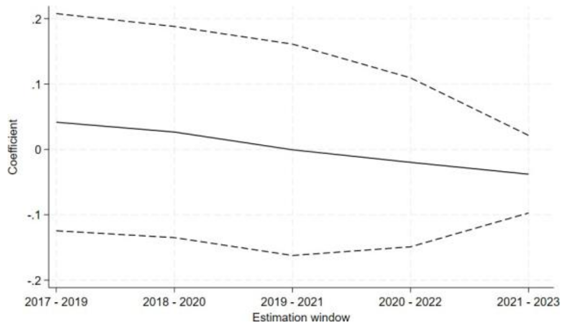
(a) Expected employment decrease



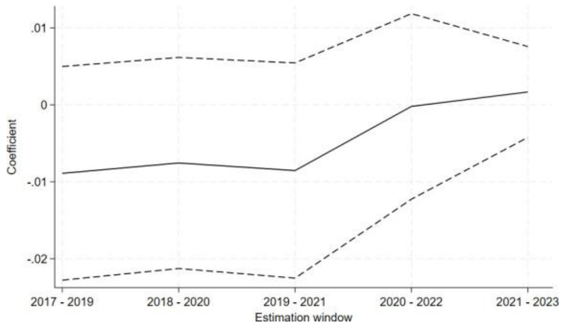
(b) Expected employment increase



(a) Expected employment change (ordered)



(d) Expected employment growth



Notes: The figure displays the estimated effects of interaction terms between the treatment dummy and the scentral bank information shock of Jarociński and Karadi (2020) on four measures of expected employment change for five time intervals (rolling window). Expected employment increase, decrease, and ordered employment change are based on the survey question “How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?”. Expected employment growth rate is computed using responses to the question “By how many persons will employment increase/decrease in the next 12 months?”. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Point estimates are displayed as solid lines, while 95% confidence intervals based on robust standard errors are shown as dashed lines. Data: IAB-Job Vacancy Survey, 2017 - 2023.

B Robustness checks

Table B.1: Robustness check: different measures of interest rate

Interest rate measure: 1 month OIS rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.002	0.010	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{1M}$	0.013*	-0.031***	-0.090***	-0.002
	(0.007)	(0.011)	(0.030)	(0.003)
N	36119	36119	36119	35361
Interest rate measure: 3 months OIS rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.002	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{3M}$	0.014*	-0.026**	-0.083***	-0.002
	(0.008)	(0.012)	(0.032)	(0.003)
N	36119	36119	36119	35361
Interest rate measure: 6 months OIS rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.009	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{6M}$	0.015**	-0.028**	-0.089***	-0.003
	(0.007)	(0.011)	(0.030)	(0.003)
N	36119	36119	36119	35361
Interest rate measure: 1 year German bond rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.006	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{D1Y}$	0.013*	-0.023*	-0.074**	-0.004
	(0.008)	(0.012)	(0.033)	(0.003)
N	36119	36119	36119	35361
Interest rate measure: ECB main refinancing operations				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	-0.000	0.002	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{i}$	-0.001	-0.002	-0.003	-0.000
	(0.002)	(0.003)	(0.008)	(0.001)
N	36119	36119	36119	35361

Table continues on next page

Interest rate measure: corrected 1 year OIS rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.002	-0.000	0.003	0.000
	(0.003)	(0.005)	(0.012)	(0.001)
$T_{i,t}\varepsilon_t^{cois}$	0.017**	-0.025**	-0.088***	-0.004*
	(0.007)	(0.011)	(0.028)	(0.003)
N	36119	36119	36119	35361

Interest rate measure: Corrected change in policy rate				
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	-0.002	-0.001	0.000
	(0.003)	(0.005)	(0.012)	(0.001)
$T_{i,t}\varepsilon_t^{ci}$	0.002	-0.006	-0.017	0.001
	(0.004)	(0.007)	(0.018)	(0.002)
N	36119	36119	36119	35361

Notes: $T_{i,t}$ = treatment dummy; ε_t^{1M} = change in one-month overnight index swap rate; ε_t^{3M} = change in three-months overnight index swap rate; ε_t^{6M} = change in six-months overnight index swap rate; ε_t^{D1Y} = change in one-year German bond rate; ε_t^{i} = announced change in ECB's interest rate on the main refinancing operations; ε_t^{cois} = corrected change in one-year overnight index swap rate following Bauer and Swanson (2023); ε_t^{ci}= corrected change in ECB's interest rate on the main refinancing operations following Cloyne and Hürtgen (2016). The coefficients are scaled to represent a 10 basis points change. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table B.2: Robustness check: estimation window around monetary policy event

		h = 4		
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}^{h=4}$	-0.005	-0.002	0.005	0.000
	(0.003)	(0.006)	(0.014)	(0.001)
$T_{i,t}^{h=4}\varepsilon_t^{ois}$	0.015**	-0.018	-0.070**	-0.002
	(0.008)	(0.012)	(0.032)	(0.003)
N	28183	28183	28183	27590
		h = 6		
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}^{h=6}$	-0.004	0.005	0.018	0.001
	(0.003)	(0.004)	(0.012)	(0.001)
$T_{i,t}^{h=6}\varepsilon_t^{ois}$	0.019***	-0.028***	-0.099***	-0.005**
	(0.006)	(0.010)	(0.027)	(0.002)
N	42400	42400	42400	41505
		h = 4		
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}^{h=4}$	-0.005	-0.002	0.005	0.000
	(0.003)	(0.006)	(0.015)	(0.001)
$T_{i,t}^{h=4}\varepsilon_t^{mp}$	0.016	-0.041***	-0.117***	-0.004
	(0.011)	(0.016)	(0.043)	(0.004)
$T_{i,t}^{h=4}\varepsilon_t^{cbi}$	0.011	-0.003	-0.029	0.001
	(0.008)	(0.012)	(0.033)	(0.003)
N	28183	28183	28183	27590
		h = 6		
Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}^{h=6}$	-0.004	0.005	0.018	0.001
	(0.003)	(0.005)	(0.012)	(0.001)
$T_{i,t}^{h=6}\varepsilon_t^{mp}$	0.033***	-0.048***	-0.165***	-0.009***
	(0.009)	(0.013)	(0.036)	(0.003)
$T_{i,t}^{h=6}\varepsilon_t^{cbi}$	0.006	-0.013	-0.040	-0.000
	(0.007)	(0.010)	(0.027)	(0.003)
N	42400	42400	42400	41505

Notes: h = number of days before and after monetary policy event considered in estimation sample, $T_{i,t}^{h=4}$ and $T_{i,t}^{h=6}$ treatment dummy = 0 if firm's interview date is h days before monetary policy event and = 1 if firm's interview date is h days after monetary policy event; $T_{i,t}^{h=4}\varepsilon_t^{ois}$ and $T_{i,t}^{h=6}\varepsilon_t^{ois}$ are interaction terms between the respective treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events; $T_{i,t}^{h=4}\varepsilon_t^{mp}$, $T_{i,t}^{h=6}\varepsilon_t^{mp}$, $T_{i,t}^{h=4}\varepsilon_t^{cbi}$ and $T_{i,t}^{h=6}\varepsilon_t^{cbi}$ are interaction terms of the respective treatment dummy with the standard monetary policy shock and the central bank information monetary shock. The coefficients are scaled to represent a 10 basis points change. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table B.3: Robustness check: Survey waves from 2013 onward

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	-0.003	-0.004	-0.001
	(0.002)	(0.003)	(0.009)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.010*	-0.011	-0.044*	-0.002
	(0.006)	(0.008)	(0.023)	(0.002)
N	71757	71757	71757	70240

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	-0.003	-0.005	-0.001
	(0.002)	(0.003)	(0.009)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	0.012	-0.028**	-0.085**	-0.006*
	(0.009)	(0.012)	(0.034)	(0.003)
$T_{i,t}\varepsilon_t^{cbi}$	0.004	-0.001	-0.012	-0.001
	(0.006)	(0.010)	(0.027)	(0.002)
N	71757	71757	71757	70240

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to represent a 10 basis points change. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2013 - 2023.

Table B.4: Robustness check: ECB meeting fixed effects 2017 - 2023

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.002	0.001	0.005	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.012	-0.019	-0.065*	-0.003
	(0.008)	(0.013)	(0.034)	(0.003)
N	36119	36119	36119	35361

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	0.000	0.004	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	0.017	-0.034**	-0.104**	-0.005
	(0.012)	(0.017)	(0.046)	(0.004)
$T_{i,t}\varepsilon_t^{cbi}$	0.002	-0.006	-0.015	0.002
	(0.009)	(0.013)	(0.035)	(0.003)
N	36119	36119	36119	35361

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to represent a 10 basis points change. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), and ECB meeting fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table B.5: Robustness check: ECB meeting fixed effects 2020 - 2023

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.001	0.000	0.003	-0.001
	(0.005)	(0.008)	(0.020)	(0.002)
$T_{i,t}\varepsilon_t^{ois}$	0.015*	-0.028**	-0.086**	-0.002
	(0.009)	(0.014)	(0.037)	(0.004)
N	15742	15742	15742	15342

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.000	-0.000	0.001	-0.002
	(0.005)	(0.008)	(0.020)	(0.002)
$T_{i,t}\varepsilon_t^{mp}$	0.019	-0.037**	-0.109**	-0.005
	(0.012)	(0.017)	(0.046)	(0.004)
$T_{i,t}\varepsilon_t^{cbi}$	0.002	-0.010	-0.023	0.004
	(0.010)	(0.014)	(0.037)	(0.004)
N	15742	15742	15742	15342

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to represent a 10 basis points change. Control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), and ECB meeting fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2020 - 2023.

Table B.6: Robustness check: Controlling for short-time work

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.008	0.001
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	0.018***	-0.028***	-0.096***	-0.005*
	(0.007)	(0.011)	(0.029)	(0.003)
Industry-level share	0.201***	-0.067	-0.545***	-0.020
of short-time work	(0.033)	(0.041)	(0.118)	(0.014)
N	35621	35621	35621	34865

Expected empl.	decrease	increase	change (ordered)	growth
$T_{i,t}$	-0.003	0.001	0.008	0.000
	(0.003)	(0.005)	(0.013)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	0.026**	-0.049***	-0.153***	-0.008**
	(0.010)	(0.014)	(0.039)	(0.004)
$T_{i,t}\varepsilon_t^{cbi}$	0.007	-0.012	-0.039	-0.000
	(0.007)	(0.011)	(0.029)	(0.003)
Industry-level share	0.200***	-0.064	-0.537***	-0.019
of short-time work	(0.033)	(0.041)	(0.118)	(0.014)
N	35621	35621	35621	34865

Notes: Expected employment increase, decrease and ordered employment change are based on the survey question "How do you expect the size of your workforce will develop within the next 12 months? – an increase, no change or a decrease?". Expected employment growth rate is computed using responses to the question "By how many persons will employment increase/decrease in the next 12 months?". $T_{i,t}$ is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. $T_{i,t}\varepsilon_t^{mp}$ and $T_{i,t}\varepsilon_t^{cbi}$ are interaction terms of the treatment dummy with the standard monetary policy shock and the central bank information monetary shock, respectively. The coefficients are scaled to represent a 10 basis points change. The industry-level share of short-time work is computed on the 2-digit level of the German Classification of Economic Activities 2008. Further control variables: realized employment growth rate relative to the previous quarter, firm size (6 categories), economic sector (24 categories), and survey waves fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Table B.7: Robustness check: change in expectation as dependent variable

Change in	discrete empl. expectations	expected empl. growth rate
$T_{i,t}$	0.001	0.000
	(0.006)	(0.001)
$T_{i,t}\varepsilon_t^{ois}$	-0.040***	-0.004*
	(0.013)	(0.003)
r2	0.292	0.239
N	36064	34448

Change in	discrete empl. expectations	expected empl. growth rate
$T_{i,t}$	0.002	-0.000
	(0.006)	(0.001)
$T_{i,t}\varepsilon_t^{mp}$	-0.072***	-0.008**
	(0.017)	(0.003)
$T_{i,t}\varepsilon_t^{cbi}$	-0.015	0.000
	(0.013)	(0.003)
r2	0.292	0.239
N	36064	34448

Notes: Change in discrete employment expectations is 2 if employment expectations changed from decrease to increase, 1 if they increased from decrease to no change or from no change to increase and so on. Change in expected employment growth rate is the percentage point difference in these expectations. $T_{i,t}$is a treatment dummy and $T_{i,t}\varepsilon_t^{ois}$ is an interaction term between the treatment dummy and the basis point change in the one-year overnight index swap around monetary policy announcement events. The coefficients are scaled to represent a 10 basis points change. Control variables: lag of discrete employment expectations or lag of expected employment growth rate, firm size (6 categories), economic sector (24 categories), collective agreement, works council and survey wave fixed effects. Robust standard errors are displayed in parentheses. *** p<0.01, ** p<0.05, * p<0.1 indicate the significance levels. Data: IAB-Job Vacancy Survey, 2017 - 2023.

Data availability statement

This article employs confidential data of the German Job Vacancy Survey (DOI: https://doi.org/10.5164/IAB.FDZD.2406.en.v1). For replication purposes, the Research Data Centre (FDZ) of the Institute for Employment Research (IAB) will provide these data. The IAB provides access via on-site use at the FDZ and remote data access. For further information on the data and data access, refer to https://fdz.iab.de/en/be triebsdaten/german-job-vacancy-survey-of-the-iab-version-0021-v1/ and https://fdz.iab.de/en/data-access/on-site-use/, respectively.

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