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Monetary policy and the rigidity of firm employment expectations

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Abstract

This paper examines how monetary policy announcements affect firms' employment expectations. Using German survey data, we combine high-frequency monetary policy surprises with survey response dates to identify the immediate and dynamic effects of monetary policy on firm-level expectations and subsequent employment. Contractionary shocks lead firms to revise employment plans downward immediately and persistently, eventually reducing employment growth. Initially, hiring plans are reduced, while layoffs increase later. Production expectations adjust twice as often but revert faster, consistent with greater labour market rigidity. Labour market institutions shape these responses: firms subject to the minimum wage or with lower collective bargaining coverage revise employment expectations more strongly. Financially constrained firms exhibit disproportionately larger downward revisions, indicating that the financial accelerator operates already at the expectation formation stage. Because firms adjust plans well before effects appear in aggregate data, employment expectations provide an early measure of monetary policy transmission to the labour market.

Keywords: hiring, employment expectation, labour market, survey data, monetary policy surprises

JEL codes: E24, E52, J20, J63

Non-technical summary

How do firms adjust their hiring plans when monetary policy tightens? Standard macroeconomic models treat employment as a by-product of changes in demand and production — output falls, and employment follows proportionally. Yet labour markets are shaped by adjustment costs, institutions, and other frictions, so employment may respond differently from output in both timing and persistence. Firms' employment expectations offer an early window onto these dynamics, before they surface in aggregate data.

This paper studies how ECB monetary policy surprises affect firms' employment expectations and subsequent employment outcomes. We combine monthly data from the German ifo Business Survey, covering about 9,000 firms per month from 2005 to 2024 with high-frequency monetary policy surprises. By comparing firms that responded to the survey just before an ECB announcement with firms that responded just after, we isolate the immediate effect of a policy shock on expectations. We then use firm-level panel local projections to trace the dynamic response over two years.

After a contractionary monetary policy surprise, firms immediately revise their employment expectations downward. The response becomes strongest after about one month, remains elevated for roughly a year, and then fades gradually. By contrast, firms are about twice as likely to revise their production expectations at first, but these return to normal much faster, within about six months. This suggests that labour market adjustment is slower and more persistent than output adjustment.

The composition of the employment adjustment also matters. Firms initially respond mainly by reducing hiring rather than by increasing layoffs. In the medium-run, also layoffs become important. Those changes in expectations are then reflected in actual outcomes. Contractionary shocks are followed by lower firm-level employment growth within a year, in line with the decline in aggregate employment.

The responses are not uniform across firms. Labour market institutions matter: firms more exposed to minimum wages or weaker collective bargaining coverage adjust employment expectations more strongly. In addition, financially constrained firms and firms with restricted credit access revise

their employment expectations more strongly, which points to a financial accelerator that operates at the planning stage — firms facing financial difficulties do not just end up cutting more jobs ex post, they already form more pessimistic hiring intentions immediately after a policy shock. This is distinct from existing evidence on the financial accelerator, which has focused on realised employment or investment outcomes. These patterns show that policy transmission depends on firm-specific (financial) conditions and labour market regulations.

The results show that monetary policy shapes firms' employment plans in ways that are distinct from its effects on production. Because employment adjusts more slowly than output, monetary policy impacts labour market aggregates — employment, labour market tightness, and wage pressures — in the euro area with considerable delay. Monitoring firms' employment expectations can therefore give a timely read on whether monetary policy is transmitting to the labour market as usual, well before aggregate statistics reveal it. The findings also highlight that aggregate labour market data can hide important differences across firms.

Overall, the paper shows that monetary policy has persistent and meaningful effects on labour market expectations and actual employment. Labour market responses are shaped by forward-looking firm decisions, financial constraints, and institutional frictions, so employment does not mechanically follow output.

1 Introduction

How does monetary policy affect the labour market? In standard macroeconomic models, employment is largely a by-product of output fluctuations: contractionary policy reduces aggregate demand, firms scale back production, and employment declines proportionally. This view, however, relies on strong assumptions – most notably that hiring and separation decisions are symmetric and that labour adjusts to changes in production without frictions. In practice, labour markets are shaped by adjustment costs, expectations, and institutional constraints such as employment protection legislation, collective bargaining, and minimum wages. Those may generate responses to monetary policy that differ from output in their timing, composition, and persistence. A central implication is that employment depends on forward-looking firm decisions. Before adjusting hiring or layoffs, firms must revise their expectations about future economic conditions and policies. Firms' employment expectations therefore offer an early and direct read on how monetary policy reaches the labour market. Yet, despite a growing literature on the effects of monetary policy on output and inflation expectations (Bottone and Rosolia, 2019; Enders et al., 2019; Di Pace et al., 2025), evidence on how central bank announcements shape firms' employment expectations, and how these expectations translate into realised employment, remains limited. This gap is particularly pronounced at the micro level, where firm-specific belief formation ultimately drives aggregate labour market dynamics.

This paper asks how firms' employment expectations help us understand the transmission of monetary policy to the labour market. We focus on three questions. First, *when and by how much* do firms adjust their expectations about their future number of employees following a monetary policy surprise? Second, do these revisions in expectations *feed into realised employment*? Third, do employment expectations react *differently from production expectations*, and if so, through which transmission channels, with particular emphasis on the labour market?

To answer these questions, we exploit the unique features of the German ifo Business Survey, which follows roughly the same 9,000 firms every month across industry and service sectors from 2005 to 2024. The survey's rare combination of monthly expectation measures and a long-running

firm-level panel allows us to study the formation and revision of expectations at an unprecedented frequency. We combine these data with exogenous high-frequency monetary policy surprises around ECB announcements and exploit the exact survey response dates to identify the causal immediate effect of monetary policy on firms' expectations. Specifically, our identification strategy compares firms that completed the survey immediately before an ECB announcement with otherwise similar firms that responded immediately afterwards, generating quasi-random variation in exposure to monetary policy news. We then exploit the panel structure of the survey to estimate firm-level local projections, tracing the dynamic adjustment of expectations over the subsequent two years. Thereby, we can assess whether central banks can influence employment only indirectly via changes in demand or also via changes in expectations.

Our findings decisively reject the view that the employment response is a scaled replica of the production response. Firms revise their employment expectations downward immediately and significantly following a contractionary monetary policy surprise. The net balance of hiring intentions[1] deteriorates by around 13 percentage points in response to a 25 basis point surprise in the policy rate. The dynamic analysis reveals that the effect peaks about one month after the shock and persists at roughly this level for approximately one year before gradually fading. By contrast, firms are twice as likely to adjust their production expectations on impact, but the negative effect reverts to zero within six months. This points to substantial labour market rigidities rooted in employment protection legislation, notice periods, and firms' reluctance to shed workers amid persistent skilled labour shortages (Groiss and Sondermann, 2025), among others. To understand the relatively strong immediate effect in employment expectations, it is important to distinguish between plans to hire fewer people and plans to increase layoffs. The immediate effect is dominated by the reduction in plans to increase the workforce, in line with the fact that hiring is the more flexible component. Thereafter, layoff intentions grow in importance and eventually dominate.

The observed shifts in expectations translate into real outcomes as contractionary shocks are associated with economically significant declines in firm-level employment growth within a year. This highlights the role of firm expectations as a leading indicator for future development and the

[1] The difference between positive adjustments in employment expectations and negative adjustments

ability of central banks to influence labour market outcomes. We also find that the transmission channels generate substantial heterogeneity invisible in aggregate data. First, financially constrained firms and those facing restricted credit access react significantly more strongly, providing firm-level evidence that the financial accelerator operates in the labour market already at the expectation stage. While existing work has shown that constrained firms cut more jobs after monetary tightening (Bahaj et al., 2022; Singh et al., 2023), our results show that this differential response originates in how firms form their hiring plans, closing the gap between monetary policy announcements and actual employment changes. Moreover, we measure financial constraints directly through firms' self-reported financial difficulties and credit access conditions, rather than relying on balance-sheet proxies such as leverage or firm size.

Second, we observe a significant influence of trade unions and the introduction of the minimum wage on employment expectations. The weaker the sectoral coverage of collective bargaining agreements, the greater the impact of monetary policy on employment. This suggests that the aim of trade unions is not only to raise wages, but also to protect jobs. Firms affected by the minimum wage and experiencing downward wage rigidity also adjust their employment expectations more strongly in response to a monetary shock. Interestingly, the expectation responses do not differ according to firm size or age, despite the fact that large firms are less dependent on bank funding and face stricter employment regulation.

The findings on employment expectations are consistent with models incorporating Bayesian learning, in which firms immediately and systematically adjust their expectations in response to new information. They do so in the expected direction even though actual employment may not change immediately. Moreover, they align with rational inattention models (e.g. Woodford, 2003; Maćkowiak and Wiederholt, 2009). Due to limited capacity for processing new information, the effect of monetary policy peaks with a slight delay before fading out after a couple of quarters, in line with our persistent results. According to rational inattention models, firms should pay more attention if their profits are affected more strongly. Hence, firms facing higher costs due to greater (financial) constraints or competition should pay more attention to central banks (Coibion et al., 2018). In line, firms' employment expectations respond more strongly among firms facing financial

difficulties or reporting excessive constraints. Finally, our results highlight the importance of labour market rigidities in New Keynesian models. The gap between the adjustment of production and employment expectations indicates hiring and firing costs, as well as difficulties in finding new and letting go existing employees. Lechthaler et al. (2010) demonstrate the relevance of labour adjustment costs in their New Keynesian model for deriving persistent unemployment effects from monetary policy shocks and a negative correlation between job creation and job destruction.

Our findings have important implications for monetary policy. Policymakers require timely evidence on how policy actions transmit through the economy, yet aggregate indicators become available only with considerable delay. We show that firms revise their employment plans almost immediately following monetary policy surprises, well before these adjustments appear in aggregate labour market statistics. Firm-level expectations therefore provide an early and informative indicator of monetary policy transmission. Our results also provide direct evidence on the expectations channel of monetary policy. Exogenous changes in firms' expectations translate into subsequent employment adjustments, demonstrating that policy can affect real economic outcomes by shaping firms' beliefs. Finally, employment expectations adjust more gradually but remain affected for longer than production expectations, implying that labour market responses to monetary tightening are more persistent than output responses.

Therefore, we conclude that monitoring firms' employment expectations helps to identify, in real time, whether the transmission of monetary policy to the labour market is "different this time", well before the adjustment becomes visible in aggregate labour market statistics, which policymakers otherwise observe only with considerable delay.

Related Literature. Our paper contributes to two strands of the literature. The first concerns the effects of monetary policy on firm expectations. While research on household expectations has expanded rapidly,[2] firm-level evidence remains thin. A long tradition of ifo-based expectation research stretches from Nerlove (1983) through Bachmann et al. (2013) to Enders et al. (2022). A recent overview on firm expectations is provided by Born et al. (2023). The paper closest to ours

[2]See D'Acunto et al. (2024) for a review on monetary policy and households' inflation expectations.

is Enders et al. (2019), who show that firms' price and production expectations respond to ECB announcements. We deviate in three directions: from the product market to the labour market, where institutional features generate fundamentally different dynamics; from immediate impact to the full dynamic path via local projections, revealing that employment expectation persistence far exceeds that of production; and by analysing the transmission of monetary policy on firm expectations via financial and labour market constraints. Bottone and Rosolia (2019), Ferrando et al. (2022), and Di Pace et al. (2025) provide complementary evidence on monetary policy effects on inflation expectations, credit access expectations, and price expectations, respectively.

In addition to extending the existing literature, our results challenge recent findings in two ways. First, whereas Di Pace et al. (2025) find that non-financial firms react to changes in the policy rate, but not to 'sophisticated' financial market surprises, we find the opposite. Changes in the policy rate contain anticipated adjustments and central bank information effects, resulting in non-significant effects. In contrast, exogenous pure monetary policy surprises result in significant and theory-consistent expectation responses from German firms. Second, Enders et al. (2019) only finds negative responses to production expectations for small monetary policy surprises, indicating the non-linearity of the effects. In contrast, we find that large (focal) policy surprises in particular lead to expectation adjustments. This difference may be due to the central bank information effects captured in their policy shock series. These opposing information effects are potentially largest in large surprises, as the authors themselves note.

The second strand analyses the interplay between monetary policy and the labour market. At the aggregate level, many studies document employment declines following contractionary shocks (e.g. Christiano and Eichenbaum, 1996; Altavilla and Ciccarelli, 2009), while Luck and Zimmermann (2020) report mixed evidence for unconventional policy. Francis et al. (2012) show policy heterogeneity across US cities, and relatedly de Groot et al. (2023) document a spatial dimension in the euro area: monetary tightening triggers persistent declines in employment and labour productivity in poorer regions, suggesting hysteresis in labour market adjustment that mirrors the persistence we document in firms' hiring plans. Moreover, the sectoral composition of the economy influences the strength of monetary transmission to output (Hauptmeier et al., 2025). On distributional con-

sequences, Coglianese et al. (2025) show that monetary tightening raises unemployment and labour market inequality in Sweden — resonating with our finding that the layoff margin eventually dominates. Groiss (2023) highlights the job creation channel in shaping wage inequality in Germany, a mechanism our hiring-margin results corroborate at the firm level. Closest to us in using firm-level data are Bahaj et al. (2022) and Singh et al. (2023), who show that firm characteristics shape employment effects of monetary policy in the UK and US, respectively. We extend this work by shifting from realised employment to employment expectations, distinguishing between hiring and layoff intentions, covering all major sectors, and identifying the specific roles of financial constraints, credit access, trade union coverage, and minimum wage in ECB monetary policy transmission.

The paper is structured as follows. Section 2 presents the data and the construction of high-frequency monetary policy shocks. Section 3 introduces the methodological framework and analyses firm-level employment expectations — their immediate response, dynamic adjustment, and link to actual outcomes. Section 4 explores the transmission of monetary policy through financial constraints and labour market rigidities. Section 5 concludes.

2 Data

2.1 ifo Business Survey

Our analysis builds on the ifo Business Survey provided by the LMU-ifo Economics & Business Data Center (EBDC). The data has been available at a monthly frequency since 1980 for the manufacturing sector, with data for the other sectors becoming available subsequently.[3] Since 2005 all sectors are available, defining our sample period from 2005 to 2024. The survey has a broad coverage with about 9,000 responses per month and is representative within sector (Sauer et al., 2023).[4] Another advantage is the survey's monthly panel structure. Not only do we observe the same firms repeatedly, but the response rate is very high and the attrition rate low for a voluntary

[3] Industry (including manufacturing (IBS-IND, 2024) and construction (IBS-CON, 2024)), services (including trade (IBS-TRA, 2024) and other services (IBS-SERV, 2024)).

[4] To avoid oversampling of smaller sectors we weight the observations to bring them in line the with economy-wide employment share in the four sectors. Firms in agriculture, public services, finance, or healthcare are hardly or not covered by the survey.

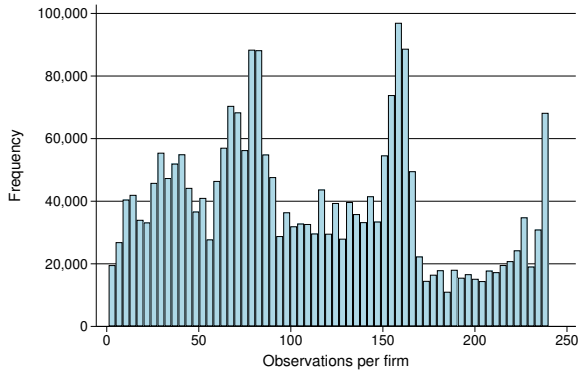
survey, mainly answered by CEOs and board members (Link, 2020). To avoid inconsistencies across sectors, we drop firms' additional answers, when they respond multiple times per month due to several products covered by the survey.[5] We then refer to our observations as "firm-specific". Our cleaned sample includes over two million firm-month observations, with the average firm responding over 100 times within our 20 year period (see Figure 1a).

The data contain a broad range of questions regarding firm characteristics and firms' current operations, including qualitative questions on expectations. We are especially interested in the response to employment expectations over the next 3 months.

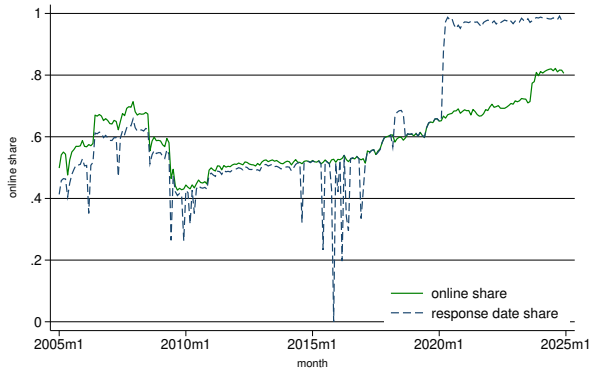
Q: Plans and Expectations for the next 3 months: The number of employees will be [1] increasing, [0] not changing, [-1] decreasing.

Figure 1: ifo survey - sample characteristics

a) Number of observations per firm



b) Online response and response date share



Notes: Descriptive statistics based on the ifo Business Survey. Panel a) shows the number of firms with a specific number of survey responses. Panel b) shows the share of firms that responded online and the share of firms for which the response date is available.

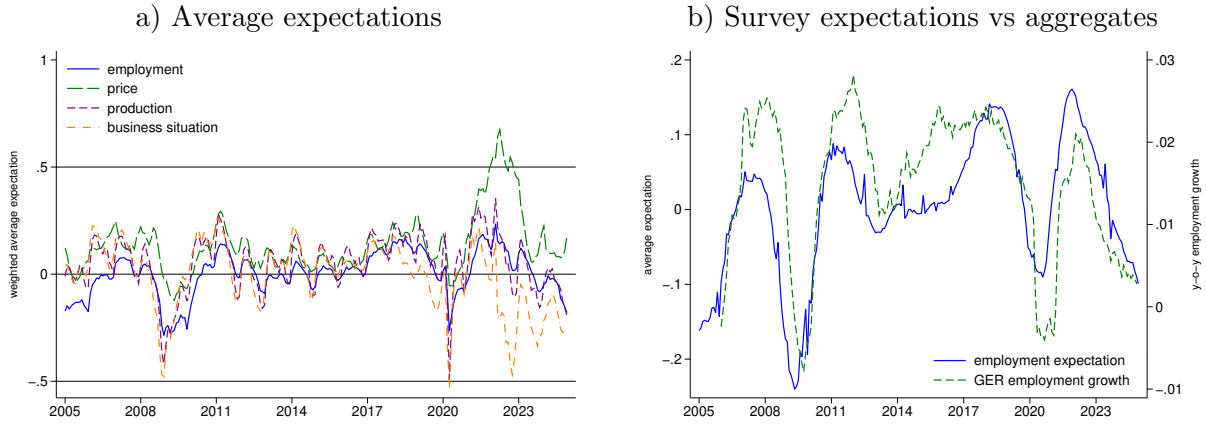
For the identification of the immediate expectation response to monetary policy announcements, we exploit the participation date of the survey, which is available since 2004 for online survey participants and since 2020 for nearly all firms. The share of covered firms has steadily increased as shown in Figure 1b, but it is only a sub-sample of observed firms. The firms in the offline and online

[5]This refers to less than 10% of industry observations and to some trade firms before 2006. Moreover, within firm-month answers are strongly correlated (Link, 2020).

sample are, however, comparable and the expectations are very similar as shown in the Appendix (Table A.2).

Figure 2a compares the development of the average employment expectations to the average production expectations, showing that they co-move, but are clearly not identical. Employment expectations are less seasonal and cyclical than production plans. Panel b) links the average firm-specific employment expectations (seasonally adjusted) to the annual growth rate in aggregate employment, indicating a close relationship and the leading information contained in our expectation variable.[6] Besides employment expectations, we also use other variables like production expectations or the past business situation, which are also qualitative questions. The exact wording of the questions changes slightly over time and across surveys, but is comparable, also due to the ordinal answers. For details on the translated questions used in our analysis, see the Table A.1.[7]

Figure 2: Employment expectations



Notes: Descriptive statistics based on the ifo Business Survey. Panel a) shows the average expectation (= saldo) regarding changes in employment, prices, production and the business situation over time. Panel b) compares the average employment expectation in the survey (seasonal adjusted) to the annual employment growth in Germany.

[6]The correlation between average employment expectations from the ifo survey and German year-on-year employment growth is 0.652. The correlation between average production expectations and year-on-year real GDP growth is 0.747.

[7]In accordance with the diverse sectors covered, the term 'production' is defined in a broad sense, encompassing the construction of dwellings, the execution of trades, and the provision of services.

2.2 High-frequency monetary policy shocks

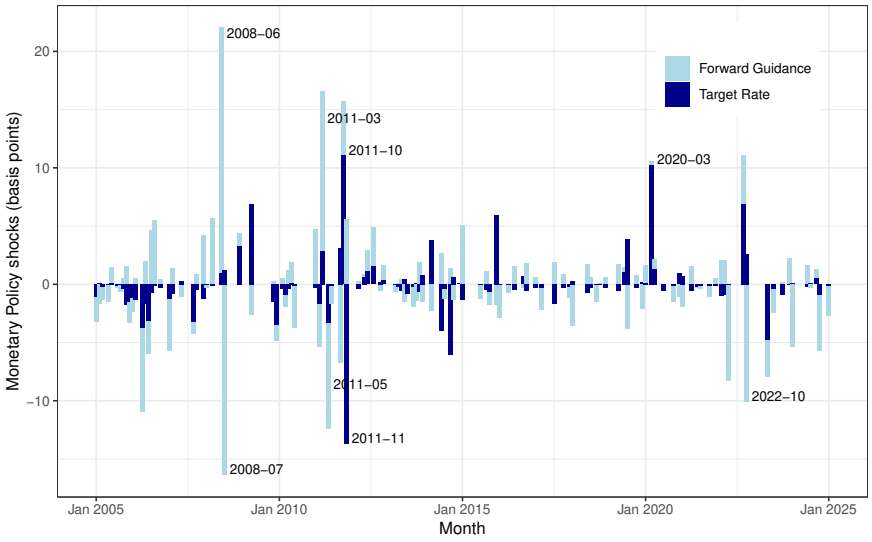
It is well known that the analysis of the effects of monetary policy is subject to endogeneity. Not only does monetary policy affect the labour market, but labour market dynamics also affect monetary policy decisions. Moreover, omitted variables affecting both monetary policy changes and the outcome variables could bias estimation results. Therefore, we follow the literature on high-frequency monetary policy shocks, which capture unexpected changes in monetary policy.

We use the high-frequency financial market data of the Euro Area Monetary Policy Event-Study Database provided by Altavilla et al. (2019). It captures the changes in the Overnight Index Swap (OIS) rates and other financial indicators in a three hour window around monetary policy announcements of the ECB. The Governing Council meets every four (2002-2014) or six weeks (since 2015) to discuss the current stance of monetary policy in the euro area, and presents the decisions on Thursday afternoon by posting a press release and holding a press conference. The reasonable identification assumption is that new information arriving within the narrow window does not influence the Council's decision and does not coincide with other relevant shocks systematically. Thus, it allows for an exogenous interpretation of the shocks. We test the exogeneity by checking the autocorrelation of the policy shocks and whether other shocks affect monetary policy surprises in a significant and meaningful way (Bauer and Swanson, 2023), which is not the case for the euro area (see Table B.1). To account for remaining concerns, we exploit the quasi-random response days to the ifo survey in estimating the immediate expectation adjustments in the next section.

Following Altavilla et al. (2019), we account for the multiple monetary policy instruments available by using the changes in OIS rates at different maturities and applying a Principal Component Analysis (PCA). For our analysis, we use the first two components representing Target Rate and Forward Guidance (FG) shocks to distinguish between conventional and unconventional monetary policy. Moreover, we control for information effects by applying the poor man's sign restriction, setting surprises to zero if the 3-month OIS rate and the EUROSTOXX50 move in the same direction within the observation window (Jarociński and Karadi, 2020). Thereby, we exclude policy announcements that predominantly contain new information about the state of the economy and

not about monetary policy itself.[8] Figure 3 depicts the monetary surprises for our sample period.

Figure 3: High-frequency monetary policy shocks



Notes: This figure plots the monthly monetary policy surprise series from January 2005 up to December 2024. The Target Rate (light blue) and FG (dark blue) shocks are identified as the first two principal components using changes in OIS rates in a narrow window around ECB monetary decision announcements. The surprises are normalised so that a Target shock has unit effect on the 1-month OIS rate, the FG has a unit effect on the 2-year OIS rate.

3 Employment expectation responses

3.1 Immediate firm responses

As suggested by the financial market theory, new information on monetary policy should result in immediate asset price adjustments due to altered expectations (Altavilla et al., 2019). Also the recent literature on price and production expectations shows adjustments within days. Therefore, monthly aggregates are not suitable for assessing immediate responses, especially since the ECB's policy announcements occur on different days of the month.

To isolate the immediate effect of a monetary policy announcement, we follow the approach by Lamla and Vinogradov (2019) and Enders et al. (2019) who consider expectation responses centred

[8] Using the monetary policy shocks by Jarociński and Karadi (2020), applying sign restrictions to control for information effects, lead to similar results as shown in Section 3.

around a small window around announcements. We focus on a narrow four-working-day window as our baseline in line with the previous literature. As all ECB announcements occur on Thursdays, and because firms rarely submit responses over the weekend (see Figure B.1), we classify answers received between Friday and Monday following the announcement as being exposed to the high-frequency policy shock. We then compare these firms with those that responded within the two working days preceding the announcement, leaving the responses on the announcement day aside. Restricting attention to this short window does not only identify the immediate expectation adjustment, but reduces the likelihood that firms' expectations are influenced by other macroeconomic developments. We assume that the timing of a firm's response is unrelated to the announcement itself, which is supported by the similar expectation distribution of treated and untreated firms (see Table A.2). Thereby, we also address any remaining concerns that the high-frequency monetary policy shocks might not be entirely exogenous. Our sample spans January 2005 to December 2024 and includes 200 monetary policy events, defined as ECB Governing Council meetings accompanied by a press release and press conference.[9]

For the analysis of the immediate monetary policy effects, we regress employment (or production) expectations on policy surprises that occurred during announcement events. Given our identification approach, the following regression allows for a causal interpretation:

$$y_{i,t} = \alpha_i + \alpha_t + \beta_1 D_{i,t} + \beta_2 D_{i,t}\varepsilon_t^p + \gamma y_{i,t-1} + \Gamma X_{i,t-1} + u_{i,t}, \tag{1}$$

where $y_{i,t}$ represents the ordinal expectations over the next three months of firm i at time t. $D_{i,t}$ is the announcement dummy, which equals one if the survey was answered post-announcement and hence the firm was treated with new information. Including the lagged dependent variable $y_{i,t-1}$ controls for the serial correlation. $X_{i,t-1}$ contains firm-specific lagged control variables. In the baseline regression we include the first lag of the expected business situation. α_i represents firm fixed effects to control for time-invariant firm characteristics, and α_t represents time fixed effects. As time fixed effects capture macroeconomic dynamics that affect all firms, they also controls for

[9]For 151 of these events, both the pre and post announcement window contain firm responses. The remaining events occur too close to the beginning or end of the month, where the number of survey responses is usually low (see Figure B.1). The results are robust dropping policy meetings with partially empty windows.

monetary policy changes at a monthly frequency.[10] However, here we are interested in the difference between firms not (yet) affected by monetary policy and those who respond after the announcement, and hence are affected, captured by β_2. ε_t^p represents our Target Rate shock or another monetary policy shock.

Table 1 presents our baseline results on the immediate expectation responses of firms to monetary policy surprises. Column (1) shows that a 25 basis point surprise increase in the Target Rate leads to a statistically significant reduction in employment expectations of 0.13. In particular, following monetary tightening, 13% more firms reduce their employment expectations than increase them. This corresponds to a meaningful deterioration in the balance between firms planning to hire and those planning to reduce their workforce, given that on average 14% of firms revise their employment expectations relative to the previous month.[11] This negative and immediate response is robust to various changes in the specification as shown in Section 3.5. Note that a monetary policy surprise of 25 bp would be a significant shock compared to the standard deviation of the Target Shock series, which is 2.4 bp. However, we aim to facilitate the comparison with the existing literature, which often uses this scale.

For a more intuitive interpretation and to link the results to a broader literature, we split the effects into positive expectations (vs unchanged or declining employment), and negative expectations (vs unchanged or increasing employment). By creating two distinct dummy variables and replacing them as our dependent variable in the regression, columns (2) and (3) in Table 1 decompose the employment expectation response into its two margins: fewer firms plan to hire (reduction in positive expectations) and more firms plan to reduce their workforce (increase in negative expectations). Both margins contribute to the overall decline documented in column (1), but three quarters stem from the reduction in new hiring plans over the three-month horizon and only one quarter stems from plans of more layoffs. As expected, it is easier to stop looking for new employees than letting

[10] In our setting, time fixed effects are equivalent to policy-meeting fixed effects, since there was at most one policy meeting per month during the sample period.

[11] The mean of employment expectations is 0.02 and the standard deviation 0.54. The range of the coefficient is bounded by -2 and +2. In the extreme case, where all firms plan to increase their workforce (1) and switch to reduce it (-1) after a 25 bp policy shock, the coefficient would be -2 for a specific event.

people go within the next three month, given the presence of employment protection.[12]

Table 1: Immediate expectation responses

	employment expectation			production expectation		
	total	increase	decrease	total	increase	decrease
	(1)	(2)	(3)	(4)	(5)	(6)
TR shock × post	-0.1280***	-0.0943***	0.0296***	-0.2903***	-0.0836***	0.2046***
	(0.0120)	(0.0082)	(0.0083)	(0.0162)	(0.0099)	(0.0112)
Post dummy	0.0003	-0.0014*	-0.0014**	-0.0138***	-0.0044***	0.0096***
	(0.0010)	(0.0007)	(0.0007)	(0.0013)	(0.0009)	(0.0008)
Exp employment (t-1)	0.4766***	0.4118***	0.4858***			
	(0.0012)	(0.0016)	(0.0016)			
Exp production (t-1)				0.3468***	0.3140***	0.3320***
				(0.0013)	(0.0013)	(0.0015)
Exp business situation (t-1)	0.0576***	0.0312***	-0.0320***	0.1520***	0.0874***	-0.0752***
	(0.0008)	(0.0005)	(0.0006)	(0.0012)	(0.0008)	(0.0007)
Constant	0.0067***	0.0852***	0.0675***	0.0520***	0.1612***	0.1038***
	(0.0006)	(0.0005)	(0.0004)	(0.0008)	(0.0006)	(0.0005)
Firm FE	yes	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes	yes
Observations	209,399	209,399	209,399	209,799	209,799	209,799
R^2	0.5198	0.4800	0.4769	0.4481	0.4149	0.3910
Number of Meetings	200	200	200	200	200	200

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on employment and production expectations. Heteroskedasticity robust standard errors in the parenthesis. TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001.

Turning to production expectations, column (4) reveals a notably larger immediate response. A 25 basis point Target Rate surprise reduces production expectations by 0.29 in the baseline specification and even more when additional controls are added (see Table D.3). Because both expectation series are ordinal, the coefficients measure the net *share* of firms revising their plans, not the cardinal size of the revision, and are therefore best compared through the likelihood of adjustment. On that basis the gap is pronounced: nearly twice as many firms adjust their production expectations rather than their employment expectations directly after a monetary policy announcement. This pattern is consistent with the notion that labour markets are characterised by greater rigidities than product markets. Those could include adjustment costs associated with hiring and firing, related to the stringency of employment protection legislation, and firm-specific human capital formation. This contrast does not stem from the two variables being measured on different scales. Their cross-firm

[12] According to a cross-equation Wald test following a joint estimation, the absolute effect sizes of columns (2) and (3) in Table 1 are statistically different (p-value: 0.0005).

means and standard deviations are very similar, so standardising both leaves the gap essentially unchanged: a 25 bp surprise lowers standardised production expectations by 0.48, against 0.25 for employment (columns (4) and (5) of Table D.1), again a ratio close to two.

The finding also aligns with the observation of labour hoarding. Using an indicator that identifies labour hoarding as dependent variable, i.e. a dummy that is one if production expectations are negative but employment expectations are positive (or neutral), we find a significantly positive response to a monetary surprise (see Table D.1). This is in line with the gap observed between employment and production expectations, and shows that this gap is statistically significant when the production and employment expectations of the same firm are compared.

The decomposition of the trichotomous variable in columns (5) and (6) shows that most of the reduction in production expectations stems from an increase in negative expectations. In contrast to employment expectations, the dominant immediate strategy of firms is not to reduce their expansionary plans, but to reduce existing production following a contractionary monetary policy shock. This shows that firms find it easier to reduce production than employment. Furthermore, if demand drops, firms offering non-storable goods or services might be forced to reduce their activities.

Across all specifications, the post dummy — which captures any systematic difference between firms responding before and after an announcement irrespective of the shock size — is economically small and varies in sign, supporting the identifying assumption that the timing of survey responses is unrelated to the content of the announcement. The lagged dependent variables enter with large and significant coefficients, reflecting the autocorrelation in firm-level expectations.

So far, our findings are based on dependent variables with two or three possible outcomes. Consequently, they primarily capture the binary extensive margin of firms' employment responses, i.e. whether they plan to hire or make employees redundant, rather than how many. However, the results are also informative for actual realisations of employment, as demonstrated in Section 3.3, and are closely related to the magnitude of planned changes in the workforce. This is due to the relatively short forecast horizon of three months and the significant proportion of small firms in Germany and the ifo survey. Consequently, the majority of firms that plan to hire or fire intend to

recruit or dismiss one person. Although a quantitative variable on hiring/layoff expectations has only been available since 2023, it helps to assess the intensive margin. The median firm expects to hire one new employee, with even the 90th percentile only hiring seven (see Table A.4). To improve fitting to the intensive margin, we apply size weights from the ifo survey in our regressions, resulting in more hiring by larger firms. Figure 2b shows the relationship between weighted average employment expectations and aggregate employment growth in Germany, and illustrates the close fit to the actual dynamics.

3.2 Dynamic responses of firm expectations

In order to analyse the extent to which monetary policy affects firms' expectations beyond the immediate adjustment, we estimate firm-level panel local projections. This is important because there may be a delay in forming expectations or beliefs may persist, both of which are important for understanding how monetary policy is transmitted. By analysing expectation dynamics at firm level, we go beyond the aggregate analysis of previous studies. High-frequency monetary policy shocks enable us to present causal evidence of monetary policy changes. However, we have to deviate from the immediate response specification by not controlling for time fixed effects. At the same time, our sample size increases nearly ten times as we can include all firms, not just those responding within a 4-day window.

We estimate the following panel local projection equation to derive IRFs:

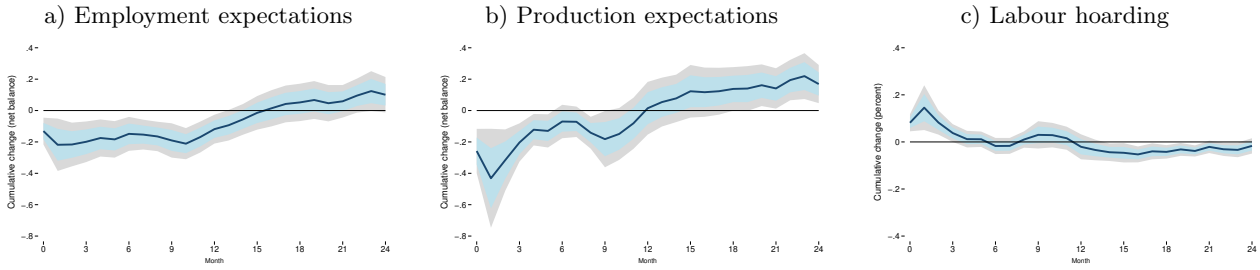
$$y_{i,t+h} = \alpha_{i,h} + \beta_h^p \varepsilon_t^p + \sum_{s=1}^{s=3} \gamma_h y_{i,t-s} + \Gamma_h Z_{i,t-1} + u_{i,t}, \quad h = 0, ..., 24 \tag{2}$$

where $y_{i,t}$ represents the employment or production expectation of firm i at time t. We control for up to three lags of the dependent variable as it captures the expectations three months ahead, which induces a time overlap when analysing responses at the monthly frequency and serial correlation. Further, we control for lagged monetary policy shocks by $Z_{i,t-1}$ to improve exogeneity and efficiency of the estimation. We also include calendar-month fixed effects to account for seasonality. While we cannot control for time fixed effects in this setting, as it would absorb the monetary policy effects,

we can still control for firm fixed effects to control for unobserved heterogeneity across firms, α_i.[13] β_h^p is the coefficient of interest capturing the expectation responses to a contractionary Target Rate shock.

Figure 4 displays the dynamic responses of firm-specific expectations estimated via panel local projections. As in the previous sub-section, it captures the change in the net balance between firms that plan to increase their workforce and those which want to decrease it. The responses are surrounded by the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.[14] The left panel shows that employment expectations decline significantly following a 25 bp Target Rate shock. The immediate impact is already significantly negative, and similar to our immediate response specification. This points to the consistency of the two approaches and the exogeneity of the monetary policy shocks. The peak effect of approximately -0.21 is reached only one month after the shock. Importantly, the effect remains at this level for roughly twelve months before a gradual reversal sets in, pointing to a high degree of persistence in firms' hiring plans. This persistence is consistent with labour market frictions — including notice periods, employment protection, and time to restructure workforces — that prevent firms from adjusting employment as swiftly as production.

Figure 4: Dynamic expectation responses



Notes: This figure shows the impulse responses of firm-specific employment expectation (left), production expectations (middle) and the likelihood of labour hoarding to a 25 bp Target Rate shock. The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

[13] Including the lagged dependent variable and firm fixed effects might result in biased estimates according to Nickell (1981). The alternative bias-corrected split-panel jackknife estimator mostly falls within the confidence bands of our baseline estimates, see Figure D.1, showing the robustness of our findings.

[14] Using Driscoll and Kraay (1998) standard errors instead results in equally significant impulse responses, see Figure D.2.

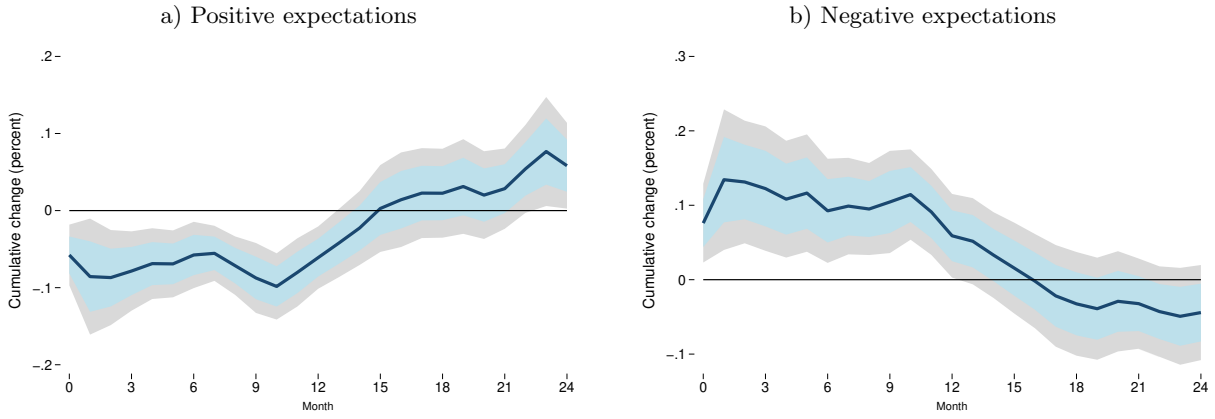
The middle panel of Figure 4 shows the response of production expectations. In stark contrast to employment, firms are more likely to adjust their production expectations, with a peak effect of -0.43 at the one-month horizon. However, the reversal is substantially faster: the effect is no longer statistically different from zero after about six months. Beyond that horizon the response does not remain at zero but turns positive at longer horizons, overshooting its pre-shock level, so that employment and production expectations differ not only in the *likelihood* of their initial reaction but in the *speed* with which production expectations reverse and rebound.

This divergence between the two types of expectations is confirmed when we use our labour hoarding indicator, as defined in the previous section, in equation (2). The likelihood to observe a firm that reduces its production expectations, while having stable or positive employment expectations, increases significantly in the short-run and gets significantly negative after a year (Figure 4 c). It suggests that monetary policy operates through distinct channels in the product and labour markets, with the latter exhibiting considerably more inertia. The labour market institutions in Germany, including statutory employment protection, the minimum wage, and the prevalence of works councils, are likely to explain this differential persistence. Moreover, firms' reluctance to shed workers in the face of persistent skilled labour shortages since the global financial crisis (Groiss and Sondermann, 2025) may further dampen the speed of adjustment in employment expectations.

Figure 5 decomposes the employment expectation response into its two margins. Both margins contribute to the overall decline documented in Figure 4. Panel (a) shows that positive employment expectations decline by up to 10 percent over the first twelve months, indicating that a meaningful share of firms withdraws previously planned hiring. Panel (b) reveals an increase in negative expectations of up to 15 percent. Both effects are statistically significant and persistent, indicating that contractionary monetary policy suppresses job creation and promotes job destruction simultaneously. This two-margin decomposition is informative for understanding the welfare implications of monetary tightening: while reduced hiring slows the flow of workers into employment, increased layoff intentions raise separations. The importance of the layoff margin echoes findings by Coglianese et al. (2025) on the distributional consequences of monetary policy for the labour market. The reduction in production expectation also results from both dimensions, with the increase in negative

expectations being twice as common as the decline in positive expectations (Figure D.5).

Figure 5: Less hiring versus more layoffs



Notes: This figure shows the responses of firm-specific positive employment expectations (left) and negative employment expectations (negative) to a 25 basis point Target Rate shock. The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

3.3 Transmission to actual employment

While we want to know how monetary policy affects employment expectations in the first place, eventually the realised employment changes matter. The ifo survey does not ask for the number of employees of each firm in each month, but once a year. Therefore, the ifo forwards this information until the firm provides a new number of employees, at most 11 months ahead. Based on this monthly variable, we calculate the year-on-year growth rate. We use this information as dependent variable in equation (2) to approximate whether exogenous changes in monetary policy affect employment similar to employment expectations.

Table 2 links our findings on employment expectations to actual employment outcomes. A 25 basis point contractionary Target Rate shock is associated with a reduction in 12-month ahead firm-level employment of between 0.60 and 1.42 percent. Given the average annual firm-level employment growth of 0.41%, this represents an economically meaningful impact. Importantly, the direction and significance of the effect are consistent with the dynamic employment expectations in Figure 4 and

the aggregate employment decline in Figure 6. It also aligns with the findings of Bahaj et al. (2022), showing that a tightening in the 5-year interest rate reduces firms' employment significantly after a year in the UK. This confirms that contractionary monetary policy has tangible consequences for firm-level labour demand and that the observed reduction in employment expectations of 0.21 after one month is partly realised in the form of lower employment after a year.[15]

Table 2: Employment growth response

	year-ahead employment growth			
	(1)	(2)	(3)	(4)
TR shock	-1.4200***	-0.5973***	-0.2636	-1.7360***
	(0.4055)	(0.0821)	(0.2405)	(0.3649)
Declining employment expectations (t-1)	-0.6123***	-0.3672***		
	(0.2237)	(0.0240)		
Increasing employment expectations (t-1)	0.3847***	0.2135***		
	(0.1480)	(0.0249)		
Employment growth (t-1)	0.8932***	0.9541***	0.8888***	0.9196***
	(0.0289)	(0.0028)	(0.0086)	(0.0061)
Employment growth (t-2)	0.0196	-0.0083***	0.0108	-0.0078
	(0.0248)	(0.0028)	(0.0081)	(0.0070)
Employment growth (t-3)	-0.0615***	-0.0568***	-0.0485***	-0.0361***
	(0.0117)	(0.0019)	(0.0082)	(0.0042)
Lagged policy shocks	yes	yes	yes	yes
Firm and calendar month FE	yes	yes	yes	yes
Observations	1,199,955	1,109,829	124,973	113,457
R^2	0.8169	0.8538	0.8391	0.8682
Number of Meetings	200	200	200	200

Notes: OLS regressions showing the monetary policy effect on 12-month employment growth. Firm cluster robust standard errors in the parenthesis. TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001.

We provide a range of estimates instead of a specific estimate, as the estimates should be interpreted with caution. The firm-level employment variable is mostly reported at an annual frequency and forwarded across months by the ifo institute, which introduces measurement noise. To capture the induced serial correlation within firms' observations, we control for lagged employment growth and estimate firm cluster robust standard errors. Column (1) reports the estimates using the same sample and specification as for the local projections. This includes three lags of employment

[15] Given that the net balance deteriorates by 0.21, at least 21% of firms will have to revise their expectations downwards (if none revise them upwards). Assuming that each of these firms plans to reduce its workforce by one employee (see A.4) and that there are around 3.4 million firms in Germany, this would result in the loss of 0.71 million jobs. Compared to the total number of employees in Germany in 2024 (42 million), this would represent a 1.7% reduction in employment, similar to the aggregate employment responses in Figure 6.

growth and three lags of monetary policy shocks, as well as fixed effects. As these estimates may be influenced by outliers or incorrect data, which is not relevant in regressions with ordinal dependent variables, column (2) provides estimates that exclude the top and bottom 3% of employment growth observations.

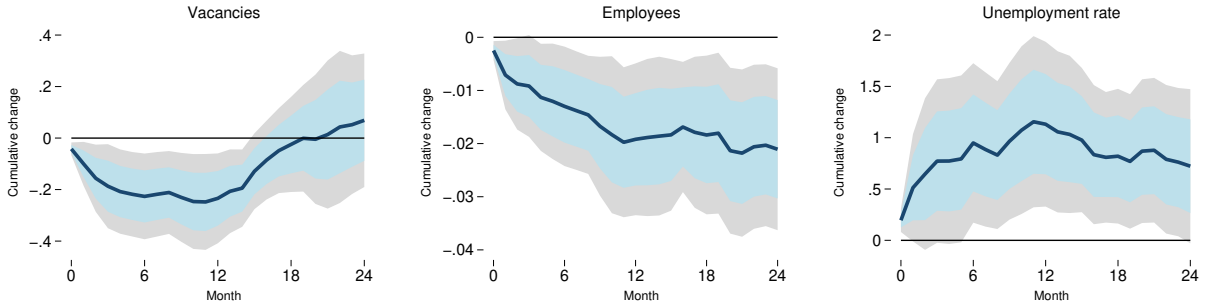
To understand the relationship between a firm's employment expectation and actual employment growth, we also control for employment expectation in the column (1) and (2). While we cannot assess the transmission from expectation to realised employment exactly due to the ordinal expectation variable, we still find a statistically significant and economically meaningful impact. Firms that expect declining employment (prior to the monetary policy shock), are more likely to realise low or negative employment growth, while positive expectations lead to higher employment growth. The role of expectations also matter for monetary policy transmission. In columns (3) and (4) we split the sample and evaluate the impact of a Target Rate shock on realised employment growth for firms with positive employment expectations (3) and negative employment expectations (4) prior to the policy surprise. The impact of a contractionary monetary policy shock is small and statistically not significant, when looking at firms with positive employment expectations. In contrast, firms that are pessimistic regarding their workforce react forcefully in reducing their employees, driving the negative coefficient of the overall sample in column (2).

Finally, we want to understand the effect of monetary policy on total economy employment. To this end, we employ seasonally adjusted aggregate indicators such as vacancies, employment and the unemployment rate for Germany[16] within our local projection framework, in order to estimate the impact of a 25 basis point increase in the Target Rate. The necessary adjustments for the aggregate analysis are explained in Appendix C. In line with theory and our firm-level responses, Figure 6 shows that the number of registered vacancies declines immediately and significantly following a contractionary policy shock, remaining subdued for a year. Figure 4 shows that the net balance of firms' employment expectations deteriorates by around 20% at its trough within the first year, consistent with the decline in the aggregate number of vacancies. This is reflected in employment subject to social security, which declines by 2% after twelve months and remains negative for

[16]The monthly aggregate indicators are derived from the Bundesbank time-series database.

longer. Fewer vacancies and a smaller workforce are reflected in the rising unemployment rate, which becomes statistically significant with a slight delay and peaks after twelve months.

Figure 6: Aggregate labour market responses



Notes: This figure shows the impulse responses of aggregate labour market indicators to a 25 basis point Target Rate shock. It depicts the relative cumulative growth in percent over the period 2005-2024 (change in unemployment rate in percentage points). The shaded areas depict the 68% and 90% confidence bands, based on Newey-West standard errors.

3.4 Non-linearity and information effects

Monetary policy announcements were found to convey information effects besides actual monetary policy effects (Jarociński and Karadi, 2020), and that these monetary policy effects are non-linear and asymmetric (Tenreyro and Thwaites, 2016). Furthermore, central banks relied on new measures such as forward guidance during the last decade. By communicating the future path of monetary policy instruments, central banks aim to influence firms' and households' expectations. Therefore, we evaluate potential heterogeneity in the effects of monetary policy on employment expectations in Table 3.

Enders et al. (2019) find strong non-linear effects of monetary policy on production expectations of German firms. Therefore, we follow their approach and extend equation (1) by the interaction of cubic target rate shocks with our post-announcement dummy. As shown in column (1) of Table 3, the simple target rate shock interaction stays negative, but is not statistically significant. However, the large shocks, captured by the cubic target rate shocks, have strong and statistically significant

negative effects on employment expectations. This implies that the more focal large policy surprises are more relevant for the observed expectation adjustments than small surprises. This contrasts with the findings of Enders et al. (2019) who show a significantly positive cubic term, implying weaker or even positive effects of large policy surprises on (production) expectations. A crucial difference to their analysis is that our policy shocks are cleaned of central bank information effects. As argued by Enders et al. (2019), information effects are likely to get larger with the size of the shock and thereby reverse the observed effects. Therefore, controlling for these effects is crucial to understand the actual monetary policy effect.[17]

In order to understand the role of central bank information effects and to test the robustness of our monetary policy shocks, we use the surprise series provided by Jarociński and Karadi (2020). They use a Bayesian VAR with sign restrictions to decompose OIS rate changes between pure monetary policy effects and information effects, but not distinguishing between different policy instruments. In line with our baseline results, a 25 basis point increase in the pure policy shock leads to a significant reduction in employment expectations. The information effect component of the policy surprise has significantly positive effects, flipping the sign of the monetary policy effects, if not controlled for.

Column (3) compares positive (contractionary) Target Rate shocks in the baseline with negative (expansionary) Target Rate shocks to test for asymmetric effects. As expected, the contractionary monetary policy surprises lead to a decline in employment expectations, while the expansionary surprises lead to an increase which is however not statistically significant. The absolute effect is similar, but there is some indication for asymmetric effects on the immediate employment expectations. This difference is stronger for the response of production expectations (see Table D.2). In line with the literature on asymmetric monetary policy (e.g. Tenreyro and Thwaites, 2016), contractionary shocks have a strong negative effect on output, while expansionary shocks seem to be ineffective.

[17] Their different definition of the dependent variable — change in production expectations compared to the previous month — does not affect the results, since we control for lags in the respective expectations. We also find a highly significant negative coefficient for the effect of monetary policy on production expectations (see Table D.2, column (1)). Furthermore, comparing the largest 5% of positive and negative shocks with the smaller remaining shocks also shows stronger expectation adjustments to large shocks.

Table 3: Employment expectation responses - nonlinearity and information effects

	employment expectation				
	(1)	(2)	(3)	(4)	(5)
TR shock × post	-0.0433*				
	(0.0256)				
Cubic TR shock × post	-0.6554***				
	(0.1729)				
JK monetary shock × post		-0.1207***			
		(0.0271)			
JK info shock × post		0.3343***			
		(0.0338)			
Positive TR shock × post			-0.1537***		
			(0.0132)		
Negative TR shock × post			0.0665		
			(0.0423)		
Policy rate change × post				0.1357	
				(0.1439)	
FG shock × post					0.0120
					(0.0085)
Firm FE	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes
Observations	209,399	193,480	209,399	209,399	209,399
R^2	0.5198	0.4670	0.5198	0.5197	0.5197
Number of Meetings	200	188	200	200	200

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on employment expectations. Heteroskedasticity robust standard errors in the parenthesis. (1) cubic effects, (2) Jarociński and Karadi (2020) policy surprises, (3) asymmetric effects, (4) policy rate change, (5) forward guidance shocks. TR=Target Rate, FG=Forward Guidance, JK=Jarocinski/Karadi. * p<0.10, ** p<0.05, *** p<0.001.

Di Pace et al. (2025) compare different measures of monetary policy to test which indicator matters for British firms. They find that firms price expectations react to the actual policy rate change and narrative shocks, but not to 'sophisticated' high-frequency shocks arising at financial markets. Therefore, we run regressions on changes in the ECB's main refinancing operations rate in column (4). In contrast to Di Pace et al. (2025), we do not find statistically significant effects on firm expectations. The anticipation of policy rate changes and the information effects captured in the policy announcement seem to dominate among German firms. However, we find significant and theory-consistent responses to high-frequency monetary policy shocks, in line with other studies analysing realised firm-level employment (e.g. Bahaj et al., 2022), implying that even small firms react to financial market changes.

Finally, we also compare the effects of conventional monetary policy to a contractionary Forward Guidance shock. Reported in column (5), Forward Guidance displays a markedly different pattern. The effect on employment expectations is economically negligible and statistically insignificant (0.012). This finding aligns with the interpretation that Forward Guidance, by design, targets medium-term expectations and future economic conditions rather than prompting immediate adjustments in hiring plans. Given its focus on the medium-term development, FG might affect expectations more slowly than conventional monetary policy. Similarly, FG induces small and insignificant responses in production expectations (-0.015).

3.5 Robustness

Table 4 demonstrates the robustness of our baseline findings along several dimensions. First, we changed the treatment window from +/- 2 to +/- 4 working days. Column (1) shows that the estimation does not depend on the window size, since the coefficient is only slightly larger. Column (2) presents the expectation adjustment if we remove the largest positive and negative policy shocks from our sample. As the coefficient is nearly the same as in our baseline specification, the results are not driven by extraordinary events. Column (3) estimates the policy effects with additional control variables, such as six lags of the expectations on employment and the business situation, the current state of the business situation and the number of employees. The resulting coefficient of -0.1166 is nearly the same as before, although the sample size shrinks due to the additional controls. Finally, column (4) presents the unweighted specification, which yields a somewhat smaller coefficient than the baseline estimate but is still highly significant.

Columns (5) and (6) show the results from a multinomial logit regression. Given the categorical dependent variable with three possible outcomes, we test the robustness of our findings to a regression approach specifically designed for trichotomous variables. It decomposes the employment expectation response into its positive and negative components, mirroring the decomposition in Table 1, columns (2) and (3). A contractionary monetary policy shock significantly reduces the probability of increasing employment expectations and significantly increases the probability

Table 4: Employment expectation responses - Robustness

	employment expectation					
	(1)	(2)	(3)	(4)	(increase)	(decrease)
Target Rate shock × post	-0.1570***	-0.1281***	-0.1166***	-0.1003***	-0.7654***	0.7231***
	(0.0222)	(0.0122)	(0.0141)	(0.0303)	(0.1160)	(0.1112)
Further controls	no	no	yes	no	no	no
Firm FE	yes	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes	yes
Observations	341,792	209,399	117,371	209,399	209,399	209,399
R^2	0.4380	0.5198	0.5682	0.4655		
Number of Meetings	200	200	200	200	200	200

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on employment expectations. Heteroskedasticity robust standard errors in the parenthesis. Further controls include five additional lags in the respective expectation variable, current state of the business and number of employees (in log). (1) +/- 4 working day window, (2) set largest +/- shock to zero, (3) extra controls, (4) not weighted by firm-size, (5) multinomial logit: increasing workforce (vs unchanged), (6) multinomial logit: decreasing workforce (vs unchanged). TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001.

of decreasing employment expectations, in line with the OLS estimates. The monetary effects on production expectations are similarly robust, as summarised in Table D.3.

The dynamic results are also robust to adjustments to the specification. To test for potential bias, as described in Nickell (1981), when including firm fixed effects and the lagged dependent variable, we estimate a split-panel jackknife estimator. Using this bias-corrected estimator produces similar, albeit more volatile, IRFs (see Figure D.1). The qualitative conclusion of a weaker but more persistent employment expectations response remain valid. Similarly, replacing our poor man's sign restricted Target Rate shock with pure monetary policy shocks by Jarociński and Karadi (2020) leads to dynamics that are closely aligned with our baseline results (see Figure D.3). Finally, we assess the role of the 3-month horizon in the expectation questions on our findings. To account for this built-in persistence we control for three lags of the expectation variable in equation (2), however, this might not capture the persistence in further horizons. Figure D.4 shows the robustness of our dynamic results if we additionally control for all expectations up to $(t + h - 1)$ in the regression.

4 Transmission mechanism

Having shown that monetary policy significantly affects employment expectations, leading to lower employment, we now want to understand how monetary announcements are transmitted to employment expectations and why production expectations react more quickly and strongly. Thus, this section looks at the role of financial constraints (4.1), rigidities induced by labour market institutions (4.2), and the role of sectors and the business situation more generally (4.3).

To capture potential transmission channels and heterogeneity among firms, we extend equation (1) by a triple interaction between the monetary policy shocks (ε_t), the post-announcement dummy ($D_{i,t}$) and the distinguishing firm characteristic ($T_{i,t}$), as well as all pairwise interactions (not shown):

$$y_{i,t} = \alpha_i + \alpha_t + \beta_1 D_{i,t} + \beta_2 (D_{i,t} \times \varepsilon_t^p) + \beta_3 (D_{i,t} \times \varepsilon_t^p \times T_{i,t}) + \gamma y_{i,t-1} + \Gamma X_{i,t-1} + u_{i,t}, \quad (3)$$

We decided to use the immediate response specification instead of the local projection framework for two reasons. First, by using a triple interaction, we can directly test for the statistical significance of the effect differences instead of comparing IRFs, and control for time fixed effects. Second, and more importantly, it guarantees the exogeneity of our heterogeneity dimension. For example, firm size might change due to a monetary policy shock after some time, however, it is unlikely to adjust within two days after a policy announcement.

4.1 Financial constraints

Financial constraints play a central role in the transmission of monetary policy to the real economy. A large literature has documented that financially constrained firms reduce investment and employment more strongly following contractionary shocks (Bernanke et al., 1999; Bahaj et al., 2022). However, this evidence is based on realised outcomes. Whether the financial accelerator already operates at the stage of expectation formation — that is, whether constrained firms revise their hiring plans more pessimistically even before actual employment adjusts — has not been tested. Our firm-level data allow us to examine this directly.

Column (1) of Table 5 interacts the monetary policy shock with an indicator for whether the firm reported financial difficulties in the previous month. The baseline effect for unconstrained firms is -0.13, while firms experiencing financial difficulties exhibit an additional reduction of -0.14, more than doubling the effect. This finding provides micro-level evidence for the financial accelerator mechanism. Firms that are already financially strained are disproportionately affected by monetary tightening, as higher interest rates increase the cost of servicing existing debt and reduce the availability of external finance, leaving employment cuts as a primary adjustment margin.

Column (2) explores the credit access channel using information on banks' willingness to extend loans. The baseline category — firms reporting normal credit conditions — shows only a small negative effect (-0.005). Firms with good credit access do not respond significantly differently. In contrast, firms facing reserved (i.e. restrictive) credit access exhibit a significantly negative expectation response (-0.242). This shows that the overall effect from our baseline estimation is mainly driven by firms facing financial constraints, confirming that the effects of monetary policy are mainly transmitted via financial markets and potential constraints therein. The smaller sample in this specification (136 meetings until 2017) reflects the limited availability of the credit access question in the survey.[18]

Taken together, these results establish that financial frictions shape not only realised employment outcomes, as shown by Bahaj et al. (2022) for the UK and Singh et al. (2023) for the US, but already the formation of hiring intentions. Constrained firms do not merely end up cutting more jobs because they run out of funds — they anticipate tighter conditions and revise their employment plans downward more aggressively from the outset. This anticipatory effect is invisible in studies that only observe actual headcount changes. It is, however, consistent with the finding of Ferrando et al. (2022) that monetary policy shifts firms' funding expectations, and with Altavilla et al. (2022), who show that ECB policy is transmitted to firms' real decisions through their banks with heterogeneity across firm liquidity positions, suggesting that the chain runs from policy shock to perceived financial conditions to revised hiring plans. The use of self-reported measures of financial difficulty and credit access — rather than balance-sheet proxies — further strengthens the

[18] As the question on credit availability is asked only once per quarter, we forward the values to replace the missing months and use a lag of three months to capture the previous firm response.

identification. The differential response is driven by firms that themselves report being constrained, not by firms classified as constrained based on leverage or size.[19]

Table 5: Employment expectations - Financial and Labour Market rigidities

	employment expectation				
	(1)	(2)	(3)	(4)	(5)
TR shock × post	-0.1303***	-0.0050	-0.1269***	-0.4239***	0.0973*
	(0.0125)	(0.0208)	(0.0398)	(0.0281)	(0.0636)
TR × post × Financial difficulties (t-1)	-0.1367**				
	(0.0549)				
TR × post × Good credit access (t-3)		0.0389			
		(0.0465)			
TR × post × Reserved credit access (t-3)		-0.2422***			
		(0.0347)			
TR × post × 50 − 249 empl			0.0153		
			(0.0532)		
TR × post × 250 − 999 empl			0.0286		
			(0.0674)		
TR × post × > 1000 empl			0.0073		
			(0.1084)		
TR × post × sectoral CBC share				0.0110***	
				(0.0010)	
TR × post × Minimum Wage					-0.1804***
					(0.0325)
Baseline controls	yes	yes	yes	yes	yes
Firm & Meeting FE	yes	yes	yes	yes	yes
Observations	201,319	78,221	180,516	166,865	26,788
R^2	0.5197	0.5181	0.4702	0.5195	0.6333
Number of Meetings	200	136	200	140	28

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on employment expectations. Heteroskedasticity robust standard errors in the parenthesis. Baseline category: (1) no financial difficulties, (2) normal credit access, (3) small firms (< 50 employees), (4) no collective bargaining coverage, (5) not affected by minimum wage, TR=Target Rate, CBC=collective bargaining coverage. * p<0.10, ** p<0.05, *** p<0.001.

4.2 Labour market rigidities

We next examine how labour market characteristics shape the transmission of monetary policy to employment expectations. Column (3) of Table 5 reports interactions with firm size categories. The baseline effect for small firms (fewer than 50 employees) is -0.127 and highly significant. Neither medium-sized firms (50–249 and 250–999 employees), nor large firms with more than 1,000 employees

[19]The transmission analysis for production expectations can be found in the Appendix, Table D.4.

differ significantly from small firms in their expectation adjustment.[20] This is surprising from the point of view that small firms are more dependent on bank financing, face fewer employment regulations, and are therefore often found to react stronger to monetary policy. However, these effects might be opposed by less attention to central bank decisions and financial markets compared to highly specialised large firms.

Germany is exposed to a large influence of trade unions, although union coverage has been declining over the last decades. In column (4), we exploit the sectoral differences in the collective bargaining coverage (CBC) share, ranging from 3% to 96% across sectors and time, based on data from the Establishment Panel of the Institut für Arbeitsmarkt- und Berufsforschung (IAB). The higher the coverage of wage agreements, the weaker is the adjustment in employment expectations after a monetary policy surprise. The baseline effect on firms in sectors with (nearly) no wage agreements, such as the IT sector, is significantly larger compared to the overall sample, with a decline in employment expectations by 0.424. The influence of trade unions seems to mitigate this effect, with a 10 percentage point increase in coverage weakening it by 0.110. This points to the role of trade unions in protecting jobs, besides maintaining the real value of wages.

Column (5) investigates the role of the statutory minimum wage, exploiting its introduction in Germany in 2015 and increase in 2022 based on occasional questions in the ifo survey. The interaction is significant and economically meaningful. Firms affected by the minimum wage reduce their employment expectations more strongly in response to contractionary monetary policy, consistent with the theoretical prediction that downward wage rigidity induced by the minimum wage leaves employment as the primary adjustment margin. When wages cannot decline in response to tighter monetary conditions, firms are compelled to adjust along the quantity margin instead. This is in line with the findings of Link (2024) showing that German firms mostly adjust prices following the introduction of the minimum wage, except for deteriorating economic situations where they also adjust employment. However, given the significantly smaller sample, we do not find a significant negative effect on employment expectations of unconstrained firms for the meetings covered around the minimum wage adjustments.

[20] For the differences across size, we only weight the regression by sector size and not by firm size. Interacting monetary policy shocks with the age of a firm also leads to small and statistically insignificant coefficients.

4.3 Constraints and sectoral differences

To uncover how the transmission of monetary policy varies across sectors, column (1) of Table 6 reports the immediate employment expectation response with sector interactions. The baseline effect for industry firms amounts to -0.047 and is highly significant. The service and trade sectors react significantly more strongly than industry. The amplified response in services is particularly notable, as this sector has traditionally received less attention in the monetary policy transmission literature, which has focused predominantly on manufacturing. The strong reaction reflects the greater labour intensity and the shorter planning horizons in services, which make employment a more immediate margin of adjustment. In line with this explanation, column (2) shows larger employment reductions for firms with a higher labour intensity in their production, measured as the sectoral employment per value added.

Table 6: Employment expectation - Constraints, labour hoarding and sectors

	employment expectation				
	(1)	(2)	(3)	(4)	(5)
TR shock × post	-0.0466***	-0.0431*	-0.0986***	-0.1438***	-0.3518***
	(0.0140)	(0.0254)	(0.0153)	(0.0126)	(0.1423)
TR × post × Services & Trade	-0.2020***				
	(0.0209)				
TR × post × Sectoral labour intensity		-0.0058***			
		(0.0015)			
TR × post × Constraints			-0.0510***		
			(0.0188)		
TR × post × Hoarding (t-1)				0.1392***	
				(0.0301)	
TR × post × Bus. state uncertainty (t-1)					0.0012
					(0.0019)
Baseline controls	yes	yes	yes	yes	yes
Firm & Meeting FE	yes	yes	yes	yes	yes
Observations	209,399	209,399	204,875	209,399	52,973
R^2	0.5198	0.5196	0.5197	0.5201	0.4425
Number of Meetings	200	200	200	200	60

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on employment expectations. Heteroskedasticity robust standard errors in the parenthesis. Baseline category: (1) industry (2) low labour intensity, (3) no constraints, (4) no hoarding, (5) low uncertainty, TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001.

Column (3) explores the role of business constraints more generally. The baseline effect for unconstrained firms is -0.099, while constrained firms exhibit a significantly amplified response. This

suggests that firms already operating under strained conditions — whether due to labour market regulations, supply-side bottlenecks, capacity limitations, or other impediments — are more sensitive to monetary policy signals when forming their employment plans. This finding is consistent with rational inattention models in which agents update their beliefs most strongly when the possibility of adjustment is constrained and ignoring a shock is costly (Coibion et al., 2018). At the same time, it is noteworthy that the coefficient of constrained firms is not as highly negative as the one of financial constraints. This suggests that of all constraints, financial restrictions affect employment most in case of monetary policy shocks.

A recent phenomenon among firms is that they maintain their workforce or even expand it, although business expectations are bad – often referred to as labour hoarding. Column (4) distinguishes between firms that hoard labour and those who do not. We proxy labour hoarding by an indicator that is one if the employment expectations are stable or positive, while the production expectations are negative. To avoid endogeneity by immediate expectation adjustments, we use the lag of this indicator. We find that the negative effect of contractionary monetary policy is neutralised for those firms that maintain their workforce even in turbulent times, showing a strong hoarding behaviour among a subset of German firms.

Finally, column (5) tests whether uncertainty about the business situation amplifies the response. The recent literature shows the importance of the uncertainty for the transmission of monetary policy (Pellegrino, 2021). The interaction of monetary policy shocks with a firm-level measure of business state uncertainty is economically negligible and statistically insignificant (0.001), suggesting that the level of uncertainty does not meaningfully condition the transmission of monetary policy to employment expectations. By contrast, for production expectations the analogous interaction is small but statistically significant (-0.005, Table D.5, column 5). This asymmetry mirrors the broader pattern in our results: the production margin responds faster and more frequently to monetary policy along almost every dimension, whereas labour market frictions dampen the response of employment expectations.

5 Conclusions

This paper provides the first comprehensive analysis of how monetary policy affects firms' employment expectations. Using the German ifo Business Survey from 2005 to 2024 and high-frequency monetary policy surprises, we establish a causal link between monetary policy, firms' hiring plans and actual employment.

Our results can be summarised along three main dimensions. First, firms adjust their employment expectations immediately and significantly following a contractionary monetary policy surprise. The dynamic analysis reveals that the peak effect is reached one month after the shock and persists for approximately one year, reflecting the considerable inertia in labour market adjustment. Both margins contribute: firms withdraw hiring plans and increase layoff intentions, with the former dominating in the short-run.

Second, the comparison with production expectations reveals striking differences. Twice as many firms adjust their production expectations on impact but this effect reverts to zero within six months, whereas employment expectations remain depressed for over a year. This divergence underscores that the labour market is characterised by greater rigidities than the product market, consistent with the role of employment protection, notice periods, and firms' reluctance to shed workers in the face of persistent labour shortages.

Third, we identify the transmission channels that explain the employment expectation response. Financially constrained firms and those facing restricted credit access revise their hiring plans significantly more strongly, showing that the financial accelerator already operates at the expectation formation stage — 'upstream' of the realised employment effects documented in existing work. Among labour market characteristics, firms affected by the introduction of the minimum wage show amplified responses to monetary policy. On the other hand, a broader coverage in collective bargaining agreements reduces the adjustment in employment expectations.

From a policy perspective, the persistence of employment expectation responses suggests that the labour market effects of monetary tightening unfold more slowly but last considerably longer

than the effects on output. Because firms revise their hiring plans almost immediately, well before these effects surface in aggregate statistics, monitoring firms' employment expectations offers a timely signal of whether monetary policy is transmitting to the labour market as usual.

Our analysis also points to avenues for future research. Extending the framework to other euro area countries would help to assess how differences in labour market institutions shape the cross-country transmission of ECB monetary policy. The rich heterogeneity uncovered in our firm-level analysis could also inform the development of structural models that incorporate expectation formation and labour market frictions in the monetary transmission mechanism.

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Appendix

A Data

Table A.1: Variable description

Variable	Description	Source
Employment expectation	Employment expectations for the next 3 months: increasing, stable, falling (1, 0, -1)	IBS
Past employment change	Employment in the previous month has increased, not changed, decreased (1, 0, -1) - available since 2018	IBS
Employment	Number of employees, reported once a year (October or November), forwarded to following 11 months	IBS
Production expectation	Production (construction, orders, demand) expectations for the next 3 months: increasing, stable, falling (1, 0, -1)	IBS
Price expectation	Prices of own product/services are expected to increase, be unchanged, fall, during the next 3 months (1, 0, -1)	IBS
Business expectation	The business situation for the next 6 months will be: favourable, not changing, unfavourable (1, 0, -1)	IBS
Current business situation	The current state of business is: good, satisfiable, bad (1, 0, -1)	IBS
BS uncertainty	Uncertainty with respect to commercial operations in the next 6 months on a scale from 0 (low) to 100 (high) - available since 2017	IBS
Financial difficulty	The production is currently constrained by difficulties of financing (1, 0)	IBS
Credit access	Current willingness of banks to grant loans: accommodating, normal, reserved (1, 0, -1) - available 2005-2017	IBS
Minimum wage	The firm is (expected to be) affected by the introduction or increase in the statutory minimum wage (1, 0) - asked 2015/16 and 2022	IBS
CBC share	Sectoral collective bargaining agreement share, wage coverage related to trade unions negotiations - available since 2010	IAB
Hoarding	Indicator for labour hoarding if production expectations are negative and employment expectations are unchanged or increasing (1, 0)	IBS
Constraint	The production is currently constrained (1, 0)	IBS
Labour intensity	Sectoral ratio between employees and value added, 2-digit NACE	Eurostat
Survey	Indication in which IBS survey (sector) the firm takes part: industry (incl. manufacturing, construction), services (incl. trade or other services)	IBS
Sector	Economic sectors (# 79) - EBDC sector classification	IBS
Firm size	Firm size category (1 = ¡50, 2 = 50-249, 3 = 250-999, 4¿1000)	IBS
ifo index	Business climate index, current business situation and expectations combined, all surveys, seasonally adjusted	ifo
Industrial production	Industrial production index, Germany, calendar and seasonally adjusted	Bundesbank

Table A.1: Variable description

Variable	**Description**	**Source**
CPI	Consumer Price Index Germany, calendar and seasonally adjusted	Bundesbank
Vacancies	Registered vacancies in Germany, calendar and seasonally adjusted	Bundesbank
Employees	Number of employees subject to social security, calendar and seasonally adjusted	Bundesbank
Unemployment rate	Unemployment registered in Germany, rate, calendar and seasonally adjusted	Bundesbank
MRO rate	Main refinancing operations rate - ECB policy rate	Bundesbank

Note: IBS = ifo Business Survey, covering the period January 2005 to December 2024 if not other stated, IAB = Establishment Panel

A.1 Variable harmonisation

While the ifo Business surveys for industry (incl. manufacturing, construction), and services (incl. trade and other services) are all provided by the ifo institute and have a lot in common, there are also differences. Link (2020) provides a good overview about these differences and how to account for them. Here we want to give an overview about the questions (variables) used in our analysis and how they differ across sector (and time).

Employment expectation:

- *Industry:* (a) manufacturing: expectations for the next 3 months - The number of employees assigned to the production of XY will be increasing, not changing, or decreasing. (01/2002-06/2018)
  Plans and Expectations for the next 3 months - The number of employees will be increasing, not changing, or decreasing. (since 07/2018)
  (b) construction: During the next 3-4 months the number of our employees will be increasing, not changing or decreasing.

- *Services:* (a) trade: plans and expectations for 3 months - Under elimination of seasonal fluctuations our number of employees will raise, not change, or fall. (03/2002-01/2007)
  Plans and expectations for the next 3 months - Under elimination of seasonal fluctuations our number of employees will raise, not change or fall. (02/2007-06/2018)
  Plans and expectations for the next 3 months - The number of our employees is expected to raise, not change, or fall. (07/2018-10/2018)
  The number of our employees is expected to raise, not change or fall. (since 11/2018)
  (b) other services: The number of employees will be increasing, not changing, or decreasing over the next 2-3 months. (10/2004-06/2018)
  Plans and expectations for the next 3 months - the number of our employees will presumably raise, not change or fall. (since 07/2018)

Employment (annual):

- *Industry:* (a) manufacturing: number of employees - We occupy [. . .] persons in the whole company (domestic companies only). Thereof ..... are assigned to the production of XY. (10/1999-02/2018)
  Number of employees - We employ [...] people throughout the company (domestic operations only). Of which the following are attributable to the product area. (since 02/2019)
  (b) construction: In year 20WW the average number of our employees altogether was.... (12/2002-12/2017) In year 20WW the average number of our employees was..... (since 2018)

- *Services:* (a) trade: We occupy about .... persons in our company. (10/2000-02/2018)
  Number of persons employed - We employ in our company approx .... persons. (since 02/2019)
  (b) other services: Number of persons employed ....

Production expectation:

- *Industry:* (a) manufacturing: expectations for the next 3 months - Our domestic productions of XY is expected to be increasing, not changing, decreasing or no production. (01/2002-06/2018)
  Plans and Expectations for the next 3 months - Our production is expected to be increasing, not changing, decreasing, or no production. (since 07/2018)
  (b) construction: During the next 3 months we will presumably build more, as much or less than/as in the last 3 months. (01/1991-06/2018)
  We will presumably build more, as much or less than in the past 3 months. (07/2018-10/2018)
  Our construction activities is presumably going to increase, stay roughly the same or decrease. (since 11/2018)

- *Services:* (a) trade: plans and expectations for 3 months - Compared to the same period of time of previous year, our orders will likely be raising, not changing, or falling. (03/2002-01/2007)
  Plans and expectations for the next 3 months - Compared to the same period of time of previous year, our orders will likely be raising, not changing, or falling. (02/2007-10/2018)
  Plans and expectations for the next 3 months - Our orders will likely be raising, not changing, falling. (since 11/2018)
  (b) other services: plans and expectations - the demand for our services/our turnover is expected to increase, not change, decrease in the next 2-3 months. (10/2004-06/2018)
  Plans and expectations for the next 3 months - Our turnover will likely be raising, not changing, falling. (since 07/2018)

Table A.2: Summary statics - expectations

	Offline survey			Online survey		
	Decline	Unchanged	Increase	Decline	Unchanged	Increase
Employment expectation	0.12	0.75	0.12	0.12	0.74	0.13
Past employment	0.10	0.80	0.10	0.10	0.80	0.10
Production expectation	0.20	0.60	0.20	0.20	0.59	0.21
Past production	0.23	0.54	0.23	0.23	0.54	0.24
Price expectation	0.09	0.70	0.21	0.09	0.68	0.23
Past prices	0.11	0.75	0.14	0.09	0.75	0.16
Credit access	0.26	0.63	0.11	0.24	0.64	0.12
	Untreated firms			Treated firms		
	Decline	Unchanged	Increase	Decline	Unchanged	Increase
Employment expectation	0.11	0.75	0.14	0.12	0.75	0.13
Past employment	0.09	0.80	0.11	0.10	0.80	0.10
Production expectation	0.18	0.60	0.22	0.18	0.60	0.22
Past production	0.21	0.55	0.24	0.22	0.54	0.24
Price expectation	0.07	0.69	0.23	0.09	0.72	0.20
Past prices	0.08	0.76	0.16	0.10	0.77	0.14
Credit access	0.24	0.64	0.12	0.24	0.64	0.12
	+/- 2 day window			out of window		
	Decline	Unchanged	Increase	Decline	Unchanged	Increase
Employment expectation	0.12	0.75	0.14	0.13	0.75	0.12
Past employment	0.09	0.80	0.10	0.10	0.80	0.10
Production expectation	0.18	0.60	0.22	0.20	0.60	0.20
Past production	0.21	0.54	0.24	0.23	0.54	0.23
Price expectation	0.08	0.70	0.21	0.10	0.70	0.21
Past prices	0.09	0.76	0.15	0.11	0.75	0.14
Credit access	0.24	0.64	0.12	0.26	0.63	0.11

Note: Descriptive statistics based on the ifo Business Survey, comparing the expectations of firms responding online or offline (telephone, fax), the expectations of treated (Friday-Monday after a policy announcement) versus untreated (Tuesday-Wednesday before a policy announcement) firms, and the expectations of firms within the +/- 2 working day window or out of the window.

Table A.3: Summary statics - size and sector

	Untreated firms				Treated firms			
	Constr	Service	Trade	Manuf	Constr	Service	Trade	Manuf
<50 employees	11,961	15,602	12,751	12,587	11,653	11,388	15,052	10,099
50-249 employees	11,020	5,919	4,196	21,006	11,257	4,415	5,274	18,311
250-999 employees	1,885	1,621	972	10,072	1,999	1,287	1,499	9,919
>999 employees	347	752	396	4,247	437	587	538	4,511
Total	25,213	23,894	18,315	47,912	25,346	17,677	22,363	42,840

Note: The table shows the number of firms in each survey to size-class cell and compares treated (Friday-Monday after a policy announcement) to untreated (Tuesday-Wednesday before a policy announcement) firms.

Table A.4: Summary statics - hiring vs layoff (2023-2024)

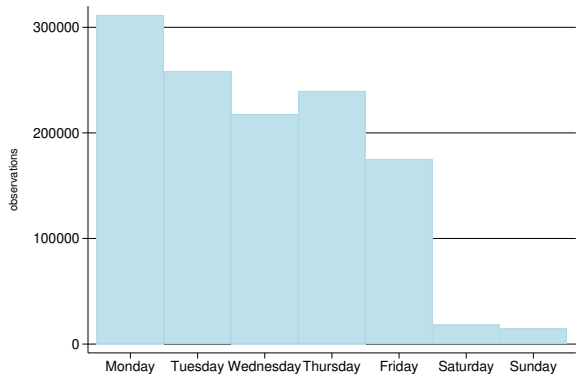
	mean	SD	perc 10	perc 25	median	perc 75	perc 90	N
Hiring next 3 months	5.58	76.19	0	0	1	3	7	33,017
Hiring last 3 months	6.32	47.62	0	0	1	3	10	27,697
Layoffs next 3 months	4.61	41.77	0	0	1	3	5	32,975
Layoffs last 3 months	5.54	40.84	0	0	1	3	8	27,660

Note: Descriptive statistics based on the ifo Business Survey, comparing the hiring and layoff expectations of firms with the realised hiring and layoff in the last 3 months. Questions are only available quarterly since 2023.

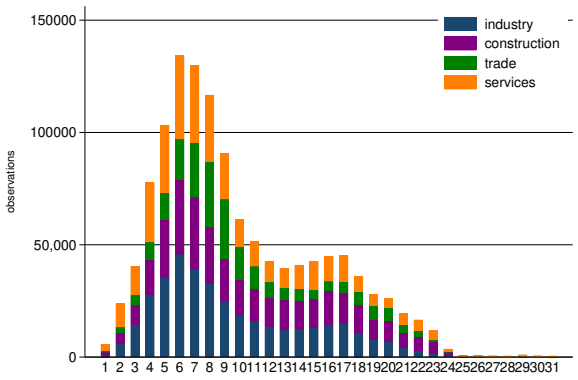
B Identification

Figure B.1: ifo survey - responses

a) Responses per day of week



b) Responses per day of month



Notes: Descriptive statistics based on the ifo Business Survey. Panel a) shows the number of survey responses handed-in per day of the week. Panel b) shows the number of survey responses per day of the month, decomposed by the survey sector.

Table B.1: Exogeneity - monetary policy shocks

	Dependent variable:			
	Target Rate Shock		Forward Guidance Shock	
	autocorr	financial	autocorr	financial
Policy Shock, t-1	-0.0805		-0.3400***	
	(0.0721)		(0.0721)	
Policy Shock, t-2	-0.0389		-0.1475*	
	(0.0723)		(0.0767)	
Policy Shock, t-3	0.0329		-0.0116	
	(0.0723)		(0.0765)	
Policy Shock, t-4	0.0254		0.0292	
	(0.0721)		(0.0723)	
Δ DAX		-0.0260		0.0037
		(0.0164)		(0.0245)
Δ German yield curve		-0.1736		0.4716
		(0.5176)		(0.7742)
Δ US 3m gov bond yield		0.1168		-0.7963*
		(0.2689)		(0.4022)
Δ FX GER-US		0.8665		2.7436
		(1.8222)		(2.7254)
Δ CISS		1.1707		-1.4006
		(0.8529)		(1.2757)
Constant	-0.0376	-0.2186	-0.0506	0.2774
	(0.1439)	(0.2403)	(0.2048)	(0.3595)
Observations	200	200	200	200
R^2	0.009	0.055	0.107	0.033

Notes: $\Delta = t - 1$ to $t - 90$, frequency = daily. *p<0.1; **p<0.05; ***p<0.01.

C Aggregate dynamics

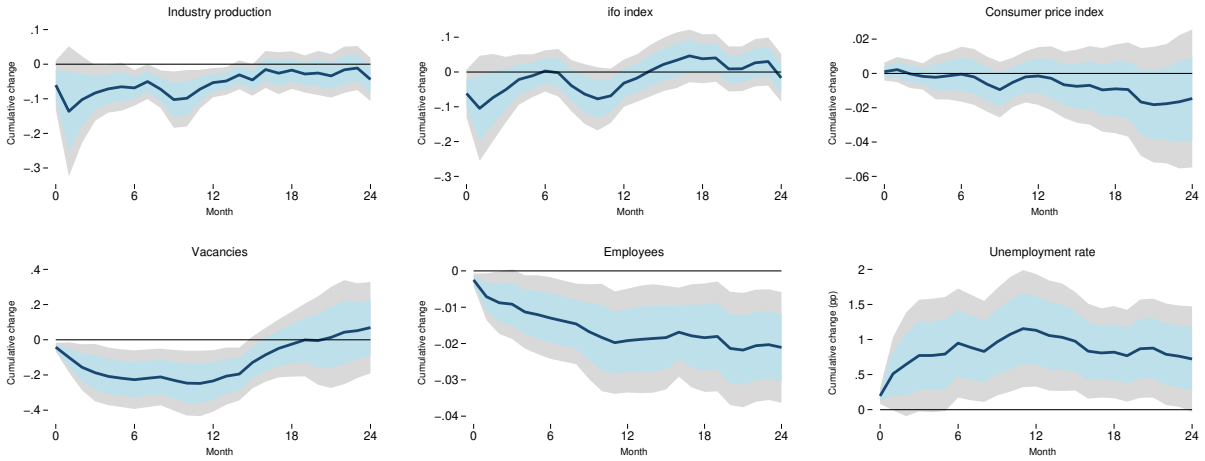
To show the consistency of our empirical framework with the existing literature and to link our firm-specific findings on employment expectations to aggregate labour market outcomes, we show aggregate dynamic responses to monetary policy changes. We are doing so by estimating impulse response functions (IRF) using a local projection (LP) framework (Jordà, 2005). At the aggregate level we estimate:

$$y_{t+h} = \alpha_h + \beta_h \varepsilon_t^p + \sum_{s=1}^{s=6} \gamma_h y_{t-s} + \Gamma_h Z_{t-1} + u_t, \quad h = 0, ..., 24 \tag{4}$$

where y_{t+h} is our labour market variable of interest at horizon h. ε_t^p captures our high-frequency monetary policy shocks, either the Target Rate shock or the Forward Guidance shock. α_h is the intercept and Z_{t-1} includes both lagged policy shocks (and further macro controls for robustness checks). We also include six lags of the dependent variable to control for the persistence in these aggregate indicators. We calculate heteroskedasticity and autocorrelation robust Newey-West standard errors to represent the uncertainty around our estimates.

The upper row of Figure C.1 shows the responses of the industry production index, the ifo business climate index and the consumer price index of Germany to a 25 basis point point increase to the conventional Target Rate shock. In line with theory and the existing literature, we see a significant decline in the real economy and a weak but negative effect on inflation (e.g. Jarociński and Karadi, 2020). More related to our analysis are the aggregate monetary policy effects to German labour market variables. While vacancies and, with a bit delay, employees decline following a contractionary monetary policy shocks, the unemployment rate increases up to one percentage point.

Figure C.1: Aggregate responses to monetary policy shocks



Notes: This figure shows the impulse responses of aggregate macro indicators to a 25 basis point Target Rate shock. It depicts the relative cumulative growth in percent over the period 2005-2024 (change in unemployment rate in percentage points). The shaded areas depict the 68% and 90% confidence bands, based on Newey-West standard errors.

D Monetary Policy Effects - Robustness

Table D.1: Immediate expectation responses - Labour hoarding

	labour hoarding (production - employment gap)			employment exp (standardised)	production exp (standardised)
	(1)	(2)	(3)	(4)	(5)
TR shock × post	0.1148***	0.1353***	0.1536***	-0.2512***	-0.4791***
	(0.0114)	(0.0102)	(0.0102)	(0.0239)	(0.0268)
Post dummy	0.0067***	0.0064***	0.0060***	0.0005	-0.0228***
	(0.0009)	(0.0006)	(0.0007)	(0.0020)	(0.0022)
Expectation employment (t-1)	0.1434***	0.0514***	0.0568***	0.4766***	
	(0.0008)	(0.0006)	(0.0006)	(0.0012)	
Expectation production (t-1)					0.3468***
					(0.0013)
Expectation business situation (t-1)	-0.0410***	-0.0363***	-0.0366***	0.1131***	0.2508***
	(0.0007)	(0.0006)	(0.0006)	(0.0016)	(0.0020)
Constant	0.1450***	0.0944***	0.0980***	0.0879***	0.1363***
	(0.0005)	(0.0005)	(0.0005)	(0.0013)	(0.0014)
Firm FE	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes
Observations	205,342	205,342	205,342	209,399	209,799
R^2	0.2416	0.2450	0.2503	0.5198	0.4481
Number of Meetings	200	200	200	200	200

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on labour hoarding indicators. (1) 1 if increasing/unchanged employment expectations and decreasing production expectations or increasing employment expectations and unchanged production expectations, (2) 1 if unchanged employment expectations and negative production expectations, (3) 1 if increasing/unchanged employment expectations and decreasing production expectations. (4) standardised employment expectations, (5) standardised production expectations. Heteroskedasticity robust standard errors in the parenthesis. TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001

Table D.2: Production expectation responses - nonlinearity and information effects

	production expectation				
	(1)	(2)	(3)	(4)	(5)
TR shock × post	0.0189				
	(0.0313)				
Cubic TR shock × post	-2.4234***				
	(0.2221)				
JK monetary shock × post		-0.3072***			
		(0.0348)			
JK info shock × post		0.0835*			
		(0.0451)			
Positive TR shock × post			-0.3297***		
			(0.0180)		
Negative TR shock × post			-0.0236		
			(0.0450)		
Policy rate change × post				-0.3656**	
				(0.1805)	
FG shock × post					-0.0146
					(0.0108)
Firm FE	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes
Observations	209,799	193,015	209,799	209,799	209,799
R^2	0.4481	0.4453	0.4472	0.4479	0.4479
Number of Meetings	200	188	200	200	200

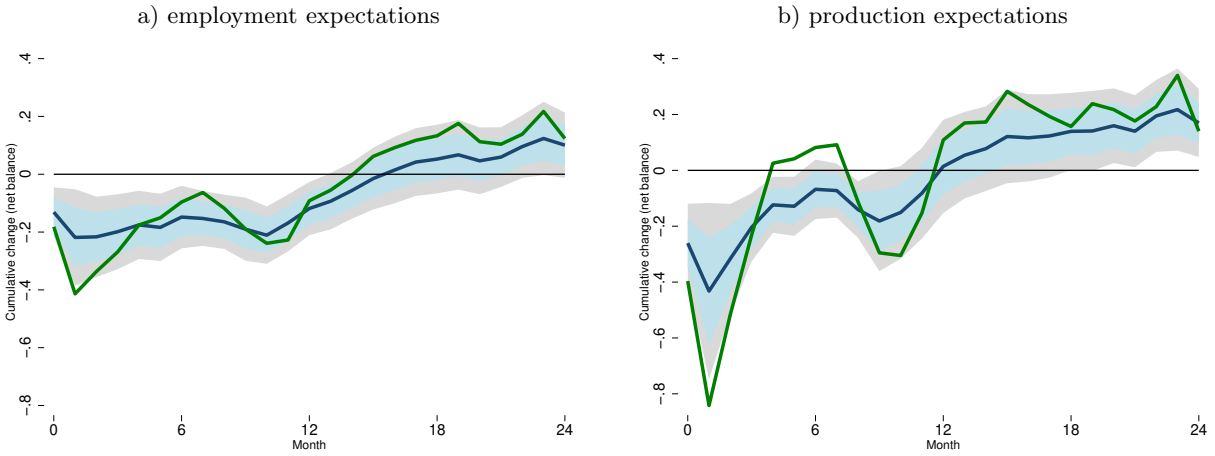
Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on production expectations. Heteroskedasticity robust standard errors in the parenthesis. (1) cubic effects, (2) Jarociński and Karadi (2020) policy surprises, (3) asymmetric effects, (4) policy rate change, (5) forward guidance shocks. TR=Target Rate, FG=Forward Guidance, JK=Jarocinski/Karadi. * p<0.10, ** p<0.05, *** p<0.001.

Table D.3: Production expectation responses - Robustness

	production expectation					
	(1)	(2)	(3)	(4)	(increase)	(decrease)
Target Rate shock × post	-0.4041***	-0.2903***	-0.3176***	-0.1548***	-0.3905***	1.3921***
	(0.0301)	(0.0162)	(0.0492)	(0.0383)	(0.0937)	(0.0875)
Further controls	no	no	yes	no	no	no
Firm FE	yes	yes	yes	yes	yes	yes
Meeting FE	yes	yes	yes	yes	yes	yes
Observations	312,484	209,799	119,297	209,799	209,799	209,799
R^2	0.3470	0.4481	0.4756	0.3537		
Number of Meetings	200	200	200	200	200	200

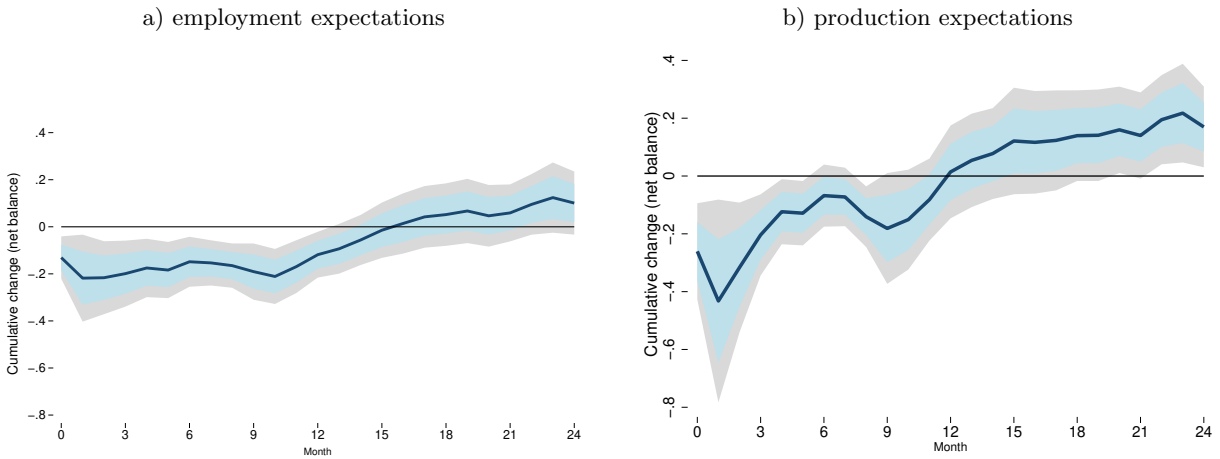
Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on production expectations. Heteroskedasticity robust standard errors in the parenthesis. Further controls include five additional lags in the respective expectation variable, current state of the business and number of employees (in log). (1) +/- 4 working day window, (2) set largest +/- shock to zero, (3) extra controls, (4) not weighted by firm-size, (5) multinomial logit: increase (vs unchanged), (6) multinomial logit: decrease (vs unchanged). TR=Target Rate.
* p<0.10, ** p<0.05, *** p<0.001.

Figure D.1: Dynamic expectation responses - Split-panel jackknife



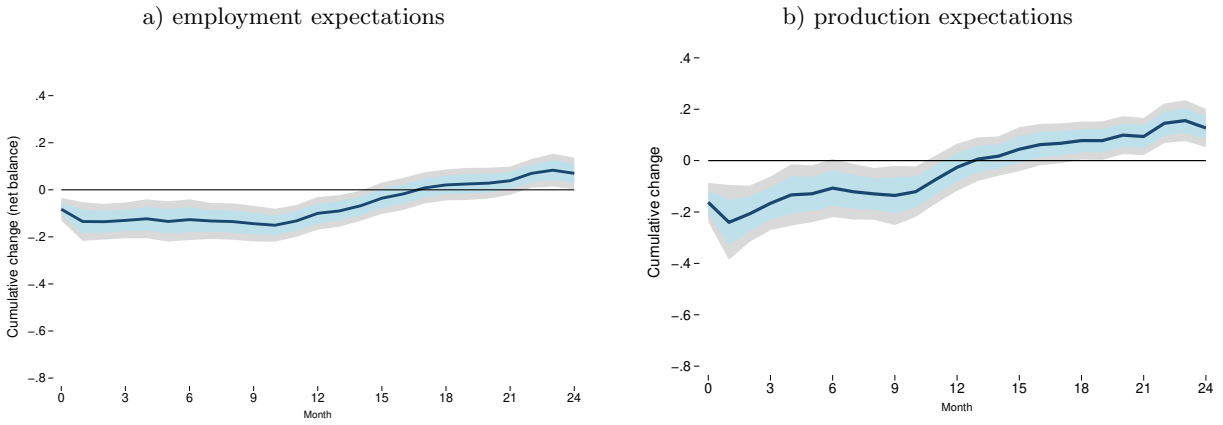
Notes: This figure shows the responses of firm-specific employment expectations (left) and production expectations (negative) to a 25 basis point Target Rate shock. The blue line depicts the OLS estimation, while the green line depicts the split-panel jackknife estimator. The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

Figure D.2: Dynamic expectation responses - Driscoll and Kraay (1998) SE



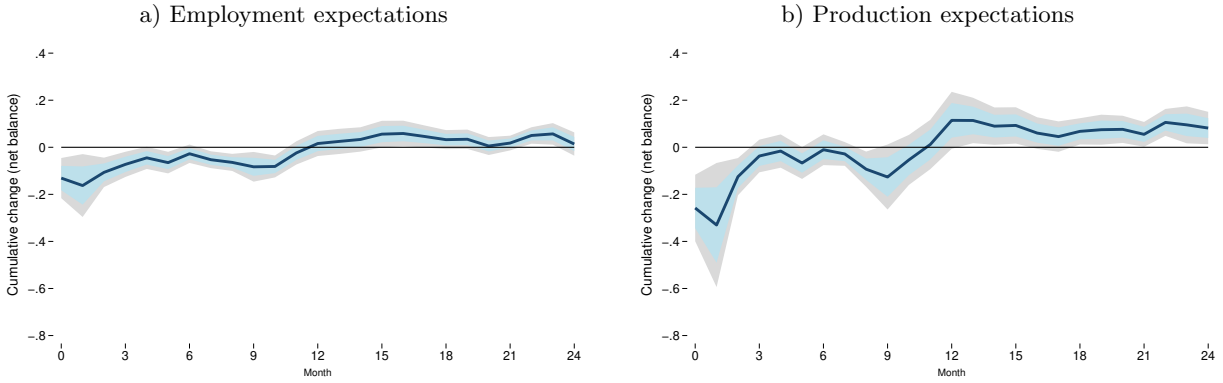
Notes: This figure shows the responses of firm-specific employment expectations (left) and production expectations (negative) to a 25 basis point Target Rate shock. The shaded areas depict the 68% and 90% confidence bands, based on Driscoll and Kraay (1998) standard errors.

Figure D.3: Dynamic expectation responses - Jarociński and Karadi (2020)



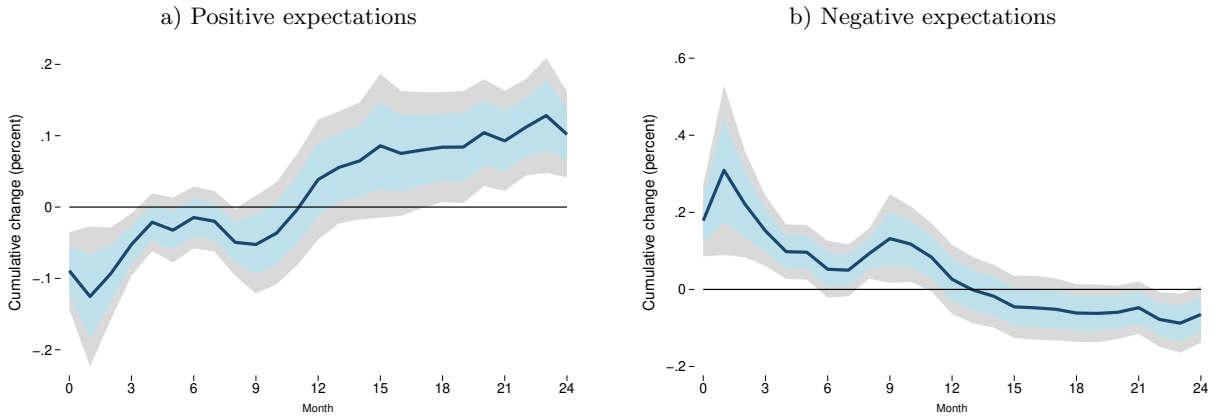
Notes: This figure shows the responses of firm-specific employment expectations (left) and production expectations (negative) to a 25 basis point pure monetary policy shock (Jarociński and Karadi, 2020). The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

Figure D.4: Dynamic expectation responses - Forwarding controls



Notes: This figure shows the impulse responses of firm-specific employment expectation (left) and production expectations (right) to a 25 bp Target Rate shock. Additional (t+h-1) forwarded expectations are added to control the persistence in the expectation variables. The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

Figure D.5: Dynamic expectation responses - production



Notes: This figure shows the responses of firm-specific positive production expectations (left) and negative production expectations (negative) to a 25 basis point Target Rate shock. The shaded areas depict the 68% and 90% confidence bands, based on firm and time cluster robust standard errors.

Table D.4: Production expectations - Financial and Labour Market rigidities

	production expectation				
	(1)	(2)	(3)	(4)	(5)
TR × post	-0.3176***	-0.0054**	-0.1935***	-0.6604***	-0.3192***
	(0.0167)	(0.0023)	(0.0519)	(0.0363)	(0.0436)
TR × post × Financial difficulties (t-1)	-0.0163***				
	(0.0059)				
TR × post × Good credit access (t-3)		-0.1199**			
		(0.0544)			
TR × post × Reserved credit access (t-3)		-0.2055***			
		(0.0471)			
TR × post × 50 − 249 empl			0.0455		
			(0.0690)		
TR × post × 250 − 999 empl			0.0104		
			(0.0909)		
TR × post × > 1000 empl			0.0429		
			(0.1329)		
TR × post × sectoral CBC share				0.0126***	
				(0.0013)	
TR × post × Minimum Wage					-0.4326***
					(0.1393)
Baseline controls	yes	yes	yes	yes	yes
Firm & Meeting FE	yes	yes	yes	yes	yes
Observations	201,702	83,884	180,863	167,499	26,927
R^2	0.4482	0.4460	0.4410	0.4523	0.5810
Number of Meetings	200	136	200	140	28

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on production expectations. Heteroskedasticity robust standard errors in the parenthesis. Baseline category: (1) no financial difficulties, (2) normal credit access, (3) small firms (< 50 employees), (4) no collective bargaining coverage, (5) not affected by minimum wage, TR=Target Rate, CBC=collective bargaining coverage. * p<0.10, ** p<0.05, *** p<0.001.

Table D.5: Production expectation - Constraints, labour hoarding and sectors

	production expectation				
	(1)	(2)	(3)	(4)	(5)
TR shock × post	-0.2691***	-0.3231***	-0.3283***	-0.1716***	-0.2148***
	(0.0195)	(0.0323)	(0.0200)	(0.0149)	(0.0780)
TR × post × Services & Trade	-0.0065***				
	(0.0022)				
TR × post × Sectoral labour intensity		0.0017			
		(0.0019)			
TR × post × Constraints			-0.1069***		
			(0.0198)		
TR × post × Hoarding (t-1)				-0.1416***	
				(0.0244)	
TR × post × Bus. state uncertainty (t-1)					-0.0051***
					(0.0010)
Baseline controls	yes	yes	yes	yes	yes
Firm & Meeting FE	yes	yes	yes	yes	yes
Observations	209,799	198,027	205,245	207,090	53,667
R^2	0.4481	0.4460	0.4483	0.5800	0.5158
Number of Meetings	200	200	200	200	60

Notes: OLS regressions showing the monetary policy effect of treated (=post) vs non-treated firms on production expectations. Heteroskedasticity robust standard errors in the parenthesis. Baseline category: (1) industry, (2) low labour intensity, (3) no constraints, (4) no hoarding, (5) low uncertainty, TR=Target Rate. * p<0.10, ** p<0.05, *** p<0.001.

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