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Understanding Firm Dynamics with Daily Data

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Understanding Firm Dynamics with Daily Data*

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Abstract

How do firms respond to macroeconomic shocks? To study this question, we construct novel daily time series that measure firms' plans and expectations based on surveys from Germany. Daily variation allows us to estimate the short-run aggregate responses of firms in short samples. This allows us to analyze the post-pandemic inflation surge without relying on pre-pandemic data. We find that firms' plans, notably price-setting plans, respond within days to oil supply and monetary policy shocks but not to forward guidance shocks. The effects are especially strong for small and non-tradeable sector firms. Finally, expectations respond strongly and swiftly, but only to monetary policy.

Keywords: Daily data, firms, monetary policy, oil supply, inflation surge
JEL Codes: E31, E43, E52, E58, C83

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1 Introduction

How do firms respond to macroeconomic shocks? Answering this question is a key input for policymaking. However, how firms respond may change over time because of structural changes in the economy (e.g., Afrouzi, Halac, Rogoff, and Yared, 2024). These responses may also change strongly during episodes of financial stress or elevated inflation, e.g., through non-linearities in the Phillips curve (e.g., Benigno and Eggertsson, 2023; Erceg, Lindé, and Trabandt, 2024) or agents' attention (e.g., Pfäuti, 2023; Bracha and Tang, 2024). Hence, to inform policymakers, one should ideally answer the above question based on recent data that is informative about contemporary responses. Unfortunately, with monthly or quarterly data, researchers must typically resort to relatively long time series samples to estimate these aggregate causal effects.[1] Consequently, the resulting estimates inform us about the typical effects of shocks within the historical sample but less about contemporary responses.

In this paper, we propose daily data as a remedy to address this problem. Specifically, we construct novel daily time series data on the plans and expectations of German firms, to which we refer as *Daily Business Database*. The database starts in July 2021, will be continuously updated, and constitutes the first key contribution of the paper. It is valuable for three reasons. First and foremost, the daily frequency uncovers additional high-frequency variation that can be used to estimate the short-run causal effects of macroeconomic shocks in short samples. This allows us to obtain estimates that are informative about contemporary responses.[2] Second, daily frequency allows us to detect effects that may be too transitory to become visible in lower-frequency data. Finally, to the best of our knowledge, we are the first to provide daily time series on firms' decision-making, which can be used to answer

[1] For example, Guerrieri, Marcussen, Reichlin, and Tenreyro (2023), Blanchard and Bernanke (2023), and Giannone and Primiceri (2024) use pre-pandemic data to analyze the post-pandemic inflation surge. However, this approach is only valid when shock transmission has not changed. On the other hand, large enough samples are needed to avoid finite sample issues (e.g., Herbst and Johannsen, 2024).

[2] Alternatively, one may use longer time samples to estimate models that explicitly account for the non-linearities in the data (e.g., Pfäuti, 2023). Our advantage is that we do not rely on correctly specifying all relevant dimensions of non-linearity. In turn, a caveat of our approach is that we are restricted to short-run effects. In our application to the post-pandemic inflation surge, we study the first 100 days after a shock.

various important research questions.[3]

We use this data to estimate how energy supply and monetary shocks impact firms during the post-pandemic inflation surge. Estimating these effects without relying on pre-pandemic data is the second key contribution, which is important for three reasons. First, avoiding pre-pandemic data matters not only because of non-linearities in the Phillips curve or agents' attention but also because the pandemic and the Russian invasion arguably altered the economy.[4] Second, estimating daily responses allows us to revisit the classical question of whether monetary policy transmits with short or long lags. Third, studying supply and demand shocks serves as a proof of concept that few years of daily data can inform us about contemporary causal effects, i.e., the causal effects that prevail under the current state of the economy.

Our empirical analysis of high-frequency identified OPEC oil supply and ECB monetary policy shocks yields four main insights. First, firms change their sales price plans remarkably fast in response to conventional monetary policy and oil supply shocks. The response to the OPEC announcements is already statistically significant after one day, consistent with firms paying close attention to aggregate developments. Second, forward guidance shocks do not affect firms' plans. Third, small firms and firms that operate in the non-tradeable sector respond particularly strongly to oil supply and monetary policy (not forward guidance) shocks. Fourth, monetary policy transmits within days to firm expectations, confirming that expectations may be an important transmission channel when inflation is high.

The daily time series are constructed from the *German Business Panel* (GBP), an online survey of German firms that elicits plans, expectations, and opinions of executives and decision-makers (Bischof, Doerrenberg, Rostam-Afschar, Simons, and Voget, 2023). This survey is particularly suited to constructing daily time series because of its sampling scheme.

[3]Beyond our application below, one may use the daily data to study short-run effects of central bank communication (e.g., Istrefi, Odendahl, and Sestieri, 2024), carbon pricing (e.g., Känzig, 2023), or geopolitical tensions (e.g., Grebe, Kandemir, and Tillmann, 2024).

[4]The pandemic induced, among other changes, a strong and persistent increase in work-from-home, and the Russian invasion led to substitution away from Russian pipeline gas in Europe.

On each working day, a random subset of firms is invited to participate in the survey. It ensures that response numbers are relatively stable across the days of the month and around the OPEC and ECB announcement days that we study.[5] Moreover, the composition is also stable regarding firm characteristics, e.g., firm size and sector, and regarding the characteristics of the responding decision-makers, e.g., education and gender. Finally, the composition of early and late responses, relative to the survey invitation date, is stable. This suggests that the composition of unobserved characteristics may also be stable since the response times may be informative about unobservable characteristics (e.g., Dutz, Huitfeldt, Lacouture, Mogstad, Torgovitsky, and Van Dijk, 2021). Thus, we can use variation in the repeated cross-sections that is unlikely to be confounded by compositional changes to construct daily time series.[6] Specifically, each daily time series observation is computed as an arithmetic average across all firms that file the survey on a given date.

We construct the *Daily Business Database* (DBD) starting from July 15, 2021, after the pilot phase of the GBP has been concluded and a consistent set of questions amenable to time series analysis is available. The DBD currently runs until June 30, 2024. It will be updated as new survey data becomes available. We provide four distinct time series on firms' plans. The underlying survey questions ask for firm tendencies, i.e., whether firms want to increase, decrease, or keep a variable constant within the next twelve months. The four variables are sales prices, fixed cost, R&D investment, and payouts to owners, to which we refer as dividends. We provide six time series on expectations: the expected industry-wide firm survival rate in percent, satisfaction with economic policy on an eleven-point scale, and expectations regarding percent changes of firm revenue, profit, employment, and investment. The daily data is strongly correlated with monthly economic indicators such as industrial production or inflation. Further, our data can be linked to important economic and (geo-

[5] In contrast, other monthly firm panels send out survey invitations on the first day of the month, which induces a rather hump-shaped pattern in response numbers with few responses at the beginning and end of each month. This applies, e.g., to the German ifo survey, the Decision Maker Panel in the U.K., or the recently introduced Bundesbank Online Panel – Firms (BOP-F).

[6] The panel dimension of the GBP is biannual and, hence, less suited for time series analysis.

)political events. For example, firms' investment plans and expectations immediately plummeted after the Russian invasion of Ukraine, consistent with elevated macroeconomic uncertainty. Similarly, firm survival expectations tanked very quickly after the ECB started its recent hiking cycle. Such examples suggest that the daily data is useful for studying how macroeconomic events affect firms' decision-making. Yet, these observations do not necessarily reflect causality.

We move beyond these correlations and estimate the causal effects of oil supply and monetary policy shocks. We study these two shocks because (energy) supply shocks were arguably important drivers of the inflation surge and the ECB responded with an unprecedented interest rate hike. We identify oil supply shocks based on oil future price changes around OPEC announcements following Känzig (2021). We further apply the sign restriction approach from Degasperi (2021) and use only OPEC events that induce a negative comovement of oil price expectations and stock prices to obtain a clean measure of oil supply shocks. Similarly, we use high-frequency monetary policy shocks based on Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019) and employ the sign restriction approach from Jarociński and Karadi (2020) to obtain a clean measure of monetary policy shocks, robust to "information effects". Specifically, we use a conventional (short-rate) monetary policy shock based on the three-month Overnight Index Swap (OIS) and a shock based on the one-year OIS, which we refer to as forward guidance shock. Finally, we use daily local projections to estimate the dynamic causal effects of these shocks on firms' plans and expectations in the short-run, i.e., within 100 days after a shock.

We find that oil supply and monetary policy shocks transmit quickly to firms' plans. A contractionary oil shock leads to a significant increase in sales price plans and a significant decrease in planned dividends. The effect on dividend plans turns significant after around 20 days, whereas price plans respond significantly already one day after the shock. In response to a contractionary monetary policy shock, firms' sales price and dividend plans, but also firms' fixed cost and R&D investment plans decline significantly within only 15 days. Our

finding of rapid transmission to firms' plans is consistent with recent findings that agents tend to be more attentive when inflation is high, based on survey experiments (Weber, Candia, Ropele, Lluberas, Frache, Meyer, Kumar, Gorodnichenko, Georgarakos, Coibion et al., forthcoming; Doerrenberg, Eble, Karlsson, Rostam-Afschar, Tödtmann, and Voget, 2023) and based on observational survey data (Pfäuti, 2023). It can be explained with theories of rational inattention (e.g., Maćkowiak and Wiederholt, 2009, 2015). It further buttresses our initial motivation that it is important to estimate the responses without relying on historical data where attention was low. Moreover, the immediate impact of oil shocks on price plans points to the importance of energy supply shocks during the recent inflation surge. Consistent with this result, Patzelt and Reis (2024) finds that the pass-through from energy prices to inflation expectation of European consumers was substantially higher during the inflation surge.[7] Finally, our results on monetary policy shock transmission relate to the traditional question of whether monetary policy operates with long or short lags (Friedman, 1961). We show that monetary policy transmission affects firms' plans with remarkably short lags. Short lags are consistent with findings that ECB announcements quickly affect expectations of German manufacturing firms (Enders, Hünnekes, and Müller, 2019).

The effect of monetary policy shocks on firms' price-setting plans materializes quickly, but it is also short-lived and dissipates after 30 to 40 days.[8] This motivates us to assess whether forward guidance can be used to affect price-setting plans over a longer horizon. Yet, we find that this is not the case. We estimate a precise zero effect of forward guidance shocks on all firm plans that we study. For price-setting plans specifically, the trough of the 95 percent confidence band is roughly one-third of the trough point estimate based on conventional monetary policy shocks. This suggests that forward guidance is less effective than conventional New Keynesian theory suggests, echoing the forward guidance puzzle (e.g. Nakamura and Steinsson, 2018; Del Negro, Giannoni, and Patterson, 2023). Instead, our results are

[7]Similarly, Pfäuti (2023) finds that oil shocks have a large effect on U.S. inflation when attention is high.

[8]Note that this does not rule out more persistent effects on price-setting since the survey question measures only the extensive and not the intensive margin.

consistent with deviations from rational expectations that eliminate this puzzle, e.g., with cognitive discounting (Gabaix, 2020; Pfäuti and Seyrich, 2022).

We investigate firm heterogeneity by constructing additional daily time series that measure average firm plans for small and large firms, as well as firms operating in the tradeable and non-tradeable sector. The response of price-setting and dividend plans to oil supply shocks is larger and more significant for small and non-tradeable firms. For monetary policy shocks, we find that sales price plans respond more significantly for small and non-tradeable firms. Yet, monetary policy transmission is more uniform (in terms of point estimates) across firm types. Our heterogeneity analysis reveals that small and non-tradeable firms are remarkably responsive to macroeconomic shocks. This matters as research often focuses on the manufacturing sector, which mainly includes firms that are large and operate in the tradeable sector.

Finally, we inspect whether expectations are a channel through which shocks are plausibly transmitted to firms' plans. We confirm this, but only for monetary policy shocks. In response to a contractionary monetary policy shock, we find that the expected firm survival rate, revenue, and employment expectations decline significantly on the day of the ECB announcement. Investment and profit expectations, as well as satisfaction with economic policy follow with a significant decline in less than ten days. This shows that monetary policy transmits with very short lags to expectations of firms.

Overall, there are two key takeaways from this research. First, daily time series on firms' decision-making is useful for estimating the causal effects of macroeconomic shocks with few years of data. Our database will be continuously updated and, hence, provides valuable variations that may be readily available to investigate important episodes that might unfold in the future. Second, our empirical results reveal that during the post-pandemic inflation surge, firms respond swiftly to oil supply and conventional monetary policy shocks but not to forward guidance.

Related literature. We contribute to a burgeoning literature that aims to estimate impulse responses at a daily frequency. Buda, Carvalho, Corsetti, Duarte, Hansen, Ortiz, Rodrigo, and Rodríguez Mora (2023) construct a daily time series for the consumption of Spanish households and finds that it responds within less than a week to ECB monetary policy shocks. Born, Dalal, Lamersdorf, and Steffen (2023a) construct a daily inflation expectation measure based on German social media posts on Twitter (and X), finding that monetary policy affects inflation expectations after ten days.[9] For U.S. monetary policy, Jacobson, Matthes, and Walker (2023) construct a daily inflation series and show that price puzzles may be driven by temporal aggregation bias.[10] They detect a conventionally signed and significant effect on prices after around one month. Further studies of the U.S. suggest that commodity prices (Miranda-Pinto, Pescatori, Prifti, and Verduzco-Bustos, 2023), house prices (Gorea, Kryvtsov, and Kudlyak, 2022), and economic sentiment (Lewis, Makridis, and Mertens, 2019) respond swiftly to U.S. monetary policy shocks. To the best of our knowledge, none of the preceding research has studied the responses of firms at a daily frequency in general or during the post-pandemic inflation surge specifically. Moreover, we study monetary policy and oil supply shocks jointly, whereas the above literature is tilted toward monetary policy.[11]

Other closely related papers study the high-frequency survey responses based on an event study approach. Enders et al. (2019) estimate how expectations change by comparing survey responses of German manufacturing firms filed within two days after an ECB announcement with those filed within two days before the same event. They find significant effects only for modest but not for large policy surprises. Using the same methodology, Rast (2022) estimates that German households' inflation expectations do respond within a weekly event

[9] Relatedly, Grebe et al. (2024) use tweets (from Twitter/X) to construct a daily index of uncertainty associated with the Russian invasion of Ukraine.

[10] Price puzzles refer to the frequent empirical finding that contractionary monetary policy shocks do not lead to lower but higher inflation in the short run. Relatedly, Kilian (2023) provides an alternative approach to aggregate daily data to monthly frequency for VAR analysis.

[11] A recent exception is Gazzani, Venditti, and Veronese (2024), which identifies demand and oil supply shocks in a daily VAR. Relative to this paper, we differ as we use high-frequency identified shocks and firm outcomes and focus on the post-pandemic inflation surge.

window. Di Pace, Mangiante, and Masolo (forthcomimg) employ the same strategy for the U.K. but find evidence only for monetary shocks that are identified as residuals of a Taylor rule regression but not for high-frequency shocks. For Italy, Bottone and Rosolia (2019) find a response for inflation expectations but not for pricing plans. Finally, Binder, Campbell, and Ryngaert (2024) construct daily time series for consumer inflation expectations, finding that monetary policy announcements move consumer inflation expectations. Relative to these papers, we contribute evidence on oil supply shocks and firms, study the dynamic causal effects of monetary policy beyond a short event window, and deliver evidence on shock transmission when inflation is high.

Another strand of the literature focuses on understanding the post-pandemic inflation surge. Blanchard and Bernanke (2023), Guerrieri et al. (2023), Giannone and Primiceri (2024), and Kilian and Zhou (forthcoming) use linear VARs estimated on samples that are dominated by observations before 2019 to understand the inflation surge. Gagliardone and Gertler (2023) follow a similar approach to discipline a New Keynesian model but use post-pandemic data to test the model predictions. Closely related is also Shapiro (2024), which constructs a decomposition of inflation into demand- and supply-driven components and investigates how monetary and oil shock drive these measures based on pre-pandemic data. Relative to these papers, our key contribution is that we do not need to rely on pre-pandemic data. A further difference between these papers and our approach is that we focus on firms' plans and expectations, whereas they focus on conventional aggregate time series.

Further, Acharya, Crosignani, Eisert, and Eufinger (2023) connect the inflation surge to supply shocks and market power. Patzelt and Reis (2024) estimate the pass-through from energy supply shocks on consumer inflation expectations. Dao, Gourinchas, Leigh, and Mishra (2024) decompose inflation and relate it to differences between core and headline inflation and economic conditions in a cross-country approach. These papers do not use pre-pandemic data but rely on cross-sectional variation. Instead, our approach leverages only time variation, which incorporates general equilibrium feedback and is not subject to a

missing intercept problem (e.g., Wolf, 2023). Further, many papers use fully specified structural models to understand the recent inflation surge (e.g., Di Giovanni, Kalemli-Ozcan, Silva, and Yildirim, 2022, 2023; Gagliardone and Gertler, 2023). Relative to these papers, we do not need to impose a fully specified structural model. Finally, our results are complementary to recent research that documents the increase in attention during the inflation surge based on observational survey data (Pfäuti, 2023; Link, Peichl, Roth, and Wohlfart, 2023a) and based on many survey experiments across space and time (Weber et al., forthcoming).

More broadly, we relate to papers on the identification of the causal effects of oil supply (e.g., Degasperi, 2021; Känzig, 2021; Baumeister and Hamilton, 2019) and monetary policy (e.g., Gürkaynak, Sack, and Swanson, 2005; Gertler and Karadi, 2015; Jarociński and Karadi, 2020),[12] and research that studies (German) firms more generally (e.g., Bachmann, Elstner, and Sims, 2013; Enders, Hünnekes, and Müller, 2022; Link, Peichl, Roth, and Wohlfart, 2023b; Born, Enders, Menkhoff, Müller, and Niemann, 2023b; Balleer and Noeller, 2023).

The rest of the paper is structured as follows. Section 2 introduces the *Daily Business Database*. Section 3 introduces the shocks and the estimation methodology. Sections 4 and 5 investigate the responses of firms' plans and expectations. Section 6 concludes.

2 The Daily Business Database

In this section, we introduce the *Daily Business Database* (DBD), a set of daily time series that measure firms' plans and expectations based on surveys from Germany. We show that the survey response numbers and the composition of responding firms are stable, especially around the oil and monetary news events that we study. Furthermore, we present descriptive evidence linking the daily data with important macroeconomic and geopolitical events.

[12] Alternatives to high-frequency identification include residuals of Taylor rule regressions (e.g., Romer and Romer, 2004; Cloyne, Hürtgen, and Taylor, 2022; Hack, Istrefi, and Meier, 2024) or studying systematic monetary policy directly (Hack, Istrefi, and Meier, 2023).

2.1 Survey setup

We introduce the underlying survey and explain the survey design, which is key for the construction of daily time series.

German Business Panel. We construct the DBD using firm-level survey data from the *German Business Panel* (GBP). The GBP is an online survey that was introduced in 2020 and regularly interviews decision-makers of firms operating in Germany. The sample is constructed from around one out of three million firms that have a publicly available email address.[13] Around 90 percent of the survey respondents are the firm owner or the CEO, and the overall sample is representative of the target population of German firms along many important characteristics (Bischof et al., 2023).

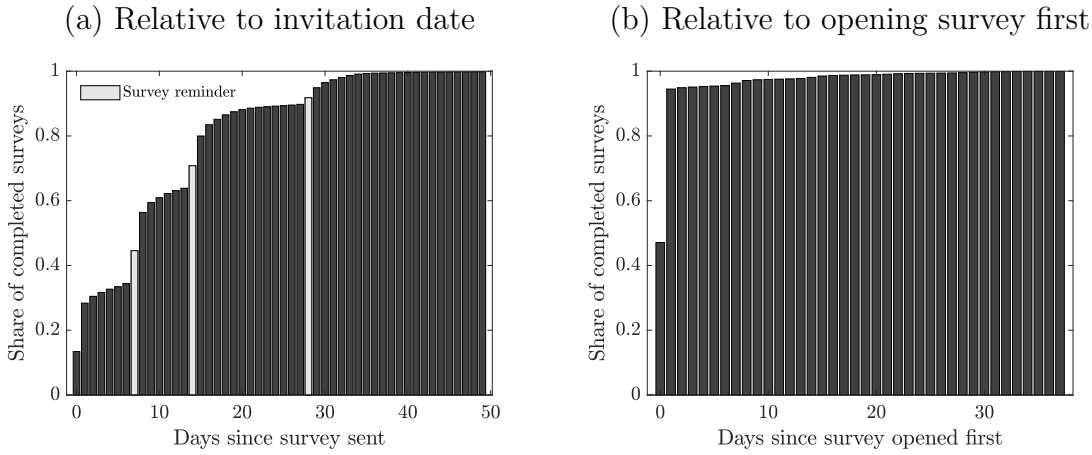
The survey has been continued since its launch in 2020, with eight waves currently available. The first two waves fall into the pilot phase, with many changes in the questionnaire. Starting with the third wave, there is a consistent set of questions amenable to a macroeconomic analysis. We thus base the DBD and our subsequent analysis on waves three to eight, ranging from July 15, 2021, until June 30, 2024.

Survey design. The GBP is particularly suited to construct daily time series due to its survey design. It is a semi-annual panel with rolling invitations. It means that at each working day, a randomly selected sub-sample of the pool of participants receives an invitation to participate in the survey.[14] This invitation scheme facilitates that survey responses also arrive each day. Indeed, around 30 percent of the survey responses arrive only one day after the survey invitation was sent. To further increase participation, the GBP sends out reminders after 7, 14, and 28 days; see Bischof et al. (2023) for details. We display the share

[13] To be precise, in the financial year of 2019, there were 3,559,197 firms registered, according to the Federal Statistical Office. The GBP is based on the 949,463 firms with publicly available email addresses, which are taken from Orbis and Amadeus as well as other sources such as the German Schmalenbach Society; see Bischof et al. (2023) for details.

[14] Specifically, for each wave, there are 125 consecutive working days at which participants are invited. Each firm in the pool is randomly assigned to one of these working days so that invitations are uniformly distributed across working days.

Figure 1: Days until respondents complete the survey



Notes: This figure shows the number of completed surveys over all completed surveys by the day since the survey invitation was sent or since the date on which the survey was opened for the first time.

of completed surveys relative to the date on which the invitation was sent in Panel (a) of Figure 1, where light-gray bars indicate the days on which survey reminders are sent. More than 50 percent of the responses arrive within 10 days, and more than 97 percent within the first 30 days.[15] Panel (b) of Figure 1 shows how many days elapse from the first time a respondent opens the survey until it is completed. It turns out that 95 percent of the responses are completed after only one day. This ensures that the answers provided by the respondents reflect their contemporaneous plans, expectations, and views.

2.2 Survey responses

We show that the cross-sectional response numbers that enter a daily observation, as well as the composition of responding firms remain stable, particularly around the ECB and OPEC events that we study in Sections 4 and 5.

Response numbers. A reasonable number of responses per day is instrumental for the daily time series to represent a sensible estimate of the average survey answer across firms at a given date. We report summary statistics for the cross-sectional response numbers in

[15] Our empirical results are robust to only considering responses that arrive within the first seven days (the median response time) after the survey was sent; see Section 4.3.

Table 1: Summary statistics of response numbers

	Mean	Median	25^{th} percentile	75^{th} percentile	Min	Max	N
All days	45.26	39.00	8.00	66.00	0.00	187.00	1,082
Excl. weekends	61.06	51.00	37.00	80.00	0.00	187.00	772

Notes: The table shows summary statistics of the cross-sectional response numbers per day based on all completed surveys.

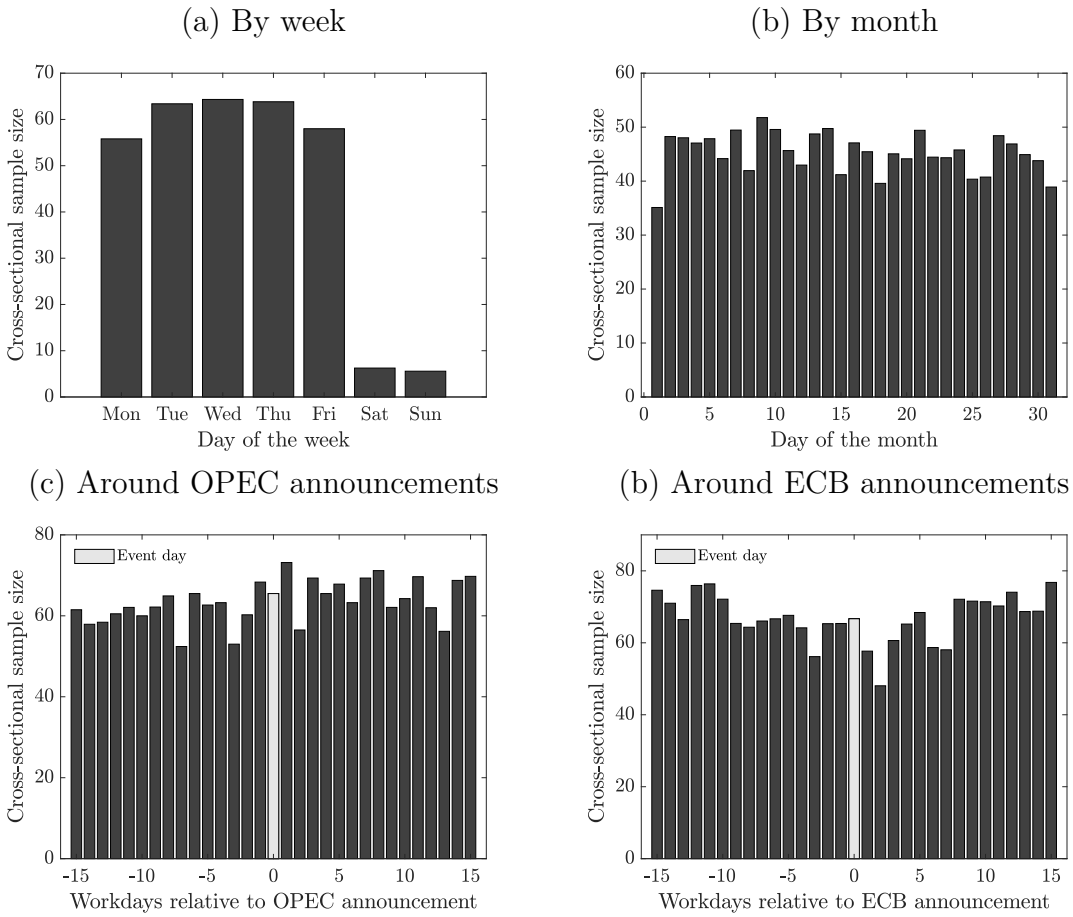
Table 1 for the full sample and when excluding weekends. On average, around 45 responses arrive per day. The average response number increases to 61 when excluding Saturdays and Sundays. When excluding weekends, there are only three days with no response and only 66 days with less than 20 responses. The latter number reduces to 46 when excluding all national holidays, which amounts to less than five percent of all days in our sample. Moreover, the empirical specification introduced in Section 3.2 appropriately accounts for days with low response numbers.

One may be concerned that response numbers systematically differ on certain days. To investigate this, we display the survey response numbers by the day of the week and the day of the month in Panels (a) and (b) of Figure 2. The response numbers are relatively stable across workdays and only slightly lower on Monday and Friday. Unsurprisingly, response numbers are lower on weekends since many firms do not operate. Similarly, the response numbers are stable across the day of the month. This is a key distinguishing feature of our data relative to monthly firm panels such as the Decision Maker Panel (DMP) in the U.K. or the ifo firm panel in Germany. These monthly panels typically feature hump-shaped response patterns over the month, with relatively few responses at the beginning or end of the month.[16]

Finally, Panels (c) and (d) show the response numbers around the OPEC and ECB events that we use for identification, anticipating our identification approach discussed in Section 3.1. The day variable on the horizontal axis deliberately excludes Saturdays and Sundays for read-

[16]The exact shape of the response pattern can be found in Enders et al. (2019) for the ifo survey (see their Figure 1, Panel (b)) and in Di Pace et al. (forthcomimg) for the DMP (see their Figure 4)

Figure 2: Cross-sectional response numbers



Notes: The figure shows the cross-sectional response numbers per day based on all completed surveys averaged across various daily running variables.

ability, as response numbers are low on these days; see Panel (a). We find that the average response numbers are relatively stable and never fall below 40 around both events. For ECB announcements, the smallest response number occurs two workdays after event days. This may be explained by the fact that this is always a Monday with generally lower response numbers. Similarly, the four days with the lowest response numbers around ECB announcements are only Mondays and Fridays, which generally feature lower response numbers.

Overall, we conclude that the response numbers are sufficiently high and stable, especially across ECB and OPEC announcements. Moreover, our empirical strategy explicitly accounts for the variation in response numbers inherent in the data; see Section 3.2.

Firm composition. Even if cross-sectional response numbers are stable, one may be concerned that the composition of firms is not. This could point towards selection and may invalidate the construction of daily time series. Thus, we present the composition of firm and respondent characteristics, as well as the response timing composition in Figures 3 and 4. The underlying survey questions that measure these characteristics are provided in Appendix B.[17]

Panel (a) of Figure 3 focuses on firm characteristics across days of the week and days of the month. The characteristics are the share of firms in the tradeable sector, the share of firms located in East Germany, and the shares of firms with either revenue (from the previous calendar year) above the median or with above-median employees. These characteristics are stable across the day of the month. A similar conclusion holds for weekdays, except that large firms (measured by revenue or number of employees) are slightly less likely to reply on weekends. This is not surprising as self-employed, and owners of small firms may be more likely to work on weekends.

Panel (b) of Figure 3 provides the composition of responding individuals, i.e., the share of males, members of the executive body of the firm, and the share with vocational or academic education.[18] This may be important since Savignac, Gautier, Gorodnichenko, and Coibion (2024) shows that expectations differ by respondent characteristics for French firms. Yet, all displayed characteristics are remarkably stable, even over weekends.

We further investigate whether the timing of the responses differs systematically across days. This could be indicative of selection based on unobservable characteristics to the extent that these latent characteristics correlate with the timing of the response. For example, firms that face more competition or more financial stress might respond later because tasks other than answering a survey are prioritized.[19] We compute the shares of individuals who answered

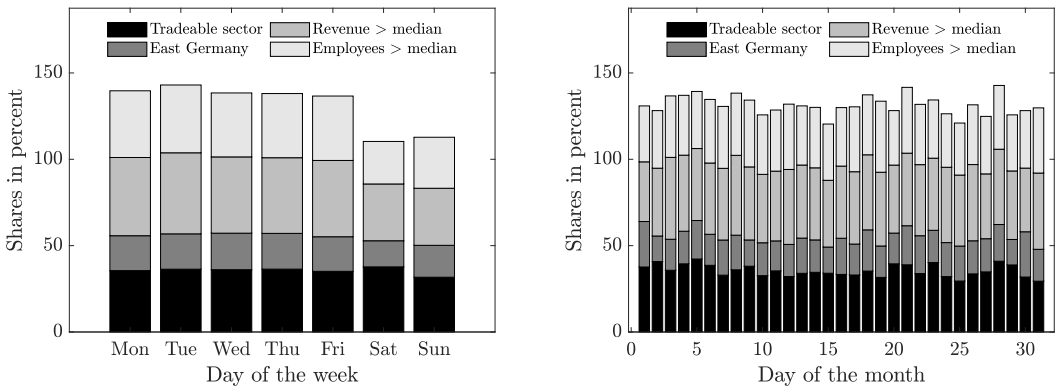
[17] All shares are computed by dividing through all firms that answer a respective survey question. The displayed shares add up to more than 100 percent since the displayed groups are not mutually exclusive.

[18] Academic training is defined by having at least a Master's or equivalent degree, but the shares are also stable when including those with a Bachelor's degree.

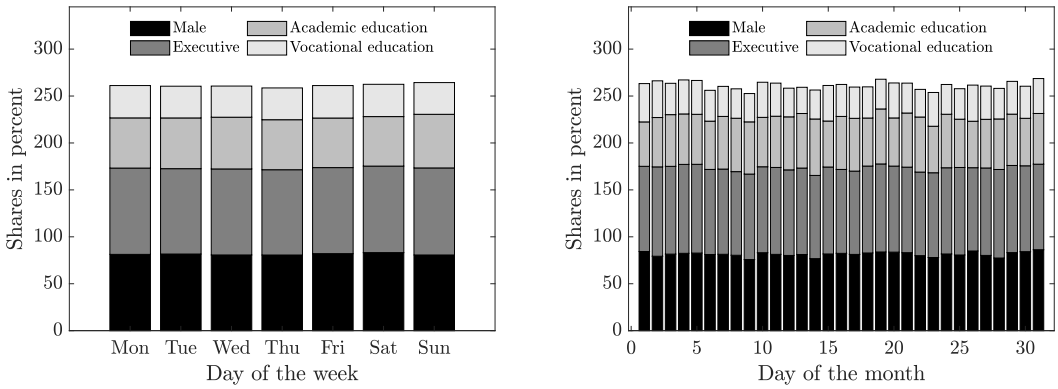
[19] Relatedly, Dutz et al. (2021) argue that response times can be informative about unobservable characteristics.

Figure 3: Cross-sectional composition by day of the week and month

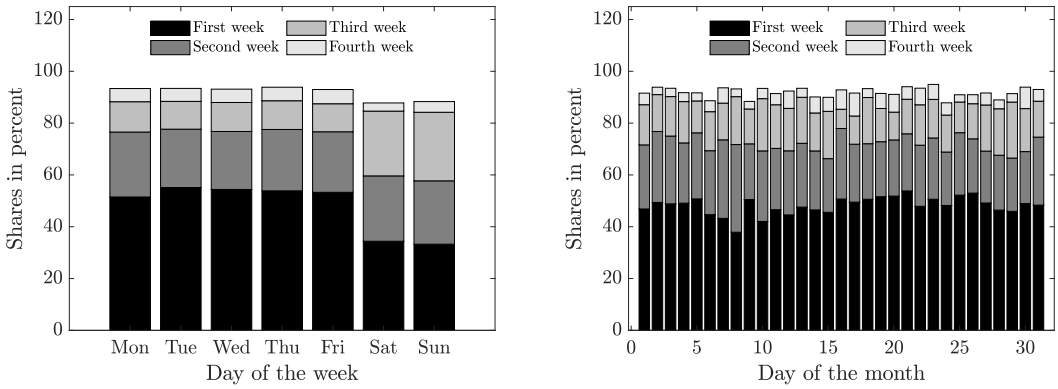
(a) Firm characteristics



(b) Respondent characteristics



(c) Response timing after invitation



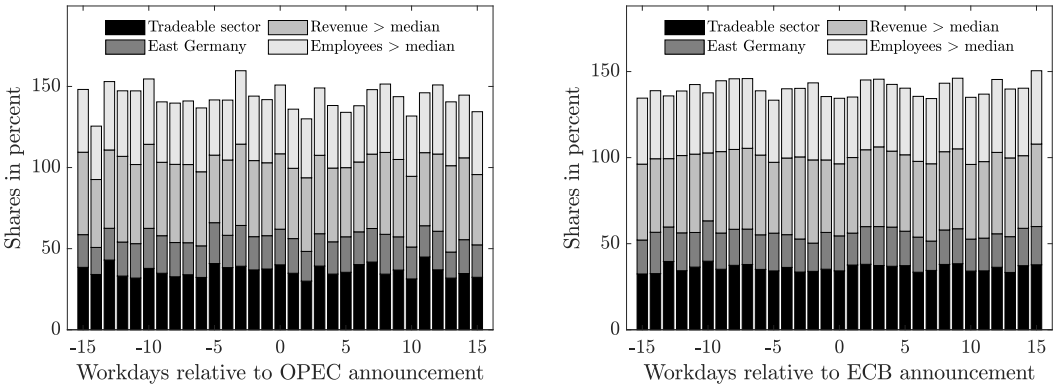
Notes: The figure shows the cross-sectional composition of survey responses per day based on all completed surveys averaged across the day of the week or month. The response timing panels indicate the share of surveys completed within the respective week relative to the date on which the survey invitation was sent.

in the first, second, third, and fourth week after the survey invitation was sent and provide the results in Panel (c) of Figure 3. The composition remains reasonably stable across days

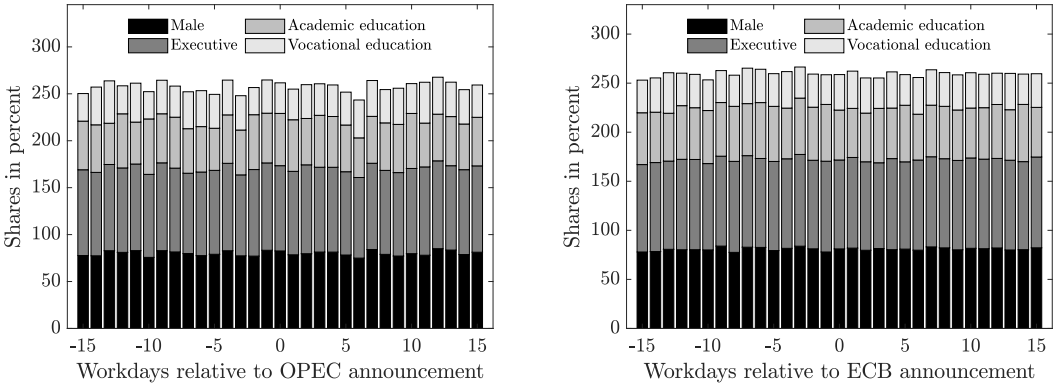
of the month and across workdays. There are only more late respondents on weekends. However, in the sensitivity analysis in Section 4.3, we show that our results are very similar when restricting the sample to early respondents only.

Figure 4: Cross-sectional composition around OPEC and ECB announcements

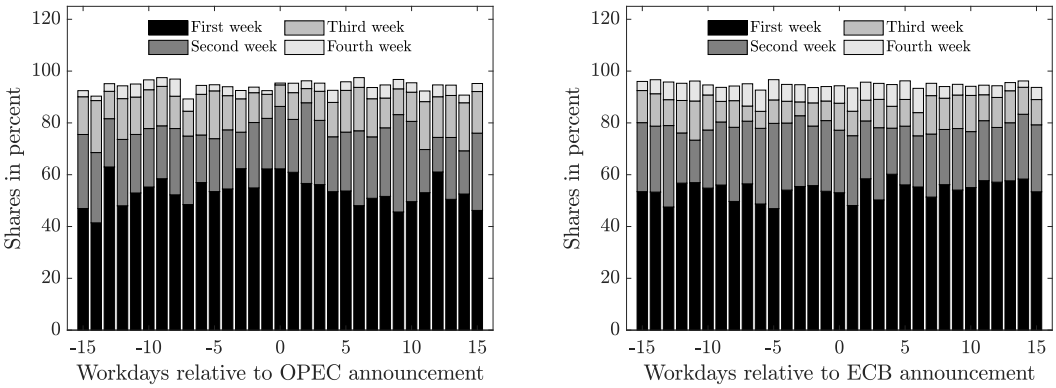
(a) Firm characteristics



(b) Respondent characteristics



(c) Response timing after invitation



Notes: The figure shows the cross-sectional composition of survey responses per day based on all completed surveys averaged across workdays around OPEC and ECB announcements. The response timing panels indicate the share of surveys completed within the respective week relative to the date on which the survey invitation was sent.

Finally, we present the same exercise for workdays around OPEC and ECB announcements in Figure 4. Along all dimensions, we find no evidence for strong compositional effects. Overall, our results indicate that the composition is remarkably stable. There is only modest evidence that the composition is slightly different on weekends. Yet, our empirical strategy in Section 3.2 will be robust to these compositional changes.

Response numbers and composition by survey question. The above discussion focuses on all firms that file a response. In practice, however, firms may not answer all questions. Thus, we repeat our analysis for each outcome, conditional on all firms who answered the underlying question. These questions are introduced in the subsequent section. The results on response numbers and composition effects are provided in Appendix C which is contained in the working paper version that can be found on the authors' websites.[20] This analysis leaves our conclusions regarding response numbers and composition effects unchanged.

2.3 Survey questions

We introduce the survey questions we use to construct daily time series of firms' plans and expectations. The full set of questions is provided in Appendix B, including the original in German language.

Firms' plans. The GBP asks decision-makers about their plans within the next 12 months. As we study the post-pandemic inflation surge, we are particularly interested in pricing plans, which are elicited by the following question.

> *What decisions are you planning to make in the next 12 months?*
>
> (a) *Increase sales prices*

[20] The present version omits this appendix to respect file size constraints. See https://lukas-hack.github.io or https://rostam-afschar.de for the full version.

(b) *Decrease sales prices*

(c) *No change in sales prices*

Based on this question, we encode this extensive margin pricing plan of firm i on date t in variable $\tilde{p}_{it}$ and take the cross-sectional arithmetic average on each date t as

$$\tilde{p}_t = \frac{1}{N_t} \sum_{i=1}^{N_t} \tilde{p}_{it} \times 100 \qquad \text{with} \quad \tilde{p}_{it} = \begin{cases} +1 & \text{if increase} \\ 0 & \text{if no change} \\ -1 & \text{if decrease} \end{cases} \tag{2.1}$$

where N_t is the number of responses on date t. There are three additional questions that are identically formulated but ask about changes in fixed costs, R&D investment, and dividend payouts. It is worth noting that the dividend question is framed such that it includes all payments to owners and not only dividends in a narrow sense; see Appendix B.

Firms' expectations. The GBP further elicits firms' expectations and beliefs regarding general economic conditions. The first question asks about expected firm closures in percent.

What do you estimate: What percentage of firms in your industry will go out of business in the next 12 months?

(a) *Firm exit rate* $\in [0, 100]$

Respondents may answer with a natural number between 0 and 100. We invert this variable to measure the expected rate of firm survival. The second question asks about the satisfaction of decision-makers concerning contemporaneous economic policy.

How satisfied are you with economic policy in Germany?

(a) *Satisfaction* $\in \{0, 1, 2, ..., 10\}$

Respondents have 11 distinct reply possibilities on a scale from 0 (*very dissatisfied*) to 10 (*very satisfied*). We re-scale this variable to range from zero to 100, analogous to the firm survival rate and aggregate both variables by taking the arithmetic average in the cross-section of firms on each date. Finally, there is a set of questions that ask about the expected performance of the firm for which the respondent works.

> *What change (in %) in the following key figures do you expect for your firm in the current calendar year compared to the previous calendar year?*
>
> (a) *Revenue* $\in [-100, 100]$
>
> (b) *Number of employees* $\in [-100, 100]$
>
> (c) *Investment* $\in [-100, 100]$
>
> (d) *Profit* $\in [-100, 100]$

Respondents can answer with any integer number in the stated interval, and we take arithmetic averages across all responses on each date. The question is framed in terms of calendar years and not in terms of the next twelve months, with the aim of measuring targets that can be compared to actual figures typically included in annual reports. This, however, implies that respondents face less uncertainty when asked later in the calendar year. This may attenuate responses to shocks because there is less scope for a shock to affect these expectations.[21] Thus, estimated responses of these expectations likely constitute a lower bound and must be interpreted with caution.

2.4 Daily time series

We present correlations with monthly macroeconomic indicators, summary statistics, and the time series of the daily data. The time variation can often be linked to economic and (geo-)political events in the sample.

[21] This holds when expectations are rational to some degree. If expectations are completely detached from rationality, then it could be that shocks affect expectations even when the underlying outcome has already been realized before the shock.

Table 2: Correlations with macroeconomic variables

	CPI inflation			Industrial production			ifo index		
	Lag	Cont.	Lead	Lag	Cont.	Lead	Lag	Cont.	Lead
Firms' plans									
Sales Price	0.17	0.19	0.22	0.03	0.09	0.13	0.06	0.05	0.05
	(0.00)	(0.00)	(0.00)	(0.35)	(0.00)	(0.00)	(0.06)	(0.10)	(0.13)
Fixed cost	0.09	0.10	0.14	0.00	0.04	0.04	0.00	0.02	0.01
	(0.00)	(0.00)	(0.00)	(0.97)	(0.25)	(0.20)	(0.91)	(0.60)	(0.82)
Dividends	-0.01	-0.03	-0.04	-0.02	0.00	-0.03	-0.04	-0.02	-0.00
	(0.84)	(0.27)	(0.19)	(0.55)	(0.87)	(0.36)	(0.16)	(0.52)	(0.99)
R&D investment	0.03	0.02	0.01	0.01	0.05	0.06	0.11	0.13	0.14
	(0.31)	(0.48)	(0.76)	(0.70)	(0.09)	(0.07)	(0.00)	(0.00)	(0.00)
Firms' expectations									
Firm survival rate	0.02	0.05	0.07	0.09	0.02	-0.00	0.15	0.14	0.14
	(0.60)	(0.14)	(0.03)	(0.00)	(0.46)	(0.99)	(0.00)	(0.00)	(0.00)
Policy satisfaction	0.10	0.17	0.23	0.16	0.20	0.18	0.51	0.49	0.48
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Revenue	0.14	0.14	0.15	0.02	0.06	0.05	0.04	0.05	0.04
	(0.00)	(0.00)	(0.00)	(0.55)	(0.04)	(0.09)	(0.18)	(0.10)	(0.15)
Profit	0.07	0.06	0.05	-0.05	0.03	0.01	-0.06	-0.04	-0.02
	(0.02)	(0.07)	(0.08)	(0.13)	(0.36)	(0.77)	(0.06)	(0.23)	(0.47)
Employment	0.03	0.04	0.06	-0.01	0.03	0.07	0.09	0.10	0.08
	(0.35)	(0.21)	(0.05)	(0.81)	(0.31)	(0.02)	(0.00)	(0.00)	(0.01)
Investment	0.05	0.04	0.04	0.01	0.01	0.04	0.04	0.05	0.08
	(0.08)	(0.16)	(0.17)	(0.84)	(0.66)	(0.24)	(0.18)	(0.09)	(0.01)

Notes: The table shows Pearson correlation coefficients of all daily time series contained in the *Daily Business Database*, with contemporaneous monthly macroeconomic indicators (denoted by Cont.), and correlations with these indicators at a one-month lag or lead. P-values for the null of a zero correlation are displayed in parentheses.

Correlations with macroeconomic indicators. Before discussing the summary statistics, we present correlations with industrial production, the CPI inflation rate, and the ifo index in Table 2. P-values for the null of a zero correlation are displayed in parentheses. As expected, CPI inflation correlates significantly with the sales price and fixed cost plans. The correlation is strongest for the one-month lead of inflation, which suggests that firms' plans

Table 3: Summary statistics of daily time series

	Mean	Median	25^{th} percentile	75^{th} percentile	Min	Max	N
Firms' plans							
Sales Price	58.96	60.00	50.00	70.59	-100.00	100.00	1,082
Fixed cost	19.79	19.20	6.90	31.25	-100.00	100.00	1,082
Dividends	-12.20	-10.53	-23.53	0.00	-100.00	100.00	1,082
R&D investment	13.97	13.04	2.63	22.22	-100.00	100.00	1,082
Firms' expectations							
Firm survival rate	86.48	86.63	84.38	88.95	45.00	100.00	1,082
Policy satisfaction	32.80	31.69	25.65	40.00	0.00	80.00	1,082
Revenue	6.92	6.32	1.67	11.52	-84.00	100.00	1,082
Profit	0.68	0.43	-4.55	5.33	-81.00	100.00	1,082
Employment	4.76	4.08	0.25	7.83	-100.00	100.00	1,082
Investment	4.18	4.24	0.00	9.05	-100.00	100.00	1,082

Notes: The table shows summary statistics of all daily time series contained in the *Daily Business Database*. The firm survival rate and policy satisfaction are scaled such that survey answers can range from 0 to 100. All other variables can range from -100 to 100. Note that minimum and maximum values can be driven by the answer of a single firm because there are some days with just one firm responding; see the discussion in Section 2.2.

may also translate into managerial action. Similarly, we find a significant correlation of CPI inflation with revenue and with profit expectations. Moving to industrial production, we also find a significant correlation with sales price plans but less with other variables. Further, we study the ifo *Business Climate Index*, a well-established indicator of economic conditions in Germany based on the ifo firm survey. The R&D investment plans and investment expectations correlate significantly with the ifo index, particularly with the one-month lead of the index. Finally, we note that the highest correlation across all variables is between the ifo index and the satisfaction with economic policy.

Taken together, this analysis reveals that our daily plans and expectations correlate with conventional economic indicators that are available at a monthly frequency. It suggests that studying our firm-level outcomes may be informative about the general economic situation.

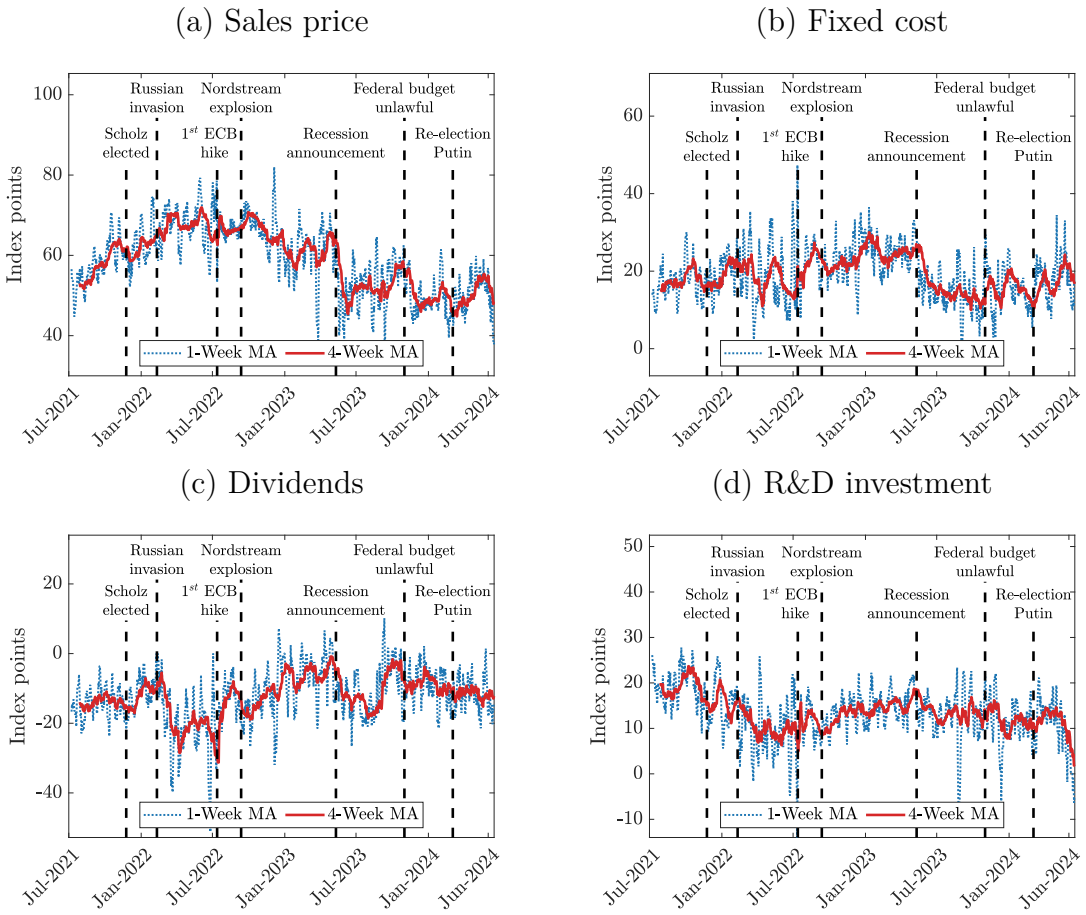
Summary statistics. The summary statistics of all firm-level outcomes are provided in Table 3. On the average day, firms plan to raise sales prices, fixed cost, and R&D investment but not dividends. Expected revenue growth is at 6.9 percent, whereas expected profit growth is only at 0.7 percent, suggesting that firms expected strong cost increases. The average satisfaction with (contemporaneous) economic policy is 32.8, suggesting that the average firm is somewhat dissatisfied. The expected one-year ahead firm survival rate is only 86.5 percent on average. For comparison, the actual firm survival rate in 2021 at the one-digit industry level ranges between 88.0 and 96.3 percent. In summary, expected cost increases, low policy satisfaction, and a low expected firm survival rate suggest a rather grim outlook as perceived by German firms. This is consistent with a period characterized by large challenges, such as energy price shocks and the associated inflation surge, and geopolitical events, such as the Russian invasion of Ukraine.

Time series. We present the daily time series from June 15, 2021, until June 30, 2024, for firms' plans and expectations in Figures 5 and 6, respectively. The dotted blue and solid red lines show backward-looking moving averages over 7 and 28 days, respectively. Specifically, we compute weighted moving averages, weighing each daily observation by the associated response number to have valid cross-sectional averages over the respective 7- or 28-day period.[22] We further highlight selected economic and (geo-)political events, which we discuss next.

Relation to economic and political events. We discuss important economic and (geo-)political events chronologically, focusing on the 28-day moving average (4-Week MA). First, Olaf Scholz was elected chancellor by the federal parliament on December 8, 2021, after a prolonged coalition negotiation. Almost all firm plans and expectations were on a downward trajectory and experienced a trend reversal around or shortly after this event. Only policy

[22]Formally, the h day moving average is given by $x_t = \sum_{s=0}^{h-1}(N_{t-s}/M_{t,t-h})\ \tilde{y}_{t-s} = 1/M_{t,t-h}\sum_{s=0}^{h-1}\sum_{i=1}^{N_{t-s}}\tilde{y}_{i,t-s}$ where $\tilde{y}_t$ is the daily time series, $\tilde{y}_{i,t}$ is the response of an individual firm i on day t, N_t is the number of responses on day t and $M_{t,t-h} = \sum_{s=0}^{h-1} N_{t-s}$.

Figure 5: Time series of firms' plans



Notes: The figure shows a 7-day and 28-day backward-looking moving averages of the underlying daily time series data, along with the dates of selected economic and (geo-)political events that are likely relevant for German firms.

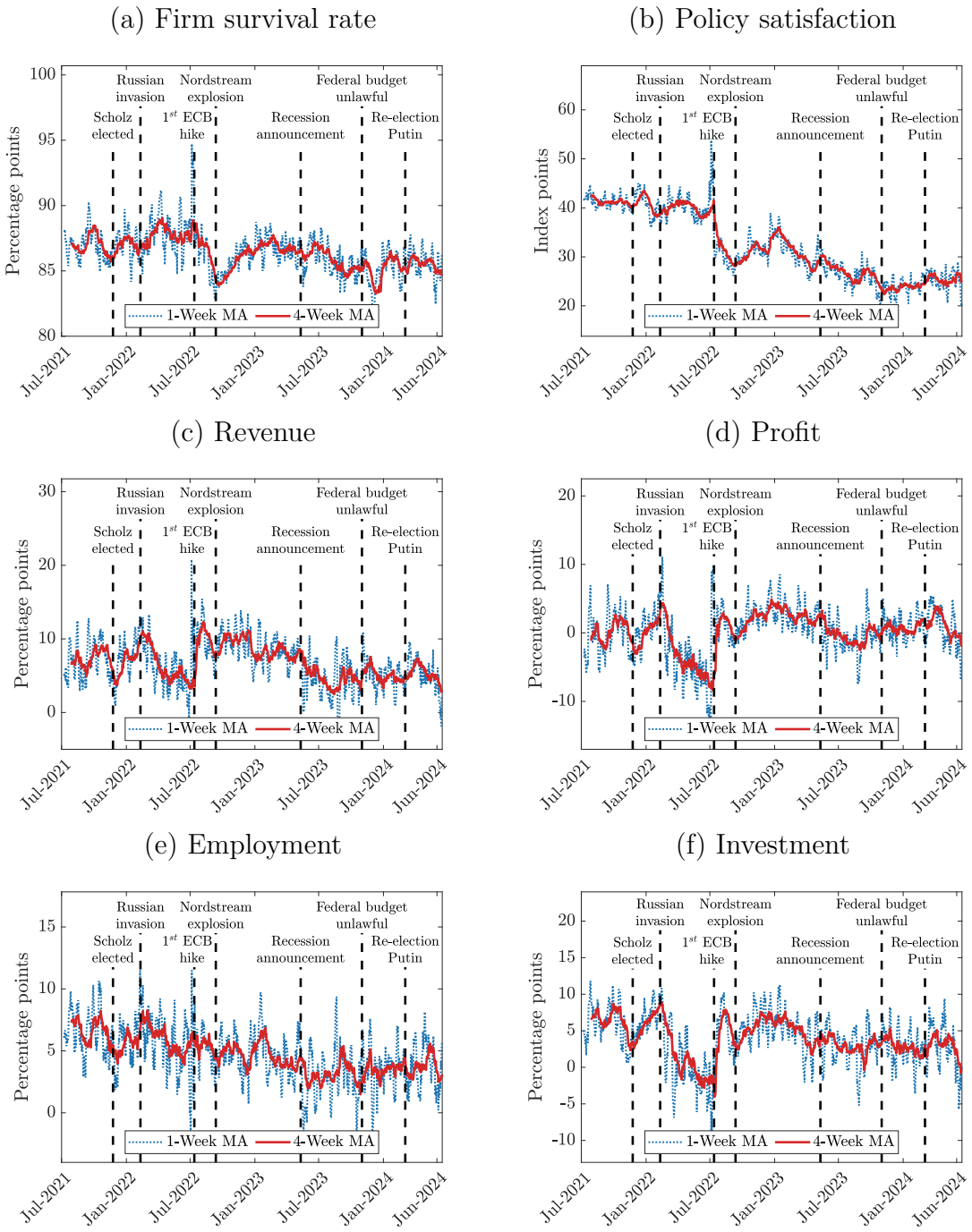
satisfaction was not on a downward trend but still displays a noticeable uptick around this date. This is consistent with firms being relieved a new government was in place around 70 days after the election, a long period for coalition negotiations compared with past federal elections in Germany.

Second, Russia started its invasion of Ukraine on February 24, 2022. Strikingly, expected revenue, profit, employment, and investment strongly fell shortly after this date. Similarly, firms revised plans for dividend payments and R&D investment downward. These developments are consistent with elevated uncertainty due to the hostilities in Ukraine.[23]

Third, the ECB started its hiking cycle with an initial hike of 50 basis points on July

[23]Real options theory predicts a negative effect of uncertainty on investment (Bernanke, 1983).

Figure 6: Time series of firms' expectations



Notes: The figure shows a 7-day and 28-day backward-looking moving averages of the underlying daily time series data, along with the dates of selected economic and (geo-)political events that are likely relevant for German firms.

27, 2022. Both the expected firm survival rate and the satisfaction with economic policy tanked quickly after this event. Somewhat surprisingly, the expectations regarding firm-level outcomes increased simultaneously. However, these are only correlations. The causal effects

of monetary policy shocks in Section 5 do not display such puzzling behavior.

Fourth, the gas pipeline Nordstream 2 was destroyed on September 26, 2022. After this event, satisfaction with economic policy and all other expectations increased, possibly in the hope of government support measures that would accommodate the lurking natural gas shortage. Eventually, such government support measures were provided.

Fifth, on May 25, 2023, the Federal Statistical Office announced that the German economy shrank in the first quarter of 2023, indicating that Germany was in a recession. This announcement was widely covered in the media. Around this date, all firm plans display a decline. Similarly, revenue and profit expectations fell, consistent with firms revising their demand expectations downward.

Sixth, on November 15, 2023, the Federal Constitutional Court ruled that the federal budget was unlawful. The decision raised doubt regarding the financing of various government support measures and plans. Yet the firm-level outcomes hardly changed, except for sales price plans, which declined around this event.

Finally, Putin was re-elected as Russian President on March 17, 2024. This event hardly affected firm-level outcomes, possibly because it was already expected.

Overall, this discussion shows that many important events may impact firms' plans and expectations. While our discussion is purely descriptive, it suggests that our data may be useful in assessing how various economic and (geo-)political events (causally) affect firm decision-making.

3 Identification and econometric framework

We briefly discuss the high-frequency identification approach for monetary policy and oil supply shocks. We further introduce the econometric framework.

3.1 Identification

Identification of monetary and oil supply shocks is based on revisions in asset prices around ECB and OPEC announcements.

Monetary policy shocks. We identify monetary policy surprises based on high-frequency changes in asset prices around ECB monetary policy announcements (e.g., Gürkaynak et al., 2005; Altavilla et al., 2019; Jarociński and Karadi, 2020). We use the Euro Area monetary policy event-study database from Altavilla et al. (2019), which provides changes in various asset prices for each policy announcement.[24] Specifically, they report the change in yields for Overnight Index Swaps (OIS) of Euribor rates at various maturities. These changes in asset prices reflect surprises to market participants concerning the underlying Euribor rate. The short-maturity Euribor OIS should mainly capture monetary policy surprises that affect short-term interest rates. With increasing maturity, the OIS should also capture forward guidance policy. We use the three-month OIS as our baseline surprise following Almgren, Gallegos, Kramer, and Lima (2022) but also consider the one-year OIS to study forward guidance. The first monetary policy announcement in our estimation sample occurs on July 22, 2021, and the last one is on January 25, 2024. On days without announcements, the time series assumes zero values.

A burgeoning literature is concerned with "information effects" polluting monetary policy shocks (e.g. Nakamura and Steinsson, 2018; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021). When the central bank has private information about the economy, then changes in OIS around monetary events may not only reflect monetary policy surprises but also news about economic fundamentals. To address this concern, we apply the "poor man's sign restriction" approach from Jarociński and Karadi (2020) where we set surprises to zero when the STOXX50 moves in the same direction as the yield of the OIS.[25] We apply this to

[24] The last monetary event in this database is on October 26, 2023. Thus, we take the data for the two subsequent ECB meetings from Istrefi et al. (2024), which provides the same data until January 2024.

[25] For example, a conventional monetary shock that raises interest rates should lead to deteriorating stock markets. When this does not happen, one may conclude that the central bank only raised rates because

the monetary policy surprises yielding the monetary policy shocks that we use. Throughout the remainder of the paper, we will refer to shock based on the three-month OIS as monetary policy shock and to the shock based on the one-year OIS as forward guidance shock.

Oil supply shocks. Analogously to monetary policy shocks, Känzig (2021) proposes to identify oil supply shocks based on changes in prices of oil futures around OPEC announcements. The oil supply surprise from Känzig (2021) is given by the first principle component across changes in oil prices ranging from contemporaneous spot prices to futures with a duration of up to one year. The first OPEC announcement in our estimation sample occurs on August 3, 2021, and the last one is on November 30, 2023. The oil shock series takes zero values on all other days, analogously to monetary policy shocks.

In a recent contribution, Degasperi (2021) shows that "information effects" also contaminate these oil surprises. The idea is that the OPEC has superior information about future oil demand, which affects the oil quotas on which OPEC members agree. Degasperi (2021) suggests an approach analogous to the "poor man's sign restriction" approach for monetary policy. Specifically, the restriction is that oil surprises indicating higher oil price expectations are only valid oil supply shocks when stock markets decline around the same event window, and vice versa for surprises that lower oil price expectations. The events that violate this restriction rather capture oil demand shocks according to this approach.[26] We follow Degasperi (2021) by setting oil surprises to zero when oil price revisions and the S&P 500 move in the same direction, which yields the oil supply shocks that we use.[27]

the economy is running hot, and the OIS does not capture a truly random monetary shock. Jarociński and Karadi (2020) show that their approach works well for removing these "information effects".

[26] In the sensitivity analysis in Section 4.3, we confirm that these events yield responses that are consistent with demand shocks, corroborating the validity of this identification approach.

[27] Känzig (2023) uses a daily event window primarily because OPEC communicates less clear than monetary policy authorities, and, thus, market participants need more time to process this information. Degasperi (2021) uses the same event window and computes differences in closing prices of the S&P 500 to obtain the oil supply shocks.

3.2 Econometric framework

We first introduce the local projection model and then discuss the empirical setup, including control variables and the estimation sample.

Local projection specification. We estimate the causal effects of oil supply, monetary policy, and forward guidance shocks on our daily outcomes based on the following variant of a local projection (Jordà, 2005). Specifically, we run the following sequence of regressions for $h = 0, 1, ..., H$ at daily frequencyy

$$\sum_{s=0}^{h} y_{t+s} = \alpha^h + \beta^h \, \varepsilon_t + \Gamma^h \, Z_{t-1} + v^h_{t+h}, \tag{3.1}$$

where y_{t+s} is the (weighted) daily time series of interest, ε_t is the shock under consideration and Z_{t-s} is a vector of additional control variables.

The causal effect of interest, β^h, is the response of the average y_t from the day of the shock up until day h. Importantly, the outcome variable is weighted with sample size to ensure that daily observations with small cross-sectional response numbers do not over-proportionally affect the left-hand-side variable. Specifically, let $\tilde{y}_t$ be the unweighted daily time series and N_t the associated cross-sectional sample size. Then, the outcome variable satisfies

$$\sum_{s=0}^{h} y_{t+s} = \sum_{s=0}^{h} \frac{N_{t+s}}{\sum_{s=0}^{h} N_{t+s}} \, \tilde{y}_{t+s} = \frac{1}{\sum_{s=0}^{h} N_{t+s}} \sum_{s=0}^{h} \sum_{i=1}^{N_{t+s}} \, \tilde{y}_{it+s}, \tag{3.2}$$

where $\tilde{y}_{it}$ is the answer of firm i filed on date t. We use this specification because it has three key advantages. First, it smooths out the noise that is inherent in daily time series data. We prefer this over using backward-looking moving averages as the left-hand-side variable (e.g., Buda et al., 2023) because this would distort the shape of the impulse response.[28]

[28] To see this, consider a conventional local projection model $x_{t+h} = \beta^h \, \varepsilon_t + u^h_{t+h}$ and suppose the left-hand-side is a 2-day backward-looking moving average of the daily time series, i.e., $x_t = 0.5(\tilde{y}_{t-1} + \tilde{y}_t)$. Now, the resulting $h = 0$ estimand is $\beta^0 = 0.5 \; \mathbb{E}[\varepsilon_t \tilde{y}_t]/\mathbb{E}[\varepsilon_t^2]$ since $\mathbb{E}[\varepsilon_t \tilde{y}_{t-1}] = 0$, when the shock is exogenous. As

Second, we can easily accommodate daily observations with small response numbers or even no response on some days. Moreover, we do not require that the composition of firms be constant on each day. Instead, it suffices when the composition is constant on average within the h-day window. Third, it allows a comparison with monthly or quarterly data because it becomes immediate which responses are too transitory to be detected at lower frequency data or which may suffer from time aggregation issues (e.g., Jacobson et al., 2023).

Empirical specification. We specify the local projection from equation (3.1) as follows. The maximum horizon corresponds to $H = 100$ days. The vector of controls includes 28 daily lags of the outcome variable $\tilde{y}_t$ and of the price that underlies the shock under consideration, i.e., the respective Euribor rate or the Western Texas Intermediate oil price.[29] These variables shall control for daily dynamics to enhance the signal-to-noise ratio in the regression. Finally, to control for macroeconomic conditions, we also include a monthly lag of the natural logarithm of CPI, of industrial production, and the ifo index. The estimation sample runs from the start of our data, July 15, 2021, until April 30, 2024. We do so because our last shock is in January 2024, and leveraging this shock over the entire response horizon requires three additional months of data.[30] Yet, our results hardly change when estimating the responses over the maximum available sample.

4 Daily responses of firms' plans

We present the daily responses of firms' plans to oil supply shocks and two types of monetary policy shocks that move short- and long-rates, respectively. The baseline results focus on the average plans across all firms. We further investigate heterogeneity by firm sector and

a result, the impulse response is mechanically cut in half for $h = 0$ but not for $h = 1$.

[29] To be precise, when we study a monetary policy shock based on the three-month OIS, then we include the lags of the three-month Euribor rate. When we use shocks based on the one-year OIS, then we include the lags of the one-year Euribor rate. Finally, we use the daily oil price when studying oil supply shocks.

[30] In our estimation sample, oil supply, monetary policy, and forward guidance shocks have standard deviations 0.09, 0.11, and 0.31, respectively.

firm size. Finally, we present a sensitivity analysis of our results.

4.1 Average firm plans

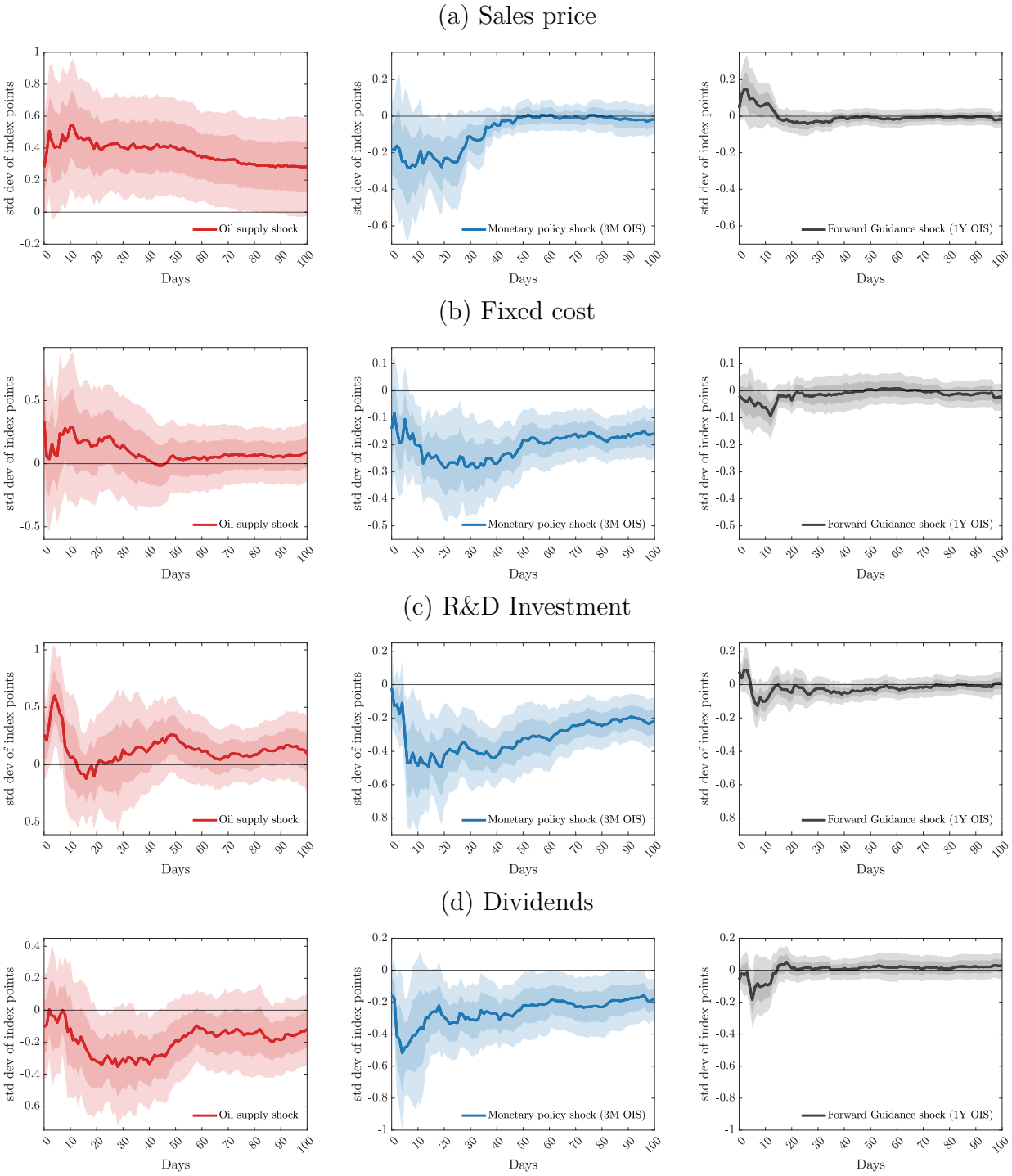
We first present the empirical results, followed by a discussion of our findings, relative to the literature. Figure 7 displays the responses of firms' plans to oil supply shocks, monetary policy shocks, and forward guidance shocks in columns one to three.[31] The left-hand-side variables and the shock measures are standardized to ease interpretation. A standard deviation of the oil supply shock corresponds to an increase in oil price expectations by 1.94 percent. A standard deviation of the monetary policy shock amounts to 2.98 basis points. Finally, we standardize the forward guidance shock also by 2.98 basis points to compare magnitudes across the two types of monetary shocks. The shaded areas are confidence bands at 68 and 95 percent based on Newey-West standard errors with automatic bandwidth selection.[32]

Oil supply shocks. The responses to oil supply shocks are the solid red lines in the first column of Figure 7. The shock is contractionary, i.e., an increase in the (expected) oil price due to a reduction in OPEC oil quotas. The standardized oil shock leads to immediate upward revisions in firms' pricing plans, as displayed in Panel (a). Quantitatively, the effect is half a standard deviation in firms' pricing plans already three days after the shock. It means that firms that file the survey during the first three days after the shock report more often that they plan sales price increases. This effect is statistically significant at the five percent level. It persists over the entire response horizon and remains significant at five percent for many days. After a hundred days, it still amounts to 0.28 of a standard deviation and is significant at the ten percent level. This shows that even during the first hundred days after the shock, firms are more likely to plan price increases on average.

[31] Recall that the monetary policy shock is based on the three-month OIS whereas the forward guidance shock is based on the one-year OIS; see Section 3.1.

[32] We obtain similar results when setting the bandwidth based on the estimation horizon to $h + 1$ and when using lag-augmented inference as in Montiel Olea and Plagborg-Møller (2021).

Figure 7: Responses of firms' plans to oil supply and monetary policy shocks



Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020). Monetary policy and forward guidance shocks use three-month and one-year Overnight Index Swaps (OIS), respectively. The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

For plans to adjust fixed cost and R&D investment in Panels (b) and (c) of Figure 7, we find only moderate positive effects that are mostly insignificant. This is not surprising as respondents likely refer to nominal quantities. Firms may seek to decrease investment and fixed cost in real terms due to the contractionary nature of the shock. However, higher input prices may force them to increase nominal fixed cost and R&D investment moderately.

Finally, in Panel (d), we find a negative effect on dividend payment plans consistent with a contractionary shock. The response becomes statistically significant at five percent after 21 days and turns insignificant after around 50 days.

Overall, oil supply shocks have an immediate inflationary impact on firms' price-setting plans. The responses of the other firm plans are consistent with a reduction in real activity and, hence, with the nature of a contractionary supply shock.

Monetary policy shocks. The effects of a contractionary monetary policy shock are displayed as solid blue lines in the center column of Figure 7. Across all outcomes, we find that firms revise their plans significantly downwards within a couple of days. The effect on the sales price plan reaches the trough at -0.28 of a standard deviation after seven days. It turns significant at the five percent level after 15 days. However, this effect fades away within 40 days after the shock. Such a short-lived effect is consistent with firms postponing their extensive margin sales price increases by 20 to 30 days.[33] This is not inconsistent with more persistent effects of monetary policy on price changes since the survey question only measures the extensive and not the intensive margin. Finally, we note that this also shows that high-frequency data is valuable for finding such transitory effects that may hardly be detectable at a monthly or quarterly frequency.

Panels (b) and (c) of Figure 7 reveal that firms revise their fixed cost and R&D investment plans significantly downward. Fixed cost plans display a significant effect at the five percent level after seven days, amounting to around -0.3 of a standard deviation. For R&D investment

[33]Recall that we display the average firm response between the day of the shock and h days after the shock. For this average to revert to zero, firms must be more likely to *increase* sales prices at some point.

plans, we find similar effects but an even quicker response. This response exceeds -0.4 of a standard deviation for many days and is significant at five percent after only five days.
Consistent with the contractionary nature of the monetary policy shock, we also find that firms revise dividend plans significantly downward. This effect reaches its trough after five days and stabilizes slightly above -0.2 of a standard deviation after 20 days, being significant at five percent on most days.
In summary, we find that the monetary policy shock affects all outcomes in the expected direction, with monetary policy transmission operating at a remarkable pace.

Forward guidance shocks. Since the effects of (conventional) monetary policy shocks on pricing plans are very transitory, one may wonder whether monetary policy could compensate for this with forward guidance. To this end, we present the responses to a contractionary forward guidance shock in the last column of Figure 7.

Over almost all horizons and across all plans, we obtain a relatively precisely estimated zero effect.[34] In the short run, we even find an insignificant price puzzle in terms of the sales price plan. The zero effect is precise in the sense that the point estimates for conventional monetary policy shocks are often a multiple of the 95 percent confidence lower bounds for the forward guidance shocks. The fact that we do not detect significant effects suggests that forward guidance has, at most, an extremely small effect on the outcomes under consideration. Overall, the clear zero effects indicate that forward guidance may be ineffective during the episode under consideration.

Discussion. We discuss the implications of our findings relative to the literature. First, oil supply and monetary policy shocks transmit quite quickly to firms' plans. Rapid transmission to firms' plans is consistent with recent findings that agents tend to be more attentive when inflation is high, based on survey experiments (Weber et al., forthcoming) and based

[34]Recall that the forward guidance shocks are scaled such that their size in basis points is identical to the monetary policy shock.

on observational survey data (Pfäuti, 2023). It can be explained with theories of rational inattention (e.g., Maćkowiak and Wiederholt, 2009, 2015). It further buttresses our initial motivation that it is important to estimate the responses without relying on historical data where attention was low.

Second, the immediate impact of oil shocks on prices points to the importance of energy supply shocks during the recent inflation surge. Consistent with this result, Patzelt and Reis (2024) find that the pass-through from energy prices to inflation expectation of European consumers was substantially higher during the inflation surge. Pfäuti (2023) further finds that oil shocks have a larger effect on U.S. inflation when attention is high.

Third, our results on monetary policy shocks relate to the traditional question of whether monetary policy operates with long or short lags (Friedman, 1961). We show that monetary policy transmission affects firms' plans with remarkably short lags. Short lags of monetary policy are consistent with findings that ECB announcements quickly affect expectations of German manufacturing firms (Enders et al., 2019). Finally, a strong and significant pass-through to R&D investment plans is in line with a nascent literature that argues that monetary policy may have long-run effects operating through R&D (e.g., Ma and Zimmermann, 2023; Jordà, Singh, and Taylor, forthcoming).

Fourth, the precise zero effects of forward guidance indicate that such policies are ineffective compared to conventional New Keynesian theory, echoing the forward guidance puzzle (e.g. Nakamura and Steinsson, 2018; Del Negro et al., 2023). Instead, our results can be reconciled with deviations from rational expectations, e.g., with cognitive discounting (Gabaix, 2020; Pfäuti and Seyrich, 2022).

4.2 Firm heterogeneity

The presented results average across all firms that answer the respective survey question. However, there is a large literature that emphasizes the importance of firm heterogeneity. Hence, we inspect whether meaningful heterogeneity exists in the responses of firms' plans to

oil supply and monetary policy shocks. We first introduce the dimensions of heterogeneity, state the empirical results, and conclude with a brief discussion.

Dimensions of heterogeneity. We investigate whether there are heterogeneous responses across two dimensions: firm sector and firm size. Firms operating in the tradeable sector may be more exposed to monetary policy through the exchange rate channel. On the other hand, tradeable sector firms may face more (international) competition, which may make it harder to increase sales prices in response to shocks. Small firms could be more responsive to shocks, e.g., due to less access to external financing (Gertler and Gilchrist, 1994).

To investigate these dimensions of heterogeneity, we split the survey responses into subgroups of similar size. Then, we construct daily time series exactly as described in Section 2. To measure firm sector, we distinguish between firms operating in the tradeable and non-tradeable sector. This is based on the survey question that asks for the industry of the firm; see Appendix B for details. The question provides us with a one-digit industry classification. At the one-digit industry level, we have additional data on the average export shares (the ratio of export revenues to total revenues) for each industry.[35] We assign these export shares to each survey response based on the reported industry. Finally, we refer to tradeable firms as those with above median export share and vice versa for non-tradeable firms.[36] To measure firm size, we leverage an additional survey question that asks for the revenue in the previous calendar year. We use this directly and refer to small firms as those with revenue below the median and vice versa for large firms.[37]

The heterogeneous responses of firms' plans to the oil supply shock and the monetary policy shock are given Figure 8. The larger shaded area and the dotted lines are 95 percent confidence bands based on Newey-West standard errors, as in the previous section. We

[35] We use the data from 2021, irrespective of the year in which the survey was completed, as this is the most recent available data; see Appendix A for more details. However, note that these shares are relatively stable over time.

[36] Firms in the tradeable sector report an industry with an average export share of 4.6 percent or higher, while more than two-thirds of these firms report an industry with an average export share above 10 percent.

[37] This implies that small firms reported revenue of 700,000 euros or less. Large firms reported annual revenue above this threshold.

discuss heterogeneity by sector in columns one and two and heterogeneity by firm size in columns three and four in this order.

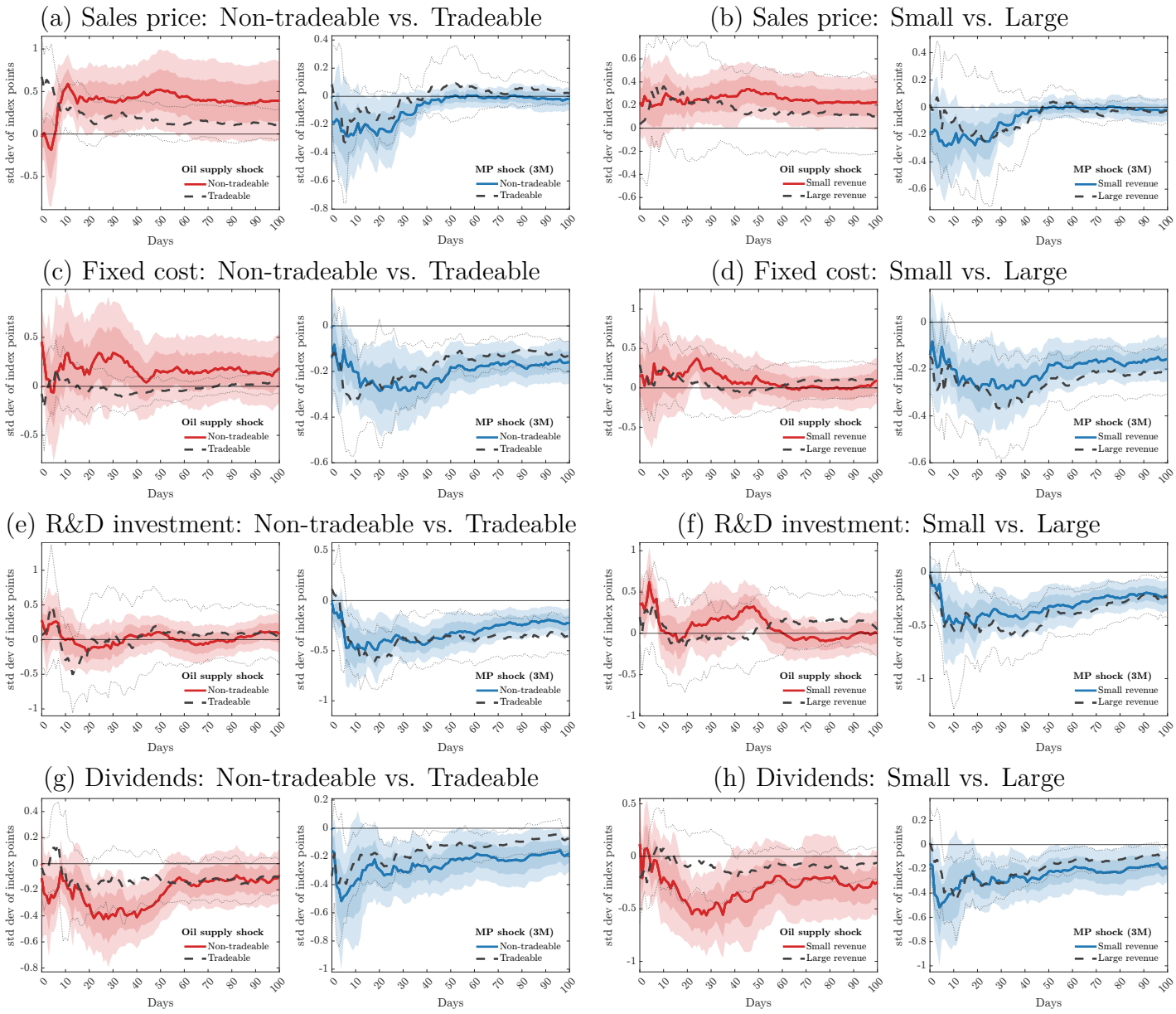
Non-tradeable vs. Tradeable. The pricing plan response to oil supply shocks is stronger and more significant for firms in the non-tradeable sector. Interestingly, the non-tradeable response takes a few days to build up, is significant at the five percent level after nine days, and remains stable in magnitude over the remaining response horizon. In contrast, the tradeable response is significant on impact but more short-lived and roughly half the size of the non-tradeable response after around 20 days. Moving to fixed cost and R&D investment, we find no meaningful effects for either group. Finally, the dividend plan response is also driven by firms operating in the non-tradeable sector, indicating that these firms tend to be more exposed to oil supply shocks.

In contrast to oil supply shocks, we find that monetary policy transmission to firm plans is relatively uniform across sectors for all outcomes. Only the effects on firms' pricing and dividend plans appear to be a bit more mute for the tradeable sector and only significant at ten percent for sales prices.

Small vs. Large. We find that small firms respond strongly and significantly to oil supply shocks in terms of sales price and dividend plans. In contrast, we obtain only insignificant effects on these outcomes for large firms with smaller magnitudes. For fixed cost and R&D investment, we find no meaningful effects for both groups, as for sectoral heterogeneity.

Moving to monetary policy shocks, we find that monetary policy transmission appears to be similar for small and large firms in terms of the point estimate. This holds for all outcomes. However, the pricing plans are only significant for small firms.

Figure 8: Heterogeneous responses of firms' plans



Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). Firms operating in the non-tradeable sector have below-median export shares (export revenues over total revenues), and the remaining firms are classified as operating in the tradeable sector. Small firms have below-median revenue, and the remaining firms are classified as large. The shaded areas indicate 68% and 95% confidence bands corresponding to the solid line. The dotted lines indicate 95% confidence bands corresponding to the dashed line. All bands use Newey-West standard errors.

Discussion. The heterogeneity analysis reveals two main findings. First, the effects of oil supply shocks on firms' plans are heterogeneous, as firms in the non-tradeable sector and small firms respond more strongly with more significant effects. In contrast, monetary policy

transmission is relatively uniform across both dimensions of heterogeneity. Since the effects are relatively similar along the firm sector and size dimension, one may wonder whether there is a strong overlap across both groups. Specifically, it could be that most small firms also operate in the non-tradeable sector and vice versa. However, the correlation coefficient between the two respective group indicators is only 0.19, suggesting that there are many small firms that operate in the tradeable sector and the other way around.

The second main finding from the heterogeneity analysis pertains to the important role of small firms and firms in the non-tradeable sector. From an ex-ante perspective, one may think that these firms are less likely to monitor monetary policy and energy prices since they might lack staff dedicated to such tasks. Our results are inconsistent with this lack of attention as we find stronger and more significant effects for these types of firms. This may be consistent with these firms being more likely to be liquidity-constrained and, hence, more responsive. This shows that studying a broad set of firms may generate additional insights and is complementary to studies of manufacturing firms, which tend to be large and tend to operate in the tradeable sector (e.g., Enders et al., 2019).

4.3 Sensitivity analysis

In this section, we provide a sensitivity analysis that corroborates the robustness of our main results for oil supply and monetary policy shocks, focusing on the average firm plans. We discuss the findings below and provide the corresponding results in Appendix C.

Shock identification. The oil supply shocks under consideration use sign restrictions based on the comovements of stock markets and oil prices around OPEC events. The argument is that only shocks that induce a negative comovement between oil prices and stock markets are true supply shocks, whereas the shocks with positive comovement are rather oil demand shocks (Degasperi, 2021). While this approach is a relatively recent refinement of the underlying and more established oil shocks from Känzig (2021), there is a straightforward

way to test whether the data support the identification approach. One can simply estimate the responses to the oil demand shock to check whether they display typical properties of such a shock. For this exercise, we maintain the baseline specification and change only the oil shock. The responses are provided in Figure C.1 in the Appendix. We find significant positive effects on sales prices, fixed cost, and dividend plans. This is exactly what one should expect from an expansionary demand shock, supporting the identification approach in Degasperi (2021).

The analogous approach for monetary policy shocks by Jarociński and Karadi (2020) is well-established in the literature. Yet, in a recent contribution, Bauer and Swanson (2023) challenges the presence of "information effects" based on U.S. data. Hence, it is also worth studying the information shocks, i.e., the monetary policy surprises that induce a positive comovement between interest rate expectations and stock markets around ECB announcements. For this exercise, we maintain the baseline specification but only exchange the shock measure. The resulting estimates are indeed incompatible with a conventional monetary policy shock. Price plans do not decline. Instead, fixed cost, dividends, and R&D investment all expand significantly in response to this increase in interest rate expectations; see Figure C.1. Overall, this suggests that the sign restriction approach is a sensible choice.

A related concern pertains to monetary policy and forward guidance shocks being potentially correlated because they are based on the same monetary policy announcements. Hence, we estimate responses to monetary policy shocks while additionally controlling for the contemporaneous forward guidance shock and 28 daily lags of the underlying one-year Euribor rate to control for the yield curve. The responses are similar to the baseline and remain equally significant; see Figure C.2. In fact, if anything, the sales price response becomes stronger and more significant. Thus, we conclude that our results are not driven by the correlation between different types of monetary shocks.

Control variables. Beyond the yield curve controls from above, we investigate the sensitivity of our results to adding potentially important co-variates to our baseline local projection specification. First, we control for 28 daily lags of the DAX and STOXX50 stock market indices to control for German and European economic conditions. As a second specification, we control for 28-daily lags of all four firm plan variables such that the set of controls is constant across outcomes. This way, we intend to control for firms' plans being jointly determined. Finally, we estimate a comprehensive specification that jointly contains all plans and stock indices. The results are given in Figure C.3. Across all specifications, we find effects that are very similar to the baseline. This suggests that our results are not driven by omitting important control variables.

Covid-19. Another concern pertains to the end of the Covid-19 pandemic being part of our sample. To inspect whether this affects our results, we add pandemic controls to the baseline specification. First, following Buda et al. (2023), we control for the contemporaneous Covid-19 stringency index as well as the contemporaneous Covid-19 case count, the latter being cumulative and in logs; see Appendix A for more details on these variables. In an additional specification, we further add the log of contemporaneous cumulative Covid-19 deaths to the preceding specification because Covid-19 deaths are a salient measure of the pandemic's severeness.[38] Finally, we also re-estimate the baseline specification but on a shorter sample that starts only in July 2022, excluding the relevant pandemic times. The results for all three specifications are given in Figure C.4. All responses are similar to the baseline and remain significant. In fact, especially for the pricing plans, we find more significant effects suggesting that keeping the pandemic in the sample worsens the signal-to-noise ratio.[39]

Late respondents. We further inspect whether the timing with which respondents file the survey affects our results. First, we re-estimate the baseline specification using firm plans that

[38]Deaths are arguably more important than the case count in this late phase of the pandemic since infections were less dangerous thanks to vaccines.

[39]We keep the pandemic in the baseline sample to use as many ECB and OPEC events as we can.

are computed only from firms that respond within seven days (the median response time) after the survey invitation is sent. Second, we also re-estimate the baseline specification using firm plans that are only based on firms that respond on the same day on which they open the survey. Both exercises address the concern that "late responders" may differ in terms of unobserved heterogeneity. The latter specification may be particularly suitable because we believe that respondents become only fully aware of the scope of the survey after having started it. The responses from both exercises are displayed in Figure C.5. All results are reasonably close to the baseline. Thus, we conclude that our results are not driven by delayed responses.

Seasonality. Finally, one may be concerned about seasonality and other regularities due to calendar time. Our baseline specification partly addresses this concern already by averaging over the response horizon. Yet, we investigate whether including additional seasonality controls affects the results. Specifically, we add either three-month or two-month fixed effects to the baseline, i.e., we include dummies that are activated for each pair or triple of months.[40] Naturally, these fixed effects absorb a substantial amount of time variation. However, we still obtain results that are comparable to the baseline; see Figure C.6.

5 Daily responses of firms' expectations

A large literature focuses on firm expectations (e.g., Coibion, Gorodnichenko, and Ropele, 2020; Candia, Coibion, and Gorodnichenko, 2023). Expectations may constitute an important mechanism why firms update their plans in response to macroeconomic shocks. We investigate this mechanism by studying firm expectations about the economy and about the respondent's firm.

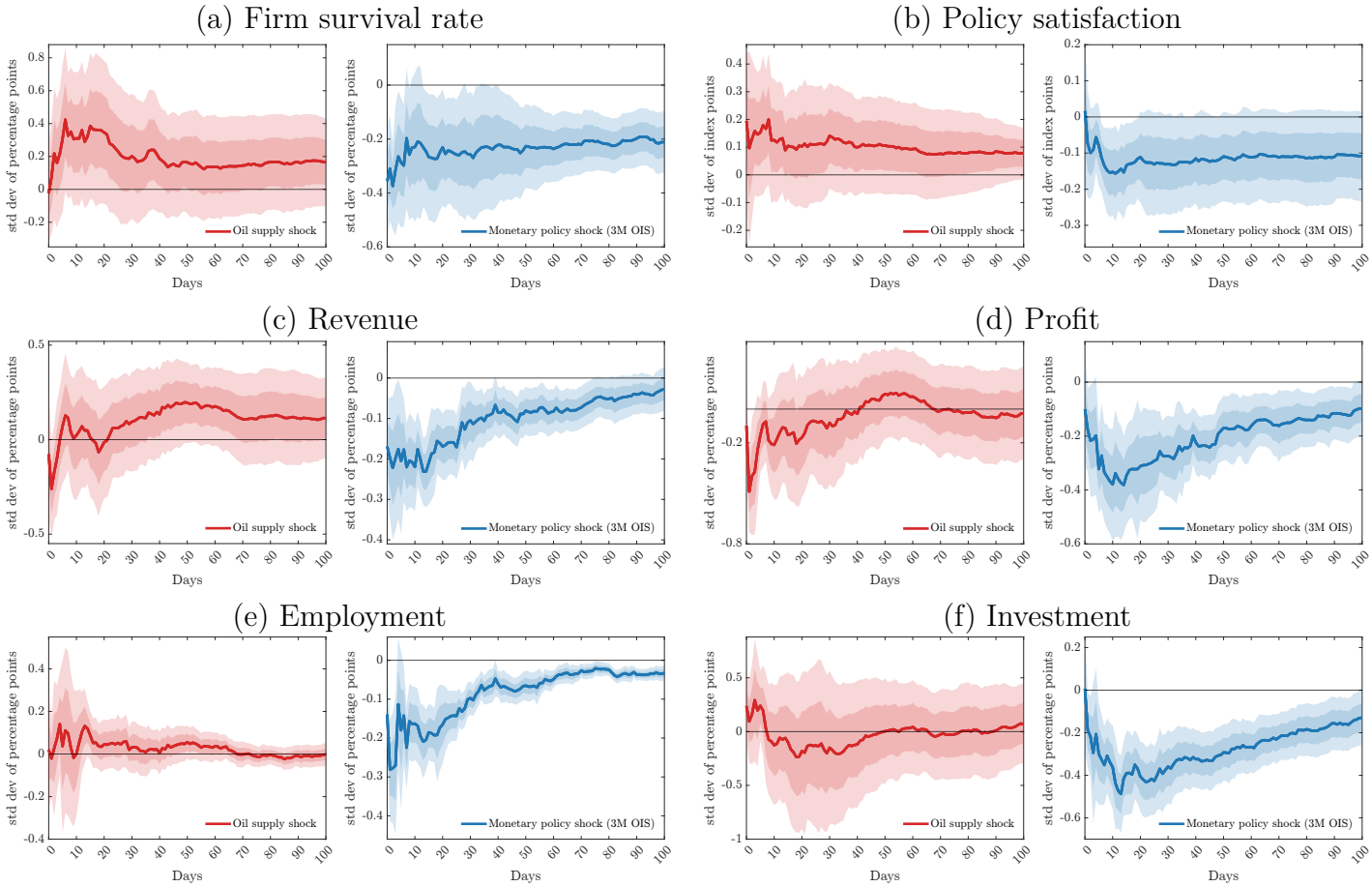
[40] The two-month dummies refer to variables that are activated either for January and February, or March and April, and so on, and similarly for three-month dummies.

Expectations about economic conditions. There are two variables in the *Daily Business Database* that measure perceptions regarding general economic conditions. First, the expected firm survival rate over the next twelve months within the industry of the firm. Second, the satisfaction with (contemporaneous) economic policy. The latter captures beliefs about policy, albeit not an expectation in a narrow sense. We display the responses of both outcomes to the oil supply shock and the monetary policy shock in Figure 9. Shocks and outcomes are standardized as in the preceding section, and the local projections specification is as described in Section 3.2.

We find that the contractionary oil supply shock leads to an insignificant increase in both, the expected firm survival rate and policy satisfaction. This may be somewhat puzzling since one would expect a contractionary effect on the firm survival rate. It may simply reflect yet another anomaly in expectation data with firms not fully understanding the consequences of the shock. However, firms being satisfied with policy could also mean that firms believe policy action will cushion the consequences of the contractionary shock and prevent firm exits. Unfortunately, our data does not allow us to discriminate these two possibilities.

Moving to the contractionary monetary policy shocks, we find conventionally signed responses of both variables. Specifically, the firm survival rate contracts immediately at -0.37 of a standard deviation after only two days. The effect is significant at five percent and relatively persistent over the entire response horizon. Similarly, firms appear to be less satisfied with economic policy, with average satisfaction being more than a tenth of a standard deviation lower after around ten days. The response is significant at five percent for multiple days and very persistent regarding the point estimate. Both responses are consistent with the overall contractionary nature of the shock. The negative effect on policy satisfaction may indicate that firms mainly perceive the costs of tighter policy, e.g., through elevated cost of credit or reduced demand. The benefits of a lower inflation rate might be less recognized or less understood by firm decision-makers.

Figure 9: Responses of firms' expectations to oil supply and monetary policy shocks



Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' expectations, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Expectations about own firm. We further investigate the responses of expectations about the own firm, which are displayed in Panels (c)-(f) of Figure 9. Across all outcomes, we find that oil supply shocks do not move expectations significantly. The responses of revenue, profit, and investment can be rationalized through firms referring to nominal quantities. Hence, there are two opposing forces as real variables, and prices move in opposite directions in response to supply shocks. The employment response measures expectations with regard to the number of employees, which may not respond to small shocks as this is an extensive margin outcome. This is especially relevant for small firms, i.e., a group of firms whose plans

respond strongly to oil supply shocks, as shown in the previous section.

In contrast, expectations respond strongly and significantly to a contractionary monetary policy shock. The revenue expectation already declines significantly on impact and slowly reverts back to zero. The expectations about profit and investment follow with only a few days of delay. Quantitatively, the trough responses among these outcomes range from -0.23 to -0.49 of a standard deviation in these expectations. Finally, we also find that employment expectations respond strongly and significantly, consistent with the contractionary nature of the shock.[41] Overall, there is a striking difference between the responses to monetary policy and oil supply shocks. This may reflect that only the former is a demand shock that moves real quantities and prices in the same direction. In contrast, supply shocks move prices and quantities in opposite directions, which makes it difficult to detect effects when respondents refer to nominal quantities.

Discussion. The analysis of expectations reveals one main message. Monetary policy strongly affects firm expectations, whereas oil supply shocks do not. This suggests that monetary policy partly operates via firm expectations during the episode under consideration.

6 Conclusion

This paper shows that daily data can enhance our understanding of firms, even during short historical episodes. Our results shed new light on firms' responses to plans and expectations during the post-pandemic inflation surge. Our results are valuable because they can inform policymakers about shock transmission during volatile and unprecedented times without relying on historical data. The key empirical findings are as follows. First, oil supply and monetary policy shocks affect various firm plans at a remarkable pace. Second, forward

[41] We may speculate that the different employment responses could also be connected to beliefs about economic policy. In response to oil supply shocks, firms may expect the government to take policy action that protects firms, showing up in responses of employment and firm survival expectations.

guidance is ineffective in affecting firms' plans. Third, small firms and firms operating in the non-tradeable sector respond particularly strongly. Fourth, monetary policy clearly affects expectations whereas we find no evidence for this channel for oil supply shocks.

Finally, our results also serve as a proof of concept that the time series contained in the *Daily Business Database* are useful for future research. For example, future work may use the database to study short-run effects of central bank communication (e.g., Istrefi et al., 2024), carbon pricing (e.g., Känzig, 2023), or geopolitical tensions (e.g., Grebe et al., 2024). The database will be continuously updated as new survey data becomes available. Thus, the *Daily Business Database* constitutes a valuable data infrastructure that may be readily available to investigate important episodes that might unfold in the future.

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Appendix

Appendix A Sources of additional data

In addition to the survey data from the *German Business Panel*, we use the following data where we state the formal data identifier in italic if applicable.

Industrial production. The industrial production index based on the manufacturing sector and is available from the Federal Statistical Office in *GENESIS-Tabelle 42153-0001: Verarbeitendes Gewerbe*.

Consumer price index. The consumer price index is from the Federal Statistical Office and can be found via the official *Statistic Code 61111*. The inflation rate is the year-over-year growth rate of this index.

ifo index. The ifo index is taken directly from the ifo institute's website.[42] We merge this with the exact ifo release date to compute the one-month lag of the index relative to the official release date. This is important because the release of this index for a given month occurs before the end of the same month.

Firm survival rate. The most recent actual firm survival rate (computed as one "minus" *Schließungsrate*) is provided by the Federal Statistical Office for the year 2021. We download the version that is based on values as of September 25, 2023, as stated on the website.[43]

Stock market indices. We take daily closing values of stock market indices directly from Yahoo Finance. Specifically, we use the DAX (*GDAXI*), the STOXX50 (*STOXX50E*) and the S&P 500 index (*GSPC*). When no value is available (weekends, non-trading days), then we take the closing value from the most recent closing value that is available.

[42] The data can be downloaded from here: https://www.ifo.de/ifo-zeitreihen.

[43] The data can be found here: https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Unternehmen/Unternehmensdemografie/Tabellen/unternehmen-wirtschaftsabschnitte.html.

Euribor rates. Daily Euribor rates are available from the Bundesbank's time series database. We take daily three-month (*ST0316*) and one-year (*ST0343*) Euribor rates. When no value is available (weekends, non-trading days), then we take the value from the most recent closing value that is available.

Oil price. The oil spot price for Western Texas Intermediate is taken from St. Louis Federal Reserves' FRED (*DCOILWTICO*).

Export shares. We take the export shares from the Institut für Mittelstandsforschung in Bonn, which are computed based on the (confidential) VAT tax statistic of the Federal Statistical Office.[44] Export shares are defined as revenue from exports divided by total revenues and available at the one-digit industry level based on the WZ2008 industry classification. We use the most recent export shares for 2021, but the shares have been stable in the past.[45]

Covid-19 variables. The daily Covid-19 stringency index is computed by the Oxford Coronavirus Government Response Tracker as a composite measure of nine metrics that measure the stringency of non-pharmaceutical interventions to fight Covid-19 (Hale, Angrist, Goldszmidt, Kira, Petherick, Phillips, Webster, Cameron-Blake, Hallas, Majumdar et al., 2021).[46] This index is available for Germany until the end of 2022 and we set all later observations to zero since no Covid-19 related non-pharmaceutical interventions were in place anymore. Daily Covid-19 cases and deaths for Germany taken from the World Health Organization.

Appendix B Survey questions and variables

We present all survey questions and variables used in the main text. Note that respondents are required to answer all questions.[47]

Industry of firm.

> Original: *Bitte wählen sie den für Ihr Unternehmen bedeutendsten Wirtschaftszweig, in dem Sie aktiv sind, durch die Wahl der zutreffenden Kategorien.*

[44] The data can be found here: https://www.ifm-bonn.org.

[45] This computation is based on the fact that revenues exported to a different country are VAT-exempt. Hence, one can divide tax-exempted revenues by total revenues to obtain the export shares.

[46] The data can be downloaded from here: https://github.com/OxCGRT/covid-policy-dataset.

[47] If respondents do not provide a valid response, they need to provide a reason why they chose to do so to move on to the next screen. Possible answers are *don't know* (*weiß nicht*), *does not apply to my firm* (*trifft auf mein Unternehmen nicht zu*), *refuse to answer* (*keine Angabe*).

Translation: *Please select the most important industry sector, in which your company is active, by selecting the corresponding category.*

[*Respondents may self-select the appropriate digit-level of the classification based on a dynamic dropdown menu*]

We obtain the classification for firms operating in the tradeable and non-tradeable sector as follows. Based on the one-digit industry classification from the survey, we assign each firm the average export share of their industry. The export share is defined as export revenues over total revenues and computed as an average across firms in each one-digit industry based on the official VAT statistic; see Appendix A. Finally, firms in the tradeable sector are those with above median export share in our sample, and vice versa for the non-tradeable sector.

Postal code.

Original: *Informationen zum Unternehmen: PLZ*

Translation: *Information about firm: postal code*

[*Respondents may enter a numerical postal code.*]

We define East German firms as those that enter a postal code that either starts with a leading zero (indicating Saxony) or with a number between 10 and 19 (indicating mostly Berlin, Brandenburg, and Mecklenburg-Western Pomerania), or with 38, 39, or 99 (indicating mostly Thuringia and Saxony-Anhalt). Note that the postal codes do not provide a one-to-one mapping to German states. However, the selection above provides a reasonable approximation of the territory that was part of the German Democratic Republic.

Revenue from previous calendar year.

Original: *Welches der folgenden Intervalle entspricht am ehesten dem Jahresumsatz Ihres Unternehmens im vergangenen Kalenderjahr?*

Translation: *Which of the following intervals corresponds most closely to the annual revenue of your company in the previous calendar year?*

(a) *Less than 50,000 EUR*

(b) *50,000 – 100,000 EUR*

(c) *100,001 – 350,000 EUR*

(d) *350,001 – 700,000 EUR*

(e) *700,001 – 2,000,000 EUR*

(f) *2,000,001 – 6,000,000 EUR*

(g) *6,000,001 – 8,000,000 EUR*

(h) *8,000,001 – 10,000,000 EUR*

(i) *10,000,001 – 12,000,000 EUR*

(j) *12,000,001 – 20,000,000 EUR*

(k) *20,000,001 – 40,000,000 EUR*

(l) *40,000,001 – 50,000,000 EUR*

(m) *50,000,001 – 60,000,000 EUR*

(n) *More than 60,000,000 EUR*

(o) *No specification*

Current number of employees.

Original: *Welches der folgenden Intervalle entspricht der aktuellen Zahl der sozialversicherungspflichtigen Mitarbeiter (in vollen Stellen) in Ihrem Unternehmen?*

Translation: *Which of the following intervals corresponds to the current number of full-time employees subject to social security in your company?*

(a) *No employees*

(b) *1 – 5*

(c) *6 – 9*

(d) *10 – 19*

(e) *20 - 49*

(f) *50 – 249*

(g) *250 – 499*

(h) *500 – 999*

(i) *More than 1000*

(j) *No specification*

Gender of the respondent.

Original: *Informationen zur Auskunftsperson: Anrede*

(a) *Frau*

(b) *Herr*

(c) *Keine Angabe*

Translation: *Information about respondent: salutation.*

(a) *Mrs. / Ms.*

(b) *Mr.*

(c) *Not specified*

Highest education of the respondent.

Original: *Informationen zur Auskunftsperson: Höchster Berufsabschluss*

(a) *Kein Abschluss*

(b) *Abgeschlossene Lehre oder vergleichbarer Abschluss an einer Berufsschule*

(c) *Meister, Techniker oder vergleichbarer Abschluss*

(d) *Bachelor*

(e) *Master, Diplom, Magister oder vergleichbarer Abschluss*

(f) *Promotion*

(g) *Habilitation*

(h) *Sonstiger Abschluss*

(i) *Keine Angabe*

Translation: *Information about respondent: Highest education.*

(a) *No qualification*

(b) *Completed apprenticeship or comparable qualification at a vocational school*

(c) *Master craftsman, technician or comparable qualification*

(d) *Bachelor*

(e) *Master, Diplom, Magister or comparable degree*

(f) *PhD*

(g) *Habilitation*

(h) *Other degree*

(i) *Not specified*

We refer to all respondents who select either (b) or (c) as individuals with vocational training and to all respondents who select (e), (f), or (g) as individuals with academic training.

Position of the respondent in the company.

Original: *Informationen zur Auskunftsperson: Funktionsbezeichnung*

(a) *Inhaber/Geschäftsführer/Vorstandsmitglied/Prokurist*

(b) *Abteilungsleiter*

(c) *Sachbearbeiter*

(d) *Andere Bezeichnung*

(e) *Keine Angabe*

Translation: *Information about respondent: Job title*

(a) *Owner/managing director/board member/authorised signatory*

(b) *Head of department*

(c) *Specialist*

(d) *Other name*

(e) *No specification*

We refer to all respondents that select (a) as executives.

Price setting plans.

Original: *Welche Entscheidungen planen Sie in den nächsten 12 Monaten?*

(a) *Absatzpreise: Reduzierung*

(b) *Absatzpreise: Keine Änderung*

(c) *Absatzpreise: Erhöhung*

Translation: *What decisions are you planning to make in the next 12 months?*

(a) *Decrease sales prices*

(b) *No change in sales prices*

(c) *Increase sales prices*

Fixed cost plans.

Original: *Welche Entscheidungen planen Sie in den nächsten 12 Monaten?*

(a) *Fixkosten (z.B. festes Personal, Miete): Reduzierung*

(b) *Fixkosten (z.B. festes Personal, Miete): Keine Änderung*

(c) *Fixkosten (z.B. festes Personal, Miete): Erhöhung*

Translation: *What decisions are you planning to make in the next 12 months?*

(a) *Decrease fixed cost (e.g., permanent personnel, rent)*

(b) *No change in fixed cost (e.g., permanent personnel, rent)*

(c) *Increase fixed cost (e.g., permanent personnel, rent)*

Dividend plans.

Original: *Welche Entscheidungen planen Sie in den nächsten 12 Monaten?*

(a) *Entnahmen von Unternehmer / Gesellschafter; Ausschüttungen an Anteilseigner: Reduzierung*

(b) *Entnahmen von Unternehmer / Gesellschafter; Ausschüttungen an Anteilseigner: Keine Änderung*

(c) *Entnahmen von Unternehmer / Gesellschafter; Ausschüttungen an Anteilseigner: Erhöhung*

Translation: *What decisions are you planning to make in the next 12 months?*

(a) *Decrease withdrawals of entrepreneurs / owners, or distributions paid to shareholders*

(b) *No change in withdrawals of entrepreneurs / owners, or distributions paid to shareholder*

(c) *Increase withdrawals of entrepreneurs / owners, or distributions paid to shareholder*

R&D investment plans.

Original: *Welche Entscheidungen planen Sie in den nächsten 12 Monaten?*

(a) *Forschung und Entwicklung: Reduzierung*

(b) *Forschung und Entwicklung: Keine Änderung*

(c) *Forschung und Entwicklung: Erhöhung*

Translation: *What decisions are you planning to make in the next 12 months?*

(a) *Decrease R&D investment*

(b) *No change in R&D investment*

(c) *Increase R&D investment*

Expected industry-level firm survival rate.

Original: *Was schätzen Sie: Wie viel Prozent der Unternehmen Ihrer Branche werden ihr Geschäft in den nächsten 12 Monaten aufgeben?*

(a) *Prozentzahl zwischen 0 und 100*

Translation: *What do you estimate: What percentage of firms in your industry will go out of business in the next 12 months?*

(a) *Percentage number between 0 and 100*

Satisfaction with economic policy.

Original: *Wie zufrieden sind Sie mit der Wirtschaftspolitik in Deutschland?*

(a) *Zufriedenheit in 11 diskreten Möglichkeiten von "sehr unzufrieden"* (0) *bis "sehr zufrieden"* (10)

Translation: *How satisfied are you with economic policy in Germany?*

(a) *Satisfaction in 11-point Likert scale from "very dissatisfied"* (0) *to "very satisfied"* (10)

Expected year-over-year change of revenue, profit, employment, and investment.

Original: *Welche Veränderung (in %) der folgenden Kennzahlen erwarten Sie für das laufende Kalenderjahr für Ihr Unternehmen im Vergleich zum vorangegangenen Kalenderjahr?*

- *Jahresumsatz* $\in [-100, 100]$
- *Beschäftigte* $\in [-100, 100]$
- *Investitionen* $\in [-100, 100]$
- *Jahresgewinn* $\in [-100, 100]$

Translation: *What change (in %) in the following key figures do you expect for your firm in the current calendar year compared to the previous calendar year?*

(a) *Revenue* $\in [-100, 100]$

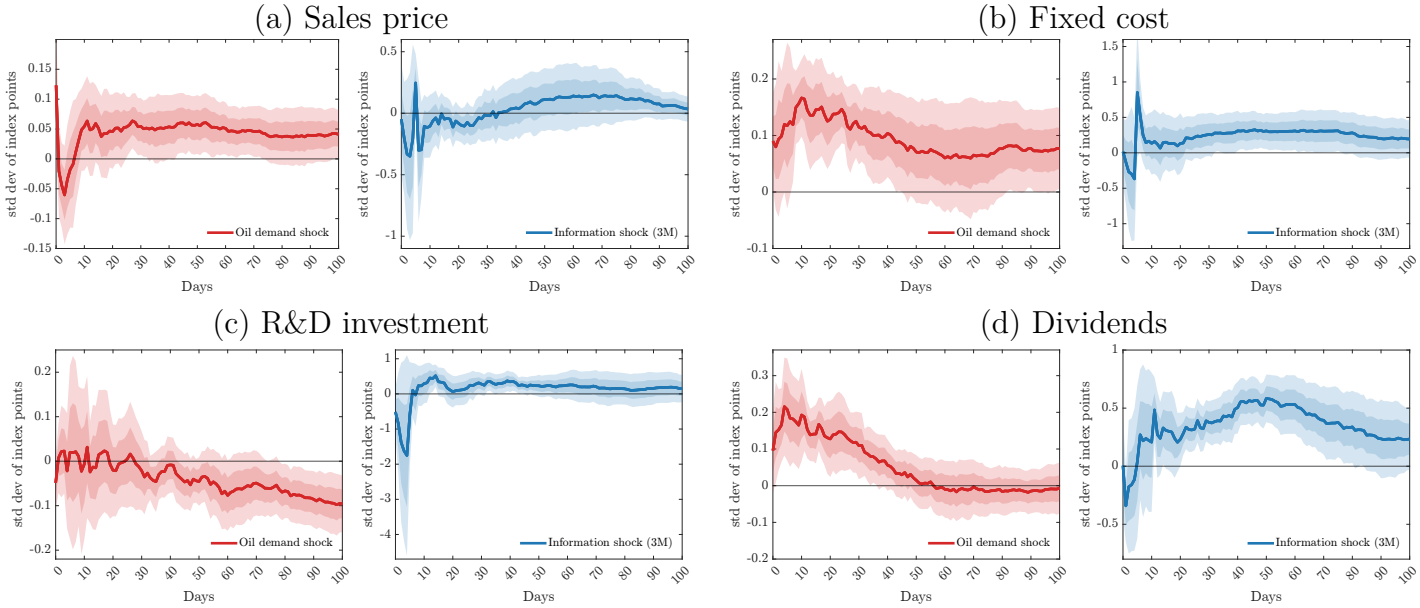
(b) *Number of employees* $\in [-100, 100]$

(c) *Investment* $\in [-100, 100]$

(d) *Profit* $\in [-100, 100]$

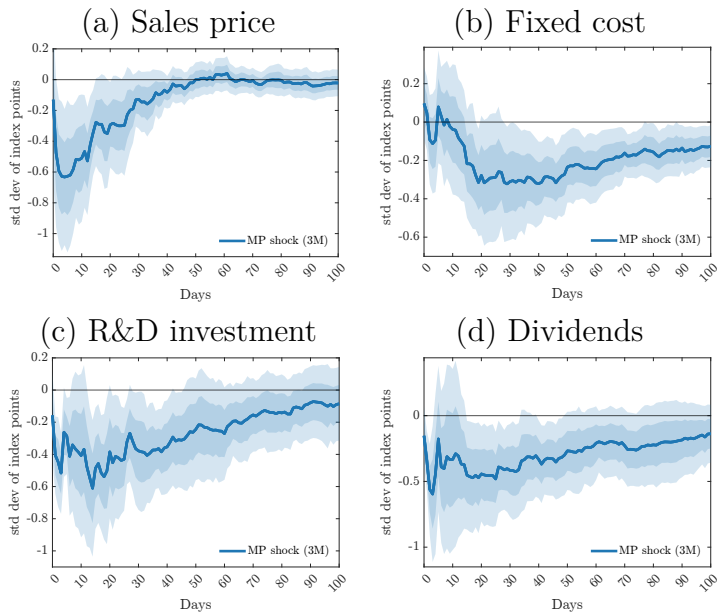
Appendix C Sensitivity analysis

Figure C.1: Responses to oil demand and information shocks



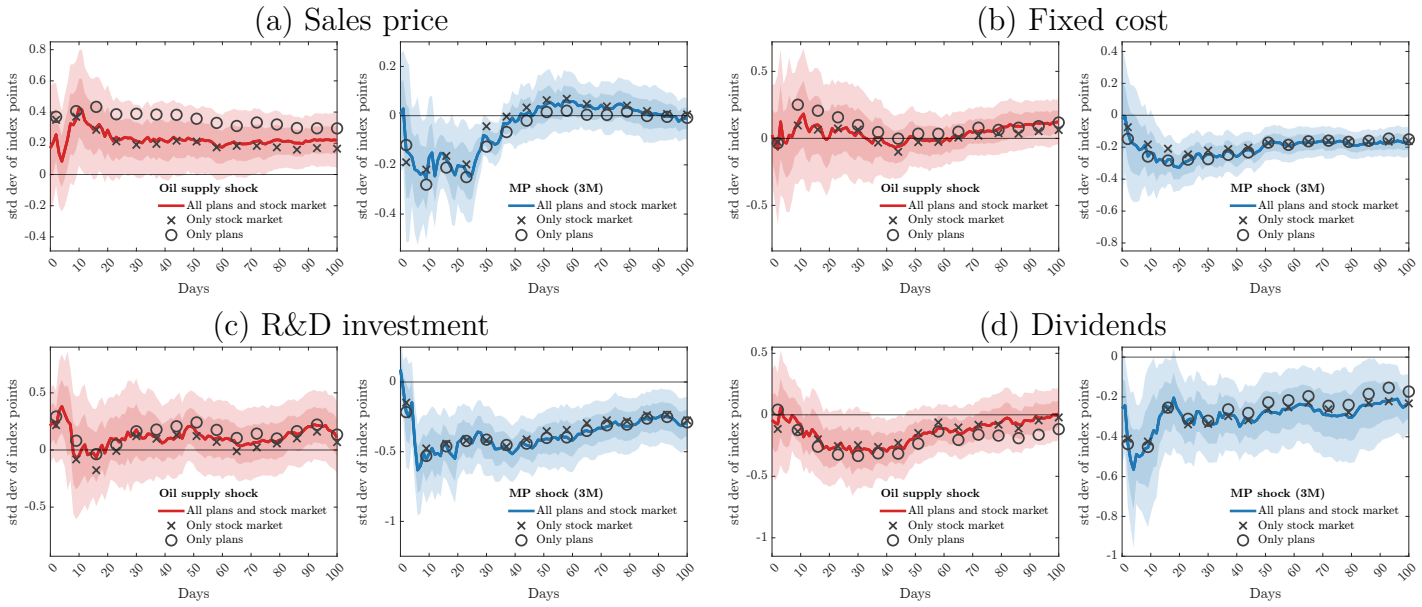
Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil demand shock is based on OPEC announcements following Känzig (2021); Degasperi (2021). The information shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Figure C.2: Responses to monetary policy shocks: Controlling for the yield curve



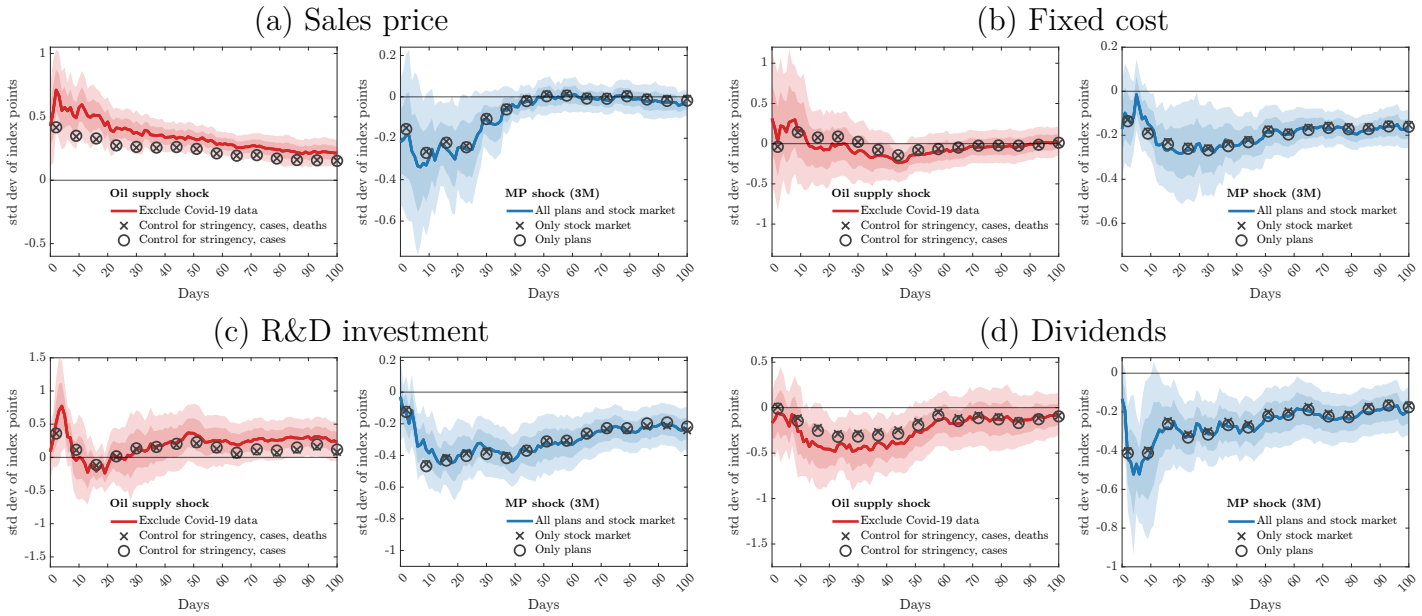
Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The baseline specification is augmented by the contemporaneous forward guidance shock, as well as 28 daily lags of the underlying one-year Euribor rate. The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Figure C.3: Responses to oil supply and monetary policy shocks: Additional controls



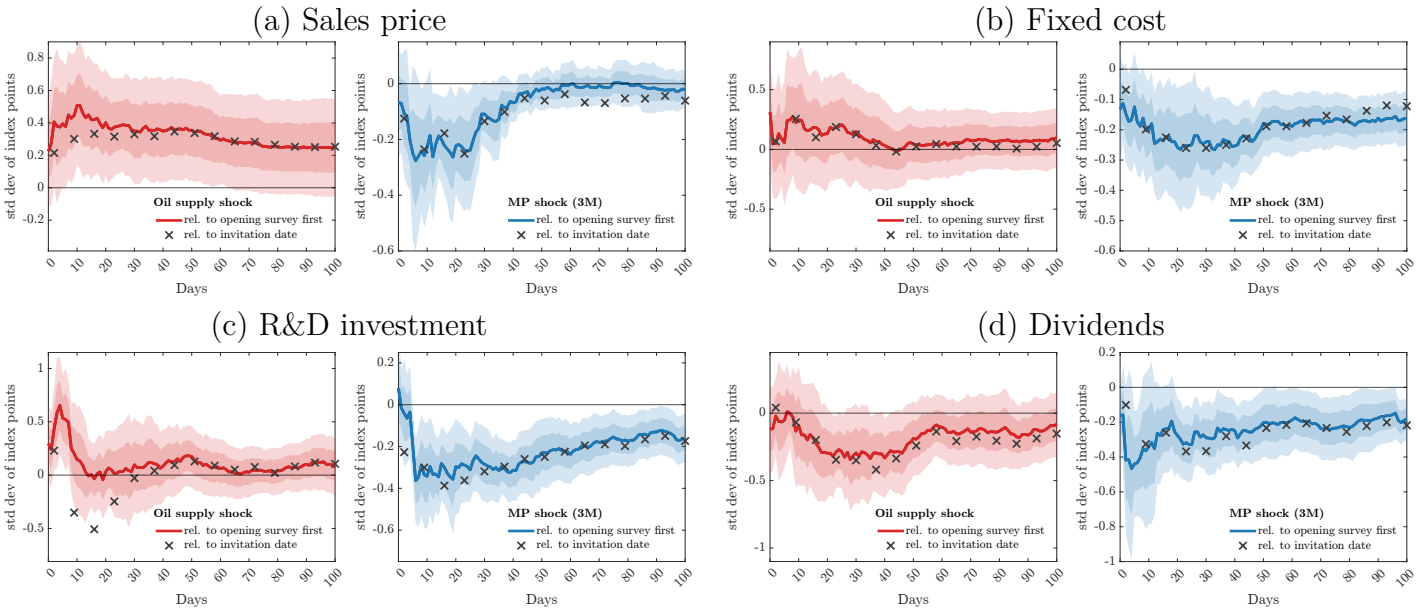
Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The baseline specification is augmented by either (i) 28 daily lags of all four firm plan variables, (ii) 28 daily lags of the DAX and the STOXX50 index, or (iii) all additional controls from (i) and (ii) jointly. The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Figure C.4: Responses to oil supply and monetary policy shocks: Accounting for Covid 19



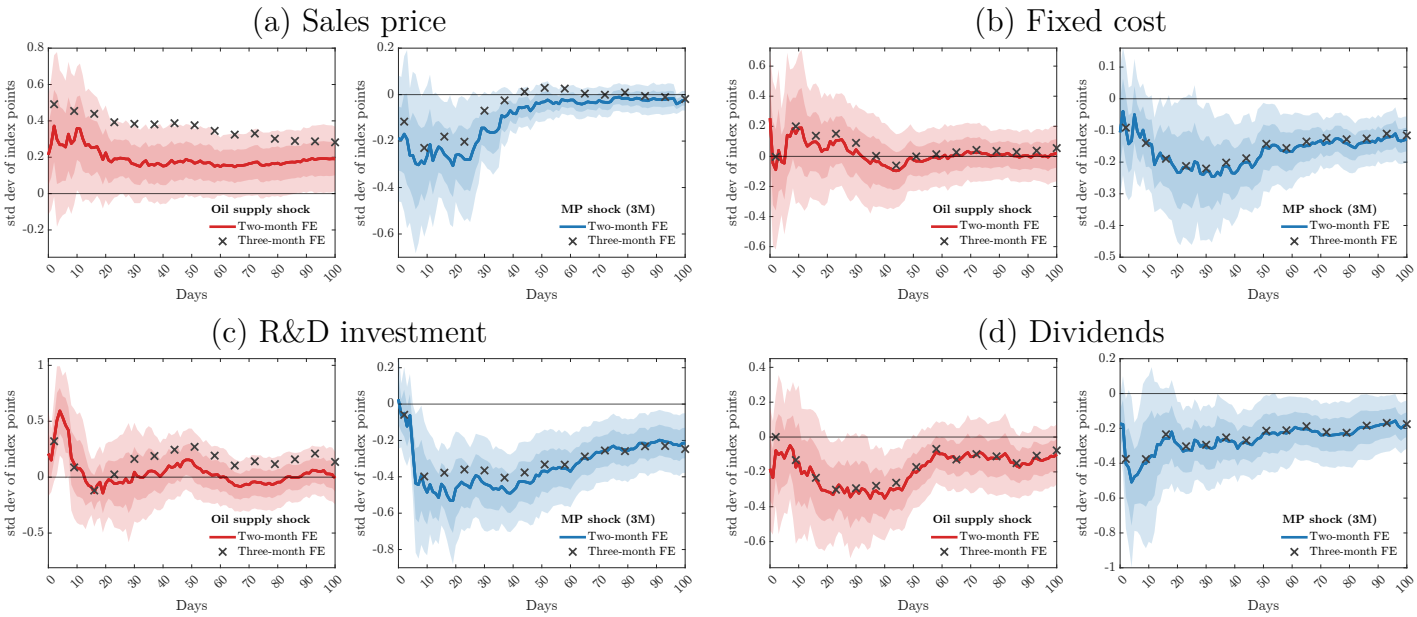
Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The baseline specification is augmented by either (i) the contemporaneous Covid-19 stringency index and the log of contemporaneous cumulative Covid-19 cases, or (ii) the variables from (i) and the log of contemporaneous cumulative Covid-19 deaths. Alternatively, we estimate the baseline specification on a subsample that starts in July 2022, effectively excluding most of the pandemic. The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Figure C.5: Responses to oil supply and monetary policy shocks: Only early respondents



Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. However, we compute the outcome variable using only firms (i) that have a response time below the median relative to the survey invitation date, or (ii) that file the survey on the same day on which they open the survey for the first time. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.

Figure C.6: Responses to oil supply and monetary policy shocks: Controlling for seasonality



Notes: This figure shows daily responses based on the local projection as specified in Section 3.2. All shocks and outcomes are standardized. The left-hand-side variable is the average firm outcome between the day of the shock and the day under consideration, as indicated on the horizontal axis. The outcomes refer to firms' plans, as introduced in Section 2. The oil supply shock is based on OPEC announcements following Känzig (2021) and Degasperi (2021). The monetary shocks are based on ECB announcements following Jarociński and Karadi (2020) using three-month Overnight Index Swaps (OIS). The baseline specification is augmented by either (i) two-month or (ii) three-month fixed effects, as explained in the main text. The shaded areas indicate 68% and 95% confidence bands using Newey-West standard errors.