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Monetary Policy Shocks and Firms' Investment Decisions*

Klaus Abberger† Alexander Rathke‡ Samad Sarferaz§
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August 2025

Abstract

We study the investment channel of monetary policy through a randomized survey experiment, exposing Swiss firms directly to shocks to the Swiss National Bank's policy rate. Our survey experiment randomizes pure policy-rate shocks—uncontaminated by information effects—and records firms' revisions to investment plans and financing choices. We find pronounced asymmetry: firms respond strongly to unanticipated rate hikes but only moderately to equivalent cuts. This asymmetry varies with firm size, sector, export intensity, and investment types. Investment financing shapes the response: reliance on internal funds and being financially unconstrained amplifies investment sensitivity.

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1 Introduction

Monetary policy affects the economy in large part through firms' investment decisions. While many studies document heterogeneous investment responses—shaped by financing conditions, leverage, and reliance on external funds—direct causal evidence on how firms adjust to exogenous policy shocks remains limited. This gap matters: for example, if externally financed firms adjust their investment more—or less—than internally financed firms, both the aggregate strength of monetary transmission and its distribution across the corporate sector are altered.

To address this gap, we shed new light on these differences with a randomized survey experiment that confronts Swiss firms with unanticipated ± 25 or ± 50 basis point policy-rate shocks of the Swiss National Bank (SNB) and then asks them to reconsider their investment plans. Whereas most of the earlier research infers the impact of monetary policy from observed outcomes, our design randomizes the policy shock itself and lets us observe firms' reactions in a controlled setting. The vignette further stresses that the SNB's economic outlook is unchanged, isolating the pure-rate effect from any information effects. The resulting microdata allow us to: (i) estimate the *causal effect* of a monetary-policy shock on firms' investment plans; (ii) quantify how the *share of external finance* amplifies or attenuates planned investment elasticities; (iii) gauge the role of *financing constraints*; and (iv) uncover the *asymmetry of responses* between rate hikes and cuts, and analyze how investment type and firm characteristics such as size, export status, or investment intensity systematically shape these asymmetric effects.

Running the survey experiment on a sample of Swiss firms, we uncover five main findings. First, we confirm that the extensive margin plays a large role in the transmission of monetary policy shocks as suggested in the lumpy investment literature.[1] Only a few firms revise their investment plans in response to monetary policy shocks, but those that do make sizable adjustments. An unexpected 25 basis point change in the policy rate alters investment plans by 2.6 percent on average and by 31 percent among adjusting firms, though this masks notable asymmetries, and heterogeneity. Second, our results indicate an asymmetric response

[1] Due to nonconvex adjustment costs and irreversibility, firms tend to invest infrequently but in large increments when they do adjust their capital stock (e.g., Caballero et al., 1995; Cooper et al., 1999). As a result, the extensive margin—the probability that a firm adjusts its investment plan at all—plays a crucial role in aggregate investment dynamics.

of investment plans to monetary policy: rate hikes are associated with markedly larger contractions than the expansions observed following cuts of the same magnitude. Third, reliance on external finance dampens pass-through: firms that fund investment mainly internally adjust spending by about -2 percent in response to unanticipated monetary tightening, but increase it by roughly 1 percent when unanticipated monetary easing occurs. By contrast, those reliant on bank or bond debt move little. Fourth, heterogeneity is pronounced: The asymmetry is driven by large, manufacturing and service firms with high investment or export intensity, and appears notably only among financially unconstrained firms. Fifth, we are the first to show that monetary-policy shocks affect investment categories unevenly: spending on machinery & equipment and on construction responds, whereas R&D does less so. Together, these results reveal a monetary-policy investment channel that is asymmetric and tightly linked to firms' balance-sheet health, financing structure and investment characteristics.

A long macro-VAR tradition shows that monetary-policy shocks have large and persistent effects on aggregate investment (Bernanke and Blinder, 1992; Christiano et al., 2005). Subsequent micro work—using panel regressions that match realised firm-level investment to identified policy shocks—confirms that this average masks sharp heterogeneity across firms (Gertler and Gilchrist, 1994; Ottonello and Winberry, 2020; Caglio et al., 2021; Grob and Züllig, 2024; Paranhos, 2024). These observational studies gauge the impact ex post, once firms have completed their adjustments and other forces may have intervened. Our survey experiment complements this evidence by capturing firms' ex-ante revisions to investment plans in response to randomized, symmetric SNB policy-rate surprises and by showing how the resulting semi-elasticities vary systematically with the composition of investment financing.

A growing body of literature shows that high-frequency monetary-policy surprises often bundle two distinct components: a *pure-rate* shock and an *information* shock that reflects what markets learn about future fundamentals. Narrative filters strip out part of this information content (Romer and Romer, 2004), while high-frequency decompositions and structural-VAR approaches aim to separate the two channels more cleanly (e.g., Gürkaynak et al., 2005; Nakamura and Steinsson, 2018; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021). Our survey experiment contributes to this literature by eliminating the information channel *by design*: the vignette conveys only the unexpected change in the

SNB policy rate and explicitly states that the central bank's economic outlook is unchanged. This randomized, pure-rate treatment yields causal semi-elasticities uncontaminated by belief revisions about macro fundamentals.

Seminal micro studies demonstrate that the investment channel is anything but uniform: small, bank-dependent manufacturers contract sharply following interest-rate hikes (Gertler and Gilchrist, 1994), whereas low-default-risk firms lead the expansion when rates decline (Ottonello and Winberry, 2020). Other work has linked monetary-policy pass-through to firm characteristics such as life-cycle stage and size (Durante et al., 2022; Cloyne et al., 2023), default risk (Caglio et al., 2021), sector durability, and debt maturity or composition (Alder, 2023; Jungherr et al., 2024), as well as to the distribution of investment rates across firms (Gnewuch and Zhang, 2025). By contrast, empirical evidence on how the sources of financing themselves condition policy shocks remains scarce. We show that reliance on internal financing amplifies semi-elasticities. A distinctive feature of our survey is that it directly measures the sources used specifically to finance investment, rather than inferring them from broader corporate financing structures.

A number of studies have found that monetary policy tightening shocks generally have a stronger impact on economic activity than easing shocks (Barnichon et al., 2017; Angrist et al., 2018; Forni et al., 2020; Jordà et al., 2020; Barnichon et al., 2022), including via the investment channel (e.g. Pérez-Orive and Timmer, 2023). Pérez-Orive et al. (2024) attribute this asymmetry to the presence of multiple financing constraints. While most recent work does not distinguish between the effects of tightening and accommodative policy actions our survey experiment contributes directly to this debate by randomizing symmetric of either ± 25 or ± 50 basis points surprises to the SNB policy rate and measuring, how firms revise investment plans—uncovering a pronounced hike–cut asymmetry. We confirm that investment responses to rate hikes are generally larger than to rate cuts. The asymmetry is concentrated among large firms, manufacturing and service firms, those in the upper investment quartiles, and firms with very low or very high export intensity, while it is absent for medium-sized and construction firms, as well as for the middle export categories. Strikingly, the asymmetry is statistically significant only among financially unconstrained firms, suggesting that mechanisms beyond traditional financing constraints—such as investment irreversibility, demand exposure, or adjustment costs—may be key drivers.

Direct evidence on how much firms change their investment when monetary-

policy rates move is sparse. Sharpe and Suarez (2021) use qualitative data to show that roughly two-thirds of US firms report no adjustment after a loan-rate cut. Best et al. (2024) elicit quantitative semi-elasticities to loan-rate cuts in a survey experiment among German firms. Both studies vary borrowing rates, focus mainly on rate cuts, and leave the actual effects of monetary-policy shocks unexplored. We estimate the causal semi-elasticities to symmetric policy-rate shocks (of either ± 25 or ± 50 basis points), uncover a pronounced hike–cut asymmetry, and show that elasticities differ sharply across investment categories.

This paper is part of a growing literature that embeds randomized information treatments in macroeconomic surveys to study expectations and behavior (see Fuster and Zafar, 2023; Haaland et al., 2023; Stantcheva, 2023). Household experiments link news shocks to consumption and belief updating (Fuster et al., 2022; Fuster et al., 2021; Coibion et al., 2020), while firm-focused studies vary uncertainty, oil-price, exchange-rate, or inflation scenarios to track pricing and investment (Drechsel et al., 2015; Coibion et al., 2018; Coibion et al., 2021; Coibion et al., 2022; Link et al., 2023; Dibiasi et al., 2025; Baumann et al., 2024; Abberger et al., 2025). Studies that survey multiple agent types examine how economic exposure shapes information acquisition across agents (Mikosch et al., 2024; Weber et al., 2023), and studies with experts explore subjective macro models and narrative effects (Andre et al., 2022, 2023). We advance this agenda by randomizing policy-rate shocks across a representative panel of Swiss firms and jointly eliciting revisions to both investment plans and financing choices, extending survey experiments to the core of monetary transmission.

The remainder of the paper is organized as follows. Section 2 details the experimental design of our vignette-based survey, the sampling strategy, and the main survey variables. Section 3 presents the empirical findings from our randomized survey experiment. We first document the causal effect of unexpected changes in the SNB policy rate on firms' investment decisions, analyzing both the probability and the average size of investment adjustments. We continue to examine the role of investment financing, focusing on how firms' reliance on external funding influences their sensitivity to monetary policy. Finally, we investigate how these responses vary with firm characteristics such as firm size or financial constraints. Section 4 concludes.

2 Experimental design and survey data

To estimate the causal effect of changes in monetary policy rates on firms' investment decisions, we design a randomized controlled trial (RCT) using a vignette-based survey experiment. Specifically, we study how Swiss firms adjust their investment plans in response to unexpected changes in the SNB policy rate, embedding our survey experiment within the regular investment survey conducted by the KOF Swiss Economic Institute at ETH Zurich.

2.1 KOF Investment Survey

The KOF Investment Survey is a well-established, biannual survey that has been collecting information on firms' investment in Switzerland for more than two decades and has become an important source for studying firms' investment decisions (see, e.g., Binding and Dibiasi, 2017; Dibiasi et al., 2018; Seiler, 2021; Mikosch et al., 2024; Dibiasi et al., 2025). The sample of firms is drawn from the business register of the Swiss Federal Statistical Office and stratified by industry and firm size (measured in full-time equivalent employment). It covers a broad range of sectors, excluding agriculture and parts of the public and non-profit sectors. A detailed overview of the sectoral and size distribution of the sample is provided in Table A.1 in Appendix A.

The survey is distributed via postal mail and personalized email invitations directed at senior decision-makers within firms, typically owners or members of the executive board. Specifically, over 70% of the respondents in the firm panel are executive board members, and 60% are employed in the management division of their respective firms (see Table A.2 in Appendix A for detailed information on the respondents' roles and divisions within their organizations). This approach ensures that responses come from informed individuals with direct authority over investment decisions.

The survey primarily collects quantitative data on firms' realized past investments and expected future investments. For example, each autumn, firms report investment volumes for the past year, the current year, and the upcoming year across three investment categories: machinery & equipment (M&E), construction, and research & development (R&D). Beyond investment volumes, additional questions cover topics such as uncertainty surrounding firms' investment plans, the

purpose of investments, factors influencing investment activity, and sources of investment financing. The complete questionnaire can be found in Appendix B.1.

2.2 Experimental design

To assess how firms adjust their investment plans in response to unexpected changes in the SNB policy rate, we incorporate a survey experiment within the online module of the KOF Investment Survey. The experiment employs a vignette-based design, where firms are randomly assigned to hypothetical scenarios that describe unexpected shifts in the SNB policy rate. The complete questionnaire of the experimental part of the survey can be found in Appendix B.2.

The experimental procedure consists of four steps. First, prior to exposure to the experiment, firms complete the regular KOF Investment Survey. Among other things, each firm i reports its investment plans, $I^{prior}_{i,k,t+1}$, for the following year $t+1$ in Swiss francs across investment categories, k: machinery & equipment, construction, and R&D.

Second, introducing the experiment, we provide firms with factual information about the most recent monetary policy decision of the SNB:

> *We would now like to know how the interest rate decisions of the Swiss National Bank (SNB) affect your investment plans.*
> *At its last monetary policy assessment on September 26, 2024, the SNB set the SNB policy rate at 1.00%.*

To ensure that firms engage with the hypothetical scenarios in relation to their own outlook, we further ask them to actively state their expectation for the upcoming SNB policy rate decision. This step encourages firms to reflect on their individual baseline prior to being presented with a scenario that may deviate from it:

> *What SNB policy rate do you expect the SNB to set at its next monetary policy assessment on December 12, 2024?*
> □ 0.50% or lower
> □ 0.75%
> □ 1.00%

□ 1.25%

□ 1.50% or higher

Third, firms are randomly assigned to one of four treatment groups or a control group. Each treatment group receives a hypothetical scenario describing an unexpected change in the SNB policy rate relative to their previously stated expectation. The vignette reads as follows:

> *Assume that on December 12, 2024, the SNB sets the SNB policy rate [X] than you expect, even though the SNB's assessment of the economic environment does not change.*

The value of [X] varies across treatment groups and takes one of four values: 0.50 percentage points lower, 0.25 percentage points lower, 0.25 percentage points higher, or 0.50 percentage points higher. By contrast, the control group receives a scenario in which the SNB policy rate remains in line with firms' expectations.[2] The increments assigned to treatment groups reflect plausible adjustments to the SNB policy rate, consistent with the typical step sizes observed in past monetary policy decisions. We vary both the direction and magnitude of the rate change to examine potential nonlinearities and asymmetries in firms' investment responses—i.e., whether firms respond more strongly to larger shifts or react differently to rate hikes versus rate cuts. Furthermore, by explicitly holding the SNB's economic assessment constant, the vignette isolates the effect of the policy rate change itself, ensuring that broader macroeconomic considerations do not confound firms' reactions. Thus, the monetary policy shocks within our experiment are uncontaminated by information effects.

Because each firm is exposed to only one hypothetical scenario, all identifying variation arises across firms. This between-subject design ensures that firms are not influenced by comparisons across multiple treatments. Random assignment guarantees that, on average, firms differ only in the vignette they receive. This eliminates concerns about selection or endogeneity, allowing for a causal interpretation of how unexpected changes in the policy rate affect firms' investment plans.

[2] The scenario for the control group reads as follows: *Assume that on December 12, 2024, the SNB sets the SNB policy rate in line with your expectations.*

Finally, after exposure to the vignette, firms report whether—and by how much—they would revise their planned investment volumes for 2025 under the respective hypothetical scenario.[3] Specifically, firms are asked:

> *Previously, you expected your gross investments in Switzerland to amount to CHF $I^{prior}_{i,k,t+1}$ in 2025. Taking into account the above assumptions on the SNB policy rate, they are likely to amount to (in whole francs):*
> *2025:* _____

As for investment plans prior to the experiment, this question is asked separately for the three investment categories k. Beyond the quantitative adjustment of investment volumes, firms are also asked to indicate whether the composition of their investment financing would change, distinguishing between internal and external sources. Additionally, they provide qualitative assessments regarding the transmission channels through which they expect policy rate changes to influence their investment decisions. Firms can attribute their responses to factors such as demand conditions, the cost of external financing, the availability of external financing, and exchange rate effects.

2.3 Implementation and sample characteristics

The survey experiment was conducted as part of the online module of the 2024 autumn wave of the KOF Investment Survey. Firms were able to complete the questionnaire between October 1 and December 24, 2024, with the survey available in German, French, Italian, and English. A total of 3,890 firms were invited to participate online (gross sample), of which 1,763 submitted responses (net sample), resulting in a response rate of 45.3%. As the vignettes explicitly refer to the SNB's monetary policy assessment on December 12, we exclude the 32 responses received after this date from our analysis. In addition, we exclude 16 firms that did not answer any questions from the survey experiment, resulting in our final sample of 1,715 firms.

The firms participating in our experiment represent approximately 11% of to-

[3] We restrict adjustments to investment plans for 2025 because the monetary policy decision occurs late in 2024, leaving little scope for firms to alter their investment activity within the same year. To ensure this, firms are explicitly instructed: *Furthermore, assume you could only react after the decision and change your investment plans only for the next year, but not for the current year.*

tal employment and 15% of total investment in Switzerland.[4] Table 1 presents summary statistics for the firms in our net sample. The median firm employs 43 workers and planned to invest about a quarter of a million CHF in 2025, of which 100,000 CHF is allocated to machinery and equipment. The average annual investment growth is 3.4 percent for 2024 and -0.3 percent for 2025. In the subsample of firms that planned investments for 2025 (in either equipment and machinery, construction, or R&D), the median firm is somewhat larger with 54 employees and half a million CHF total investments in 2025, of which 200,000 CHF in machinery and equipment and 25,000 CHF in construction. The average annual investment growth is -0.7 percent for 2024 and 0.7 percent for 2025. The median firm financed its investment entirely through internal finance and expected the SNB to cut interest rates on December 12, 2024, by 0.25 percentage points to 0.75%.[5]

[4]Employment is measured as the total number of full-time equivalent (FTE) positions among the working-age population (ages 15–64), based on the annual average for 2024. Investment refers to nominal gross fixed capital formation by financial and non-financial corporations, using data from 2023.

[5]Half of the firms (50 percent) expected the SNB to cut its monetary policy rate by 0.25 percentage points to 0.75 percent. Another 32 percent anticipated an unchanged rate at 1.00 percent. Meanwhile, 11 percent expected a rate of 0.50 percent or lower, 6 percent anticipated an increase to 1.25 percent, and 1 percent expected the rate to rise to 1.50 percent or higher.

Table 1. Summary statistics

	Mean	Std. Dev.	P10	P25	Median	P75	P90	N
Panel A: Net sample								
Employees	277.28	1941.08	6.00	13.00	43.00	134.00	371.00	1681
Total assets, 2019 (MCHF)	1051.77	9368.30	0.27	2.00	13.50	60.22	485.80	591
Total investment, 2025 (TCHF)	13401.77	115288.95	0.00	18.50	260.00	2125.00	12190.00	1663
Investment in equipment, 2025 (TCHF)	6442.12	80758.20	0.00	2.00	100.00	750.00	3997.40	1645
Investment in construction, 2025 (TCHF)	6295.43	78705.17	0.00	0.00	0.00	300.00	4253.20	1647
Investment in R&D, 2025 (TCHF)	816.11	5937.54	0.00	0.00	0.00	20.00	400.00	1619
Annual total investment growth, 2024	0.03	0.60	-0.69	-0.35	0.00	0.29	0.89	1180
Annual total investment growth, 2025	-0.00	0.58	-0.75	-0.35	0.00	0.24	0.75	1170
Share of internal investment finance	76.58	37.59	0.00	50.00	100.00	100.00	100.00	1560
Expected SNB policy rate, Dec 2024	0.84	0.20	0.50	0.75	0.75	1.00	1.00	1547
Panel B: Firms that planned investments in 2025								
Employees	301.38	1962.45	8.35	17.00	54.73	169.00	449.00	1336
Total assets, 2019 (MCHF)	927.48	8258.09	0.60	3.58	16.00	75.50	599.88	500
Total investment, 2025 (TCHF)	16399.66	127348.99	20.00	90.00	550.00	3114.35	18500.00	1359
Investment in equipment, 2025 (TCHF)	7873.17	89221.40	5.00	25.00	200.00	1168.75	5000.00	1346
Investment in construction, 2025 (TCHF)	7708.98	87037.45	0.00	0.00	25.00	600.00	5994.00	1345
Investment in R&D, 2025 (TCHF)	998.70	6554.81	0.00	0.00	0.00	50.00	526.00	1323
Annual total investment growth, 2024	-0.01	0.50	-0.66	-0.33	0.00	0.24	0.70	1084
Annual total investment growth, 2025	0.01	0.47	-0.60	-0.29	0.00	0.22	0.67	1079
Share of internal investment finance	82.27	32.19	20.00	80.00	100.00	100.00	100.00	1309
Expected SNB policy rate, Dec 2024	0.84	0.20	0.75	0.75	0.75	1.00	1.00	1278

Notes: Panel A: Summary statistics of relevant firm characteristics for all firms participating in the survey experiment (net sample). Panel B: Summary statistics for all firms participating in the survey experiment and having planned investments for 2025 (either in equipment and machinery, construction, or R&D).

Table A.3 in Appendix A shows that the number of respondents is fairly balanced between the treatment and control groups with respect to the relevant firm characteristics, consistent with the random assignment of the treatment.

2.4 Macroeconomic environment during the survey

The survey was fielded in a macroeconomic environment marked by disinflation, early-cycle monetary tightening, and heightened policy uncertainty. At the time of the survey (from October to December 2024), the SNB policy rate stood at 1.0%, following a series of interest rate cuts earlier that year from a peak of 1.75% in March 2024. This placed the Swiss economy in the early stages of a monetary easing cycle, after the tightening observed after the pandemic in 2022 and 2023. Yet, uncertainty about the future path of monetary policy remained elevated, as reflected in firms' expectations about the SNB's upcoming decision in December

2024: half of all surveyed firms (50%) expected a 25 basis point rate cut to 0.75%, while 32% anticipated no change. Meanwhile, 11% foresaw a rate of 0.50% or lower, 6% expected a hike to 1.25%, and 1% even anticipated a rate of 1.50% or above. Inflation had recently moderated from its post-pandemic peak of 3.5% in August 2022, standing between 0.6% and 0.7% during the survey period—well within the SNB's inflation target range of 0% to 2%. At the same time, GDP growth remained moderate, with real output expanding at an annualized rate of 2.1% in the second quarter of 2024. According to the autumn 2024 forecast of the KOF Swiss Economic Institute, Swiss real GDP was expected to grow by 1.1% over the course of 2024 and by 1.6% in 2025 (Abberger et al., 2024). Against this backdrop, firms were forming their investment expectations in an environment of cooling inflation, below potential economic growth, and considerable uncertainty about the future stance of monetary policy.

2.5 Definition of investment revisions

Our primary outcome of interest is the firm-level revision in planned total investment in response to the hypothetical change in the monetary policy rate. Specifically, we focus on the relative change in firms' 2025 investment plans before and after exposure to the experimental treatment.

We define the outcome variable as the percentage change[6] in total investment, calculated as:

$$\Delta I_{i,t+1}^{q} = \frac{I_{i,t+1}^{posterior,q} - I_{i,t+1}^{prior}}{I_{i,t+1}^{prior}} \tag{1}$$

where $I_{i,t+1}^{prior}$ denotes firm i's initially reported total planned investment for 2025, and $I_{i,t+1}^{posterior,q}$ is the revised investment under the hypothetical scenario associated with treatment condition q. The set of treatment conditions is defined by the deviation of the hypothetical policy rate from the firm's stated expectation, i.e., $q \in \{\mathrm{E}(i) + 0.50, \mathrm{E}(i) + 0.25, \mathrm{E}(i), \mathrm{E}(i) - 0.25, \mathrm{E}(i) - 0.50\}$. Total investment is

[6]Calculating revisions as percentage changes has the advantage that downward revisions from positive investment to zero are finitely bounded at -100 percent. In Table C.13 in Appendix C.7, we assess the robustness of our results using alternative specifications of the outcome variable, including log-differences and FTE-normalized absolute differences in investment. Our main findings are robust to these alternative measures of investment revisions.

defined as the sum of planned investments across investment categories: $I_{i,t+1} = \sum_k I_{i,k,t+1}$. In subsequent analyses, we also examine category-specific investment responses to assess potential heterogeneity across investment categories.

Since investment revisions are based on self-reported quantitative survey responses, they are prone to input or measurement errors. To mitigate the influence of extreme outliers, we winsorize investment revisions calculated as in Equation (1) at the 1st and 99th percentiles.[7]

3 Empirical results

In this section, we present empirical evidence from the hypothetical vignette experiment, which identifies the causal effect of unanticipated changes in the monetary policy rate on firms' investment behavior. We begin by quantifying firms' responses in terms of both the probability of adjustment (Section 3.1) and the average size of investment adjustments (Section 3.2). We then examine how the reliance on external financing shapes firms' investment revisions in response to monetary policy shocks (Section 3.3). Finally, we explore how investment responses—in particular, their asymmetry between positive and negative monetary policy shocks—vary with firm characteristics (Section 3.4).

3.1 Probability of investment adjustments

We begin by examining firms' investment responses along the extensive margin—that is, whether they revise their planned investment in response to the hypothetical vignettes introduced in Section 2. To quantify these responses, we estimate the following linear[8] probability model:

$$\mathbb{1}[\Delta I^q_{i,t+1} \neq 0] = \alpha + \beta_q \cdot \mathbb{1}[T_i = q] + \gamma_s + \gamma_f + \varepsilon_i, \tag{2}$$

where the dependent variable is an indicator equal to one if firm i revises its planned investment for the following year $t+1$ under treatment q, and zero oth-

[7] In Appendix C.8, we assess the sensitivity of our results to alternative thresholds for winsorization (Table C.14) and trimming (Table C.15), and find that the main findings remain robust.

[8] While we use OLS regressions in our baseline analysis for ease of interpretation, the binary nature of the dependent variable (equal to one if a firm adjusts its investment and zero otherwise) lends itself to nonlinear models such as logistic regression models. As shown in Table C.3 and Table C.4 in Appendix C, our main findings are robust to using a logit specification instead.

erwise. The indicator $\mathbb{1}[T_i = q]$ is a dummy for assignment to treatment group $q \in \{\mathrm{E}(i) \pm 0.50, \mathrm{E}(i) \pm 0.25\}$. Size and sector fixed effects are captured by γ_s and γ_f.[9]

We estimate Equation (2) separately for each treatment group q, restricting the sample in each case to firms assigned to that treatment as well as the control group. This setup allows for a straightforward interpretation of β_q as the average treatment effect of a specific monetary policy shock on the probability of revising investment plans under treatment q relative to the control group (which experiences no deviation from its expected policy rate).

Figure 1 displays the estimated probability of firms adjusting their investment plans (vertical axis, in percent) in response to hypothetical changes in the SNB policy rate (horizontal axis, in percentage points). Panel (a) shows the response for total investment, while Panel (b) disaggregates the response by investment category: machinery & equipment, construction, and R&D. The bars represent 90 percent confidence intervals.

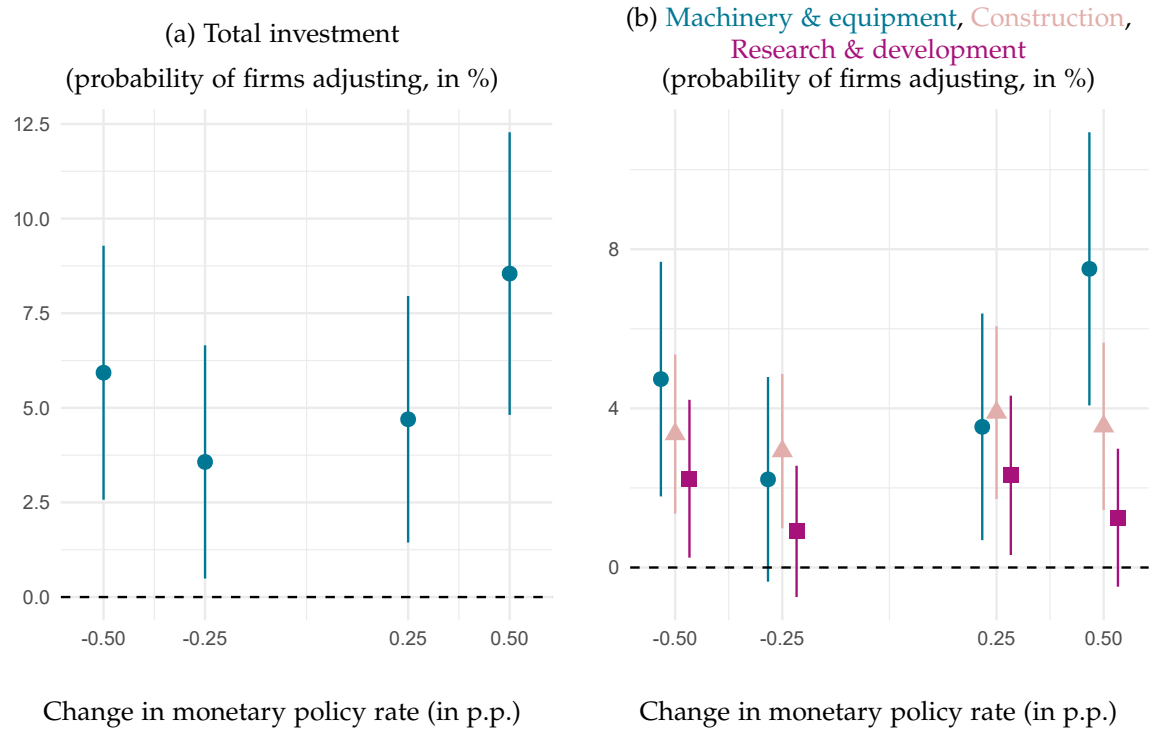
Focusing first on total investment in Panel (a) of Figure 1, we highlight the following findings. Changes in the monetary policy rate lead to significant extensive-margin revisions. The probability that firms adjust their investment plans in response to both increases and decreases in the SNB policy rate is non-negligible.[10] A 50 basis point increase in the policy rate raises the probability of adjustment to 8.5 percent, whereas a 50 basis point decrease results in a 5.9 percent probability.

Turning to the disaggregated results in Panel (b) of Figure 1, we find that the overall investment response is primarily driven by adjustments in plans for machinery & equipment. In contrast, the probability of adjusting investment in construction and R&D is lower at the tails. While the estimated probability for construction

[9] Firm size is categorized based on the number of full-time equivalent employees: small firms have fewer than 50 employees, medium-sized firms have between 50 and 249 employees, and large firms have 250 employees or more. Sectors are defined at the section level (NACE Rev. 2 Level 1, A–V), grouping economic activity into three broad categories: industry (C), construction (F), and services (G through S).

[10] Leveraging the panel structure of our survey data, we can compare our estimates for the extensive-margin response to monetary-policy shocks with unconditional investment expectation adjustments (see Appendix C.3 for more details). Pooling firm-year observations from 2016 to 2024, we observe that investment expectation revisions are frequent. Approximately two-thirds of firm-year observations involve revisions of expectations over a half-year horizon (i.e., a horizon similar to the revision horizon in our experiment), which is also similar to previous estimates for firm-level investment surprises in the literature (e.g., Bachmann et al., 2013; Bachmann and Elstner, 2015).

Figure 1. Probability of firms adjusting investments



Notes: The figure shows the estimated probability that firms adjust their investment plans (vertical axis, in percent) in response to hypothetical changes in the SNB policy rate (horizontal axis, in percentage points) estimated with linear probability models. Panel (a) shows the response for total investment, while Panel (b) disaggregates the response by investment category: machinery & equipment, construction, and R&D. Estimations include size and sector fixed effects. The bars represent 90 percent confidence intervals based on robust standard errors. The corresponding estimation results are shown in Table C.1 and Table C.2 in Appendix C.

investment is between 0.3 and 0.4%, the evidence for R&D investment revisions is weaker across the treatments. The responses also appear less sensitive to the magnitude of the policy change—doubling the rate hike does not meaningfully increase the probability of adjustment in construction and R&D investment. For machinery & equipment, by contrast, the results suggest a stronger change in the probability in response to larger policy shocks.

Our evidence shows that even relatively small changes in the SNB policy rate can trigger discrete revisions in firms' investment plans, with non-trivial extensive-margin responses. This pattern aligns with the "lumpy investment" literature, in which some firms are pushed out of their inaction bands by modest shocks. In-

vestment in machinery and equipment tends to be modular, partially reversible, and associated with lower fixed and planning costs, which—within (S–s) type models—implies more frequent adjustments and faster responses. In contrast, construction and R&D projects involve high setup costs (e.g., permits, extensive planning, and irreversible sunk expenditures), which widen inaction bands and dampen responsiveness to shocks (Caballero and Engel, 1999; Cooper and Haltiwanger, 2006).

3.2 Average investment adjustments

We now turn to the average size of investment adjustments. We consider all firms, treating non-adjusters as zero changes.[11] We estimate treatment effects using ordinary least squares (OLS), controlling for firm size and sector fixed effects. The regression specification mirrors the specification used for the extensive margin, replacing the binary outcome variable with the continuous investment revision:

$$\Delta I^{q}_{i,t+1} = \alpha + \beta_q \cdot \mathbb{1}[T_i = q] + \gamma_s + \gamma_f + \varepsilon_i, \tag{3}$$

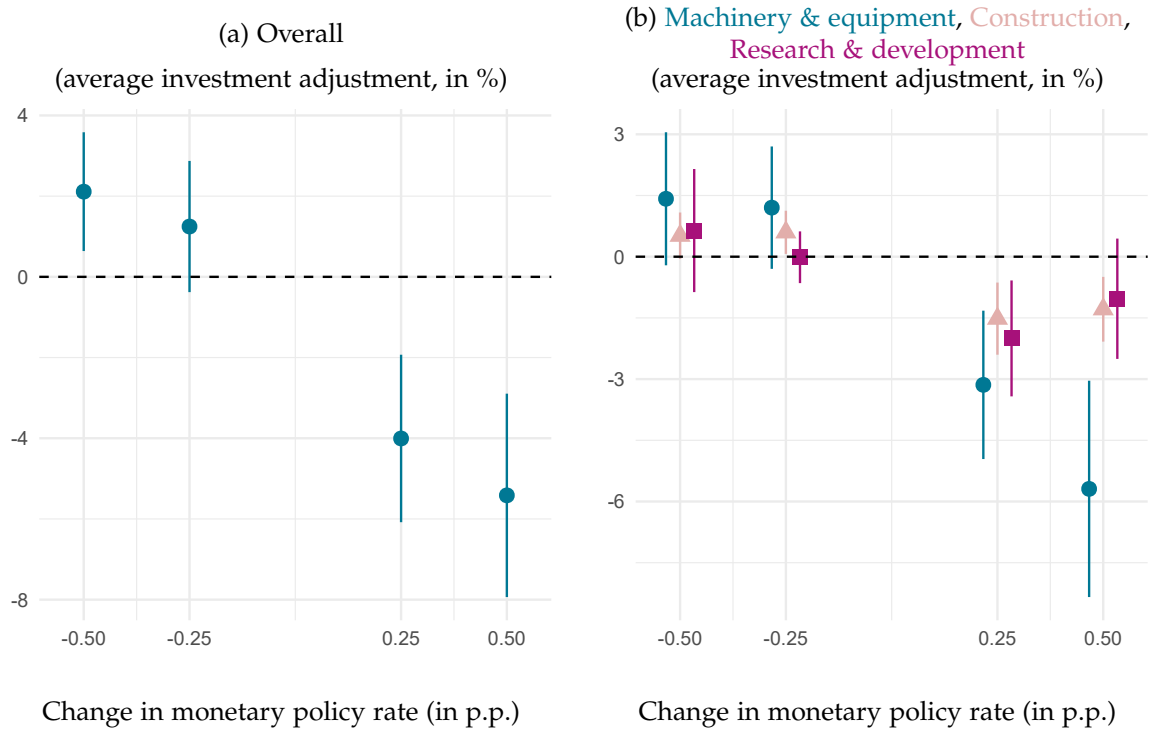
where $\Delta I^{q}_{i,t+1}$ denotes the change in firm i's planned investment for the next year $t+1$ in response to the assigned policy scenario q as defined in Equation (1). The coefficient β_q captures the average investment response to treatment q relative to the control group.

Figure 2 plots the average revision of total investment plans (vertical axis, in percent) in response to hypothetical changes in the SNB policy rate (horizontal axis, in percentage points). Panel (a) shows the response for total investment, while Panel (b) disaggregates the response by investment category: machinery & equipment, construction, and R&D. As before, the bars display 90 percent confidence intervals.

Panel (a) of Figure 2 shows a clear asymmetric investment response to unanticipated changes in the policy rate. Firms decrease their investment plans for the following year by 5.4 percent in response to a 50 basis point increase in the policy rate, indicating a substantial and statistically significant downward adjustment. By contrast, following a 50 basis point decrease in the policy rate, firms show

[11] Additional results restricting the sample to firms that revise their investment plans in response to a change in the policy rate—i.e., the intensive-margin response—are reported in Table C.5 and Table C.6 in Appendix C.

Figure 2. Average investment adjustments



Notes: The figure shows the average adjustment of total investment plans (vertical axis, in percent) in response to hypothetical changes in the SNB policy rate (horizontal axis, in percentage points). Panel (a) shows the response for total investment, while Panel (b) disaggregates the response by investment category: machinery & equipment, construction, and R&D. The bars represent 90 percent confidence intervals based on robust standard errors. Investment adjustments are calculated as in Equation (1) and winsorized at the 1st and 99th percentiles. Estimations include size and sector fixed effects. The corresponding estimation results are shown in Table C.5 and Table C.6 in Appendix C.

a much smaller increase in investment, averaging 2.1 percent. This difference in response size underscores the asymmetry in firms' investment sensitivity to rate hikes versus rate cuts: negative monetary policy surprises (rate hikes) elicit stronger downward revisions than the upward revisions triggered by equivalent positive surprises (rate cuts). This finding is in line with the empirical results in Pérez-Orive et al. (2024).[12]

[12]This asymmetry in the conditional response mirrors the skewness we observe in the unconditional distribution of investment expectation revisions and errors (see Appendix C.3), which exhibits a longer left tail. The pattern suggests that downward adjustments in investment plans tend to be larger (in absolute values) than upward ones. This finding is consistent with previous evidence of asymmetric firm-level investment revisions (e.g., Bachmann et al., 2013; Bachmann and Elstner, 2015).

The average investment adjustment in response to monetary policy surprises identified in our survey experiment is economically relevant, compared with average annual investment growth rates in our sample of less than one percent for the next year (see Table 1). Furthermore, our results align closely with the range of estimates reported in the recent work relying on high-frequency identification of monetary policy shocks estimates that a one percentage point rate cut raises annualized investment by 13% (Cloyne et al., 2023; Paranhos, 2024) to 20% (Ottonello and Winberry, 2020) in the US, and by up to 34% in the euro area (Durante et al., 2022). Using firm-level survey data, Best et al. (2024) document that a 0.5 percentage point decline in the lending rate results in a 6–7% increase in investment, though their identification relies on changes in lending conditions rather than direct monetary policy shocks. To the best of our knowledge, we are the first to provide causal micro-level evidence via a survey experiment on how firms revise their investment plans in response to changes in the monetary policy rate.

When we focus on the subsample of firms that adjust their investment plans in Figure C.1 in Appendix C, we find that these adjustments are substantial. Firms that revise their investment plans in response to an unanticipated policy rate increase reduce their investment by more than 40 percent on average for the following year. In contrast, firms responding to a policy rate cut increase their investment by roughly 20 percent, though these estimates are imprecise.

Panel (b) of Figure 2 presents the average investment adjustments by category. As before, the primary driver of the average investment adjustment is the revision in machinery & equipment investments. Adjustments in construction investments are smaller, and there is even less evidence that firms revise their R&D investments in response to the unexpected changes in the policy rate at all. Moreover, the asymmetry between contractionary and accommodative shocks is most pronounced for this category.

To better understand how monetary policy affects firms' investment decisions, we asked respondents to identify the most relevant transmission channel. A majority (55 percent) reported that changes in the policy rate would not affect their investment plans (see Figure C.4 in Appendix C). Among those who did identify a relevant channel, changes in product demand (23 percent) and the exchange rate of the euro against the Swiss franc (22 percent) were the most commonly cited, followed by the cost (15 percent) and availability (4 percent) of external finance.

3.3 The role of external financing in investment adjustments

In this section, we examine how the reliance on external financing shapes firms' investment revisions in response to monetary policy shocks.

Firms in our sample report financing, on average, 86 percent of their investments through internal sources, such as retained earnings, asset sales, or funding from a parent company. The remaining 14 percent is financed externally, with bank loans and credit lines being the predominant source. Other forms of external financing—such as bonds, equity issuance, or alternative instruments—play only a negligible role for most firms' investment financing.

To study how the reliance on external finance shapes the investment response to monetary policy, we estimate the average investment adjustment separately for positive and negative monetary policy shocks, interacting the policy shocks with the firm's share of externally financed investments. Specifically, we estimate the following specification:

$$\begin{aligned} \Delta I^{\text{norm}}_{i,t+1} = \alpha + \beta_1 \cdot \mathbb{1}[T_i = q^{\pm}] + \beta_2 \cdot \text{External}_i \\ + \beta_3 \cdot \left(\mathbb{1}[T_i = q^{\pm}] \times \text{External}_i\right) + \gamma_s + \gamma_f + \varepsilon_i \end{aligned} \tag{4}$$

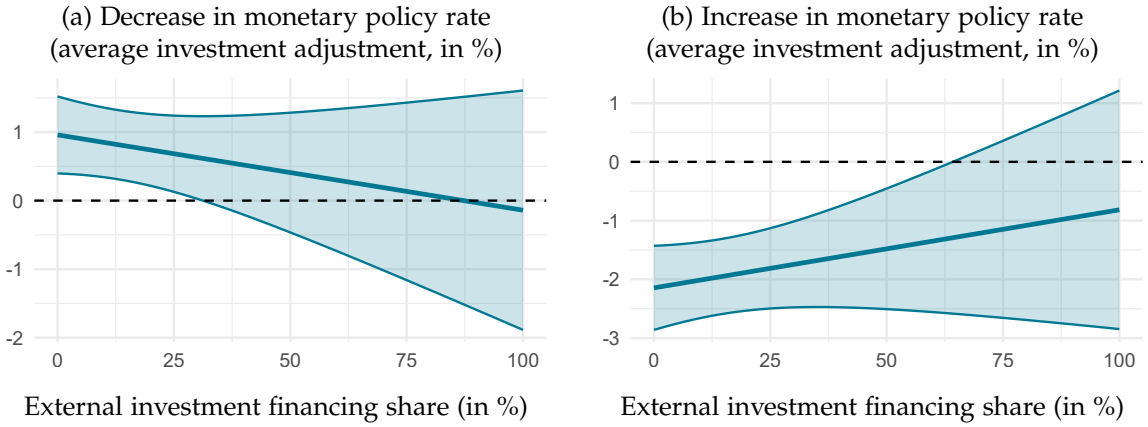
where $\Delta I^{\text{norm}}_{i,t+1}$ denotes the percentage change in firm i's planned investment for the following year $t+1$, normalized to correspond to a monetary policy shock of ± 25 basis points to avoid averaging treatment effects across different shock magnitudes within the two groups. $\mathbb{1}[T_i = q^{\pm}]$ is an indicator for assignment to either a positive (q^+) or negative (q^-) monetary policy vignette, and External_i is the firm-specific share of investment financed through external sources. γ_s and γ_f denote size and sector fixed effects, respectively, and ε_i is an error term.

The coefficients have the following interpretation: β_1 measures the average investment response to a monetary policy shock for firms that rely entirely on internal financing; β_2 captures the association between external financing and investment response in the absence of a shock; and β_3 is the heterogeneous treatment effect, indicating how the investment response varies with the degree of reliance on external finance.

Figure 3 plots the predicted investment revisions as a function of the external investment financing share, separately for expansionary (in Panel a) and tightening

(in Panel b) monetary policy shocks.[13]

Figure 3. Average investment adjustment as a function of external investment financing shares



Notes: The figure shows estimated marginal effects of monetary policy shocks on firms' investment responses as a function of external investment financing shares separately for rate cuts in Panel (a) and rate hikes in Panel (b). The x-axis displays the share of investment financed externally (in percent), and the y-axis shows the average adjustment in investment plans (in percent) relative to the control group. Investment revisions are normalized to reflect a monetary policy shock of ± 25 basis points. All regressions include size and sector fixed effects. Shaded areas show 90 percent confidence intervals based on robust standard errors. The corresponding estimation results are shown in Table C.9 in Appendix C.4.

The results indicate strong and significant revisions when investments are financed entirely through internal funds (i.e., when the external financing share is zero). In response to a positive monetary policy shock (i.e., a rate cut), the average adjustment of total investment is 1.0 percent.[14] In response to a negative monetary policy shock (i.e., a rate hike), the average adjustment of total investment is -2.1 percent. As the share of external financing increases, investment revisions become progressively smaller in absolute terms.

This pattern—that firms relying more heavily on internal financing exhibit larger adjustments in their investment plans, while those dependent on external finance display more stable and moderate revisions—is well documented in the empirical literature (Grob and Züllig, 2024; Paranhos, 2024). Furthermore, our findings

[13] Figure C.3 in Appendix C.4 plots the predicted investment revisions as a function of shares of all investment financing sources, separately: bank loans and credits, bonds, equity, and internal financing.

[14] Table C.10 in Appendix C.4 shows the estimation results across investment categories: machinery & equipment, construction, and research & development.

align with the model framework in Ottonello and Winberry (2020), which predicts that firms with lower leverage respond more strongly to interest rate changes because they face fewer financial constraints and can adjust investment more flexibly. In the model, such firms act as marginal investors, driving much of the aggregate investment response to monetary policy shocks. We extend this insight by showing that the same mechanism applies not only to aggregate leverage, but also to the composition of investment financing: firms whose investment funding mix is tilted toward internal funding display the strongest reactions to monetary policy changes. Moreover, firms react more strongly to negative shocks than to positive shocks.

3.4 Heterogeneity analyses

Given the marked difference between the responses to positive and negative monetary policy shocks documented above, we conclude by examining whether these asymmetries are systematically related to firm characteristics. For each subgroup of firms—defined by size, sector, investment intensity, financing constraints, or export orientation—we estimate

$$\Delta I^{\text{norm}}_{i,t+1} = \alpha + \beta_1 \cdot \mathbb{1}[\text{Treatment}_i] + \beta_2 \cdot \mathbb{1}[\text{Rate Cut}_i] + \gamma_s + \gamma_f + \varepsilon_i, \tag{5}$$

where $\Delta I^{\text{norm}}_{i,t+1}$ denotes the normalized investment change, constructed so that higher values indicate stronger reactions in the intended direction of the monetary policy shock. $\mathbb{1}[\text{Treatment}_i]$ equals one if firm i belongs to any treatment group—either receiving a positive or a negative shock—and zero if assigned to the control group. $\mathbb{1}[\text{Rate Cut}_i]$ equals one if the shock is a rate cut, and zero for a rate hike. γ_s and γ_f denote size and sector fixed effects, included except when the subgroup definition already conditions on that characteristic. ε_i is the error term.

Table 2 reports results for differences in the size of the treatment effect between positive and negative monetary policy shocks.[15]

Firm size and sector Panel A of Table 2 shows that the asymmetry is most pronounced for large firms, where the coefficient on the rate-cut indicator is negative

[15] Additional results for the asymmetry, focusing on the magnitude of only those that react, are reported in Table C.12.

Table 2. Heterogeneous asymmetry in investment responses

Panel A: Firm size and sector

	S	M	L	Manufacturing	Construction	Services
Dummy: Treatment	0.025***	0.023***	0.057***	0.039***	0.007	0.028***
	(0.009)	(0.008)	(0.021)	(0.013)	(0.019)	(0.007)
Dummy: Rate cut	−0.018*	−0.005	−0.042**	−0.020*	−0.010	−0.017**
	(0.010)	(0.008)	(0.018)	(0.011)	(0.019)	(0.008)
Constant	0.012	−0.007	−0.035**	0.004	0.022	−0.001
	(0.016)	(0.009)	(0.017)	(0.010)	(0.019)	(0.003)
Size	No	No	No	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	No	No	No
Observations	616	506	224	440	96	810
R^2	0.014	0.015	0.045	0.030	0.015	0.013

Panel B: Investment quartiles and financing constraints

	Q1	Q2	Q3	Q4	Constrained	Unconstrained
Dummy: Treatment	0.040***	0.009	0.034***	0.026***	0.018	0.032***
	(0.014)	(0.011)	(0.012)	(0.009)	(0.015)	(0.007)
Dummy: Rate cut	−0.014	−0.004	−0.027**	−0.026**	−0.002	−0.020***
	(0.014)	(0.012)	(0.013)	(0.012)	(0.013)	(0.007)
Constant	−0.009	0.033	−0.014	0.011	0.030	−0.003
	(0.017)	(0.026)	(0.009)	(0.009)	(0.029)	(0.009)
Size	Yes	Yes	Yes	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	Yes	Yes	Yes
Observations	306	345	361	314	228	1,118
R^2	0.034	0.018	0.030	0.027	0.014	0.018

Panel C: Export intensity

	0-5%	6-33%	34-66%	67-100%
Dummy: Treatment	0.027***	0.034	0.018	0.043**
	(0.007)	(0.028)	(0.022)	(0.019)
Dummy: Rate cut	−0.015**	−0.027	−0.024	−0.022*
	(0.007)	(0.030)	(0.025)	(0.012)
Constant	0.00001	−0.034	0.020	−0.011
	(0.010)	(0.028)	(0.023)	(0.019)
Size	Yes	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	Yes
Observations	938	120	86	178
R^2	0.013	0.047	0.061	0.055

Notes: OLS regression results showing the average adjustment of total investment. The dependent variable is the normalized investment response from Equation (5), defined such that larger values reflect stronger reactions in the intended direction of the monetary policy shock. Size and sector (NACE Rev. 2 sections) fixed effects are included as indicated in the corresponding rows of the table. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

and statistically significant, implying stronger investment adjustments following rate hikes than rate cuts. Small firms also exhibit the same pattern, though the effect is smaller and only statistically significant at the 10% level, whereas for medium-sized firms the difference is minor and not statistically significant. One possible interpretation is that large firms may react more strongly to monetary policy surprises not only because they tend to face fewer financial frictions (Ottonello and Winberry, 2020), but also because they operate a broader portfolio of potential projects. Monetary shocks shift the profitability threshold, and with more projects clustered around this margin, large firms exhibit disproportionate investment swings through more project entry and exit (Caballero and Engel, 1999).

By sector, the asymmetry is driven primarily by manufacturing and service firms, both of which respond more strongly to rate hikes. Unlike other sectors, construction firms do not display a strong asymmetric investment responses to monetary policy shocks. Their projects are typically governed by long-term contractual and financing obligations, which limit the scope for adjusting investment in response to short-run credit fluctuations. Once underway, large projects are difficult to scale back or expand, a rigidity consistent with time-to-build dynamics (Kydland and Prescott, 1982) and the irreversibility of sunk costs (Cooper and Haltiwanger, 2006). These structural commitments insulate construction investment from the asymmetry observed in more flexible sectors.

Investment quartiles Panel B of Table 2 presents the results by investment quartiles, where firms are grouped according to their pre-treatment investment intensity, measured as total investment per full-time equivalent (FTE) employee. Asymmetries are concentrated in the upper-middle (Q3) and top (Q4) quartiles, both of which exhibit negative and statistically significant rate-cut coefficients, indicating larger adjustments in response to rate hikes. For firms in the bottom half (Q1 and Q2) we find no statistically significant asymmetry. High investment intensity firms could display greater asymmetry because irreversible, sunk costs make them more willing to cancel projects after rate hikes than to initiate new ones after rate cuts (Dixit and Pindyck, 1994).

Financing constraints Panel B of Table 2 also reports results by financing constraints. A firm is classified as financially constrained if it reports being denied ex-

ternal financing, receiving less than requested, finding borrowing costs too high, or refraining from applying for fear of rejection.[16] Contrary to the hypothesis that constraints amplify asymmetry, the significant difference in responses between rate cuts and rate hikes is found only among financially unconstrained firms, which have a negative and statistically significant coefficient on the rate-cut indicator. For constrained firms we find no statistically significant asymmetry.

Contrary to the view that financial frictions amplify asymmetry (Bernanke et al., 1996; Pérez-Orive et al., 2024), we find it only among financially unconstrained firms, while constrained firms show no significant difference between hikes and cuts. This pattern is consistent with the framework of (Ottonello and Winberry, 2020), which allows firm heterogeneity to generate asymmetric transmission, and suggests that investment flexibility—rather than financing frictions—drives the asymmetric responses.

Export intensity Panel C of Table 2 examines heterogeneity by export orientation, based on firms' self-reported share of output destined for export in 2024: 0–5%, 6–33%, 34–66%, and 67–100%. Firms with low export intensity (0–5%) have a negative and statistically significant rate-cut coefficient, indicating stronger investment responses to rate hikes than to rate cuts. A similar, albeit smaller, asymmetry is present among firms in the highest export category (67–100%). The other two categories show no statistically significant differences. Overall, these results suggest that both domestically oriented firms and some highly export-oriented firms contribute to the observed asymmetry, while those in the middle export range appear less sensitive. A possible interpretation is that the asymmetry is strongest among exporters, whose machinery-intensive investment is highly responsive to financing and exchange rate shocks.

The asymmetry is driven mainly by large, high-investment firms in manufacturing and services and appears only among financially unconstrained firms. This suggests that the pattern reflects flexibility in cancelling or postponing projects rather than borrowing constraints, and that the nature of investment projects—whether they involve large, irreversible commitments or more flexible forms of

[16] According to this classification, over 18% of firms are financially constrained (see Figure A.1 in Appendix A): 12.6% cite high borrowing costs, 3% refrain from applying due to fear of rejection, 1.6% have been denied credit, and 1.2% have received less than requested.

spending—is also likely to play an important role, consistent with theories of lumpy and partially irreversible investment.

4 Conclusion

This paper provides causal evidence on how firms adjust planned investment when confronted with policy-rate surprises. Exploiting randomized ± 25 and ± 50 basis-point shocks embedded in a survey of Swiss firms, we uncover an investment channel that is asymmetric and tightly conditioned by firms' balance-sheet positions.

Three results stand out. First, only a minority of firms revise their investment plans in response to monetary policy shocks, but those that do adjust substantially. Second, there is a clear asymmetry: rate hikes reduce investment much more than cuts of comparable size increase it. Third, financing matters: firms relying more on internal funds react strongly, while those dependent on external finance adjust little. The asymmetry is concentrated among large, financially unconstrained firms, consistent with flexibility in cancelling or postponing projects and with the nature of investment—large, irreversible versus more flexible—echoing theories of lumpy and partially irreversible investment. Taken together, these results highlight that the investment channel of monetary policy is both heterogeneous and asymmetric, shaped by firms' financing structure, balance-sheet position, and investment characteristics.

Our results complement recent evidence that balance-sheet strength conditions monetary pass-through (Ottonello and Winberry, 2020; Jeenas, 2024) and that contractionary shocks are more powerful than expansionary ones (Jordà et al., 2020; Seiler, 2025). This could reflect the well-known asymmetry of the pass-through of policy to lending rates (Holtemöller and Wozniak, 2023) or the vicinity to the effective lower bound (Tenreyro and Thwaites, 2016). The experiment, however, is the first to show—causally—that small, symmetric policy-rate surprises elicit the strongest investment reactions from firms that rely primarily on internal financing.

Our evidence also contributes to growth policy. Investment in machinery and construction is highly sensitive to unanticipated policy-rate hikes, but R&D spending is not. If intangible investment is the engine of long-run productivity, then the

asymmetric pass-through we document may cushion the growth drag of monetary tightenings—yet it also means that rate cuts do little to boost innovation. Future work could extend the experiment across countries, link survey responses to realized outcomes, and embed endogenous financing choices in macro-finance models.

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A Descriptive statistics

Table A.1. Sectoral and size distribution of firms

	Share of firms in panel (%)	Share of firms in economy (%)
Sector group		
Manufacturing	30.3	9.6
Construction	6.8	11.5
Retail Trade	11.3	6.6
Financial and Insurance Activities	5.7	2.8
Other Service Activities	42.0	53.3
Other	4.0	16.2
Size class		
L	15.6	0.6
M	43.4	3.3
S	41.0	96.1

Notes: This table shows the sectoral and size distribution of the 1,715 firms participating in the survey experiment. Sector group "other service activities" includes all services excluding retail trade and financial and insurance activities. Sector group "other" includes agriculture, forestry, fishing, mining, electricity, gas, water supply, waste, public administration, education, activities of households as employers, activities of membership organizations, activities of extraterritorial organizations. Size classes differentiate between large (employing more than 250 employees, "L"), medium-sized (employing more than 50 employees but less than or equal to 250 employees, "M"), and small firms (employing fewer than 50 employees but more than 1 employee, "S").

Table A.2. Respondents' roles and divisions within the firm

	Share of firms (%)
Owner/CEO/board director/authorized officer	70.0
Department head	16.6
Team manager	4.6
Specialist	8.7
Management	57.3
Finances/controlling/accounting	35.8
Sales	3.6
Marketing/communication	0.5
Human resources	0.7
Executive department/administration	2.1

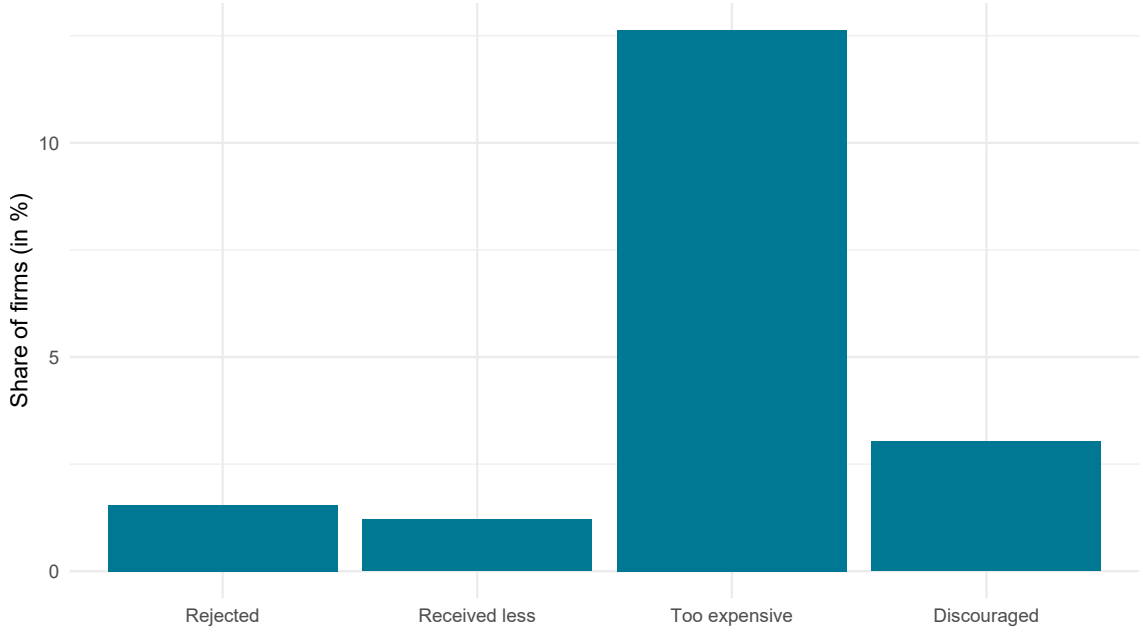
Notes: Data stem from the KOF investment survey in spring 2022.

Table A.3. Characteristics of intervention groups

Dimension	$E(i) - 0.50$	$E(i) + 0.25$	$E(i)$	$E(i) + 0.25$	$E(i) + 0.50$
L	14.56	17.37	15.48	13.12	18.10
M	44.78	44.26	44.27	43.44	43.92
S	40.66	38.38	40.25	43.44	37.98
Construction	5.98	6.41	11.64	5.59	6.69
Services	59.26	61.52	57.86	63.66	64.44
Industry	34.76	32.07	30.50	30.75	28.88
de	78.32	78.67	78.85	75.68	77.42
en	1.08	1.11	0.30	0.30	0.29
fr	13.55	14.96	13.29	19.15	15.84
it	7.05	5.26	7.55	4.86	6.45
TZO1	2.71	1.95	2.42	3.06	1.47
TZO2	15.99	23.40	20.24	22.94	20.23
TZO3	15.72	16.71	16.31	11.62	13.49
TZO4	65.58	57.94	61.03	62.39	64.81
0.50% or lower	8.93	12.05	11.22	13.47	10.53
0.75%	52.68	48.80	51.70	46.13	51.97
1.00%	30.36	35.24	28.91	34.68	30.92
1.25%	6.25	3.31	6.80	5.05	5.59
1.50% or higher	1.79	0.60	1.36	0.67	0.99

Notes: Percent of participants by dimension and vignette.

Figure A.1. Self-reported reasons for limited use of external financing



Notes: This figure shows the distribution of responses to the survey question on why firms are not financing a larger share of their investments in 2024 through external sources. Firms were asked to indicate the main reason from a list of predefined options. The available responses were: external financing was sought but rejected ("rejected"), a smaller amount than requested was granted ("received less"), borrowing costs were perceived as too high ("too expensive"), or the firm did not seek more external financing because it expected to be rejected ("discouraged"). Responses are based on single-choice selections.

B Survey questionnaire

Appendix B.1 shows the questionnaire of the regular KOF Investment Survey in autumn 2024. Appendix B.2 shows the questionnaire of the survey experiment appended to the online module of the regular KOF Investment Survey in autumn 2024.

B.1 Questionnaire of the KOF investment survey in autumn 2024

KOF Investment Survey

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KOF Swiss Economic Institute
ETH Zürich, LEE F 105, 8092 Zürich
www.kof.ethz.ch

Tel: 044 632 80 64
surveyadmin@kof.ethz.ch

Sector name:

Classification: NA608

Survey IVU 2024 10

Firm

Contact

Sector

Please note

- Answer for the above sector only
- Consider only domestic business
- Do not use red pen
- Please fill in the boxes as follows:

- **Your information will be kept strictly confidential**

Explanations

https://u.ethz.ch/DKRQ9

Questions autumn

0. Weighting information

Number of employees in **full-time equivalent** positions incl. apprentices, in **Switzerland** (in the company or the company division entered in the questionnaire)
Example: 2 full-time positions,1 apprenticeship position and 1 part-time position at 40% correspond to a total of 3.4 employees

2024 [ ][ ][ ][ ][ ].[ ][ ]

In 2024 the following percentage of our production wasexported:

○ 0-5% ○ 6-33% ○ 34-66% ○ 67-100%

1. Investment activity

a) Our gross **construction** investments in Switzerland in whole francs amounted / are likely to amount to

2023 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2024 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2025 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

b) Our gross **machinery and equipment (M&E)** investments in Switzerland in whole francs amounted / are likely to amount to

2023 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2024 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2025 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

c) Our gross **research and development (R&D)** investments in Switzerland in whole francs amounted / are likely to amount to

2023 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2024 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

2025 [ ][ ]'[ ][ ][ ]'[ ][ ][ ]'[ ][ ][ ].-

d) Relative to 2024, in the year 2025 our investment in Switzerland is likely to

	Construction	M&E	R&D
increase	○	○	○
remain unchanged (or at zero)	○	○	○
decrease	○	○	○

e) We consider the realisation of our investment plans for 2025 as

○ very certain ○ fairly certain ○ fairly uncertain ○ very uncertain

2. Production capacity

In comparison to 2024, our technical production capacity in Switzerland in the year 2025 shall probably

○ expand ○ leave unchanged ○ reduce

3. Product programme

In the year 2025, we are planning to
(you may pick one or more categories)

- retain our product range ☐
- bring our products into line with the state of the art ☐
- add new products to the product range ☐

4. Structure of the investment

Our investment in 2024/2025 serves
(you may pick one or more categories)

		2024	2025
a)	replacement	☐	☐
b)	extension of the production capacity	☐	☐
c)	to streamline production	☐	☐
d)	environmental protection and regulations by trade law	☐	☐
e)	other objectives	☐	☐

5. Factors influencing the investment activity

Our investment activity will be positively/negatively influenced in 2024 and 2025 respectively by the following factors:

a) 2024	++	+	=	-	--	n.A.
Demand	○	○	○	○	○	○
Financial resources / expected profits	○	○	○	○	○	○
Technical factors	○	○	○	○	○	○
Other factors	○	○	○	○	○	○

b) 2025	++	+	=	-	--	n.A.
Demand	○	○	○	○	○	○
Financial resources / expected profits	○	○	○	○	○	○
Technical factors	○	○	○	○	○	○
Other factors	○	○	○	○	○	○

++ very stimulating + stimulating = no influence
- limiting -- very limiting n.a. no answer

6. Non-domestic investment

In the year 2025, we plan to make direct investments abroad

○ Yes ○ No

If yes, to what activities will they be allocated?
(you may pick one or more categories)

- Distribution ☐
- Production ☐
- Research and development ☐

Please turn over

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7. Sources of investment finance

a) We finance our investment in 2024 proportionately from the following sources approximately:
Please provide the shares in whole numbers as a percentage (without decimal places).

Internal financing (e.g., retained earnings or financing through depreciation/provisions, sale of assets, or by the parent company)	___ %
External financing through bank loans and bank credit	___ %
External financing through bonds	___ %
External financing through equity financing (e.g., stock issuance, business angels, venture capital)	___ %
Other forms of external financing (e.g., profit participation certificates, convertible bonds, crowdfunding)	___ %
We do not plan any investments in the year 2024	___ %
	100 %

b) What is the main reason why you are not financing a larger share of your investments in 2024 from external sources?

Choose one of the following answers:

- ○ We do not seek a larger share of external financing or make any investments in 2024.
- ○ We have sought more external financing, but it was rejected by external sources.
- ○ We have sought more external financing, but we received a smaller amount than desired.
- ○ We did not seek more external financing because we felt the cost of debt would have been too high.
- ○ We did not seek more external financing because we expected to be rejected.

Required only in case of change or correction in personal details

First name _____ Last name _____

Street _____ Number ____

ZIP _____ City _____ Country _____

Function _____ Phone (___) _____

Type of participation

○ Online questionnaire ○ Paper questionnaire

For online participation please specify e-mail address

_____

Remarks

Thank you for your participation

B.2 Questionnaire of the survey experiment

Randomization and vignettes

Each respondent was randomly assigned to one of five groups: a control group or one of four treatment groups. Respondents were shown a short statement (vignette) about a hypothetical interest rate decision by the SNB. The exact wording is shown in Table B.1 below. In the questionnaire below, the positioning of these vignettes is indicated by "[Vignette statement according to Table B.1]."

Table B.1. Experimental vignette treatments shown to participants

Group	Vignette statement
Control	Assume that the SNB sets the SNB policy rate in line with your expectations on December 12, 2024.
Treatment 1	Assume that on December 12, 2024, the SNB sets the SNB policy rate 0.50 percentage points higher than you expect, even though the SNB's assessment of the economic environment does not change.
Treatment 2	Assume that on December 12, 2024, the SNB sets the SNB policy rate 0.25 percentage points higher than you expect, even though the SNB's assessment of the economic environment does not change.
Treatment 3	Assume that on December 12, 2024, the SNB sets the SNB policy rate 0.25 percentage points lower than you expect, even though the SNB's assessment of the economic environment does not change.
Treatment 4	Assume that on December 12, 2024, the SNB sets the SNB policy rate 0.50 percentage points lower than you expect, even though the SNB's assessment of the economic environment does not change.

Questionnaire of the survey experiment

8. Interest rate decisions and investment plans

We would now like to know how the interest rate decisions of the Swiss National Bank (SNB) affect your investment plans.

At its last monetary policy assessment on September 26, 2024, the SNB set the SNB policy rate at 1.00%.

a. What SNB policy rate do you expect the SNB to set at its next monetary policy assessment on December 12, 2024?

□ 0.50% or lower

□ 0.75%

□ 1.00%

□ 1.25%

□ 1.50% or higher

b. [Vignette statement according to Table B.1]. Furthermore, assume you could only react after the decision and change your investment plans only for the next year, but not for the current year. If at all, how would your responses to the following questions approximately change?

Previously, you expected your gross construction investments in Switzerland to amount to CHF [input from question 1a] in 2025. Taking into account the above assumptions on the SNB policy rate, they are likely to amount to (in whole francs):
2025: _____

Previously, you expected your gross machinery and equipment investments in Switzerland to amount to CHF [input from question 1b] in 2025. Taking into account the above assumptions on the SNB policy rate, they are likely to amount to (in whole francs):
2025: _____

Previously, you expected your gross research and development investments in Switzerland to amount to CHF [input from question 1c] in 2025. Taking into account the above assumptions on the SNB policy rate, they are likely to amount to (in whole francs):
2025: _____

c. [Vignette statement according to Table B.1]. From which sources would you proportionately finance your investment in 2025 approximately? Please provide the shares in whole numbers as a percentage (without decimal places).

□ Internal financing (e.g., retained earnings or financing through depreciation/provisions, sale of assets, or by the parent company) _____

□ External financing through bank loans and bank credit _____

□ External financing through bonds _____

□ External financing through equity financing (e.g., stock issuance, business angels, venture capital) _____

- □ Other forms of external financing (e.g., profit participation certificates, convertible bonds, crowdfunding) _____
- □ We do not plan any investments in the year 2025. _____

d. [Vignette statement according to Table B.1]. Through which channels would this decision most likely affect your investment plans in 2025?

- □ Change in demand
- □ Change in cost of external financing
- □ Change in availability of external financing
- □ Change in the EUR/CHF exchange rate
- □ No impact

C Empirical results

C.1 Probability of investment adjustments

Table C.1. Extensive margin: Probability of firms adjusting total investment

	(1)	(2)	(3)	(4)
Dependent variable: Total investment				
0.50 percentage points higher	0.085***			
	(0.023)			
0.25 percentage points higher		0.047**		
		(0.020)		
0.25 percentage points lower			0.036*	
			(0.019)	
0.50 percentage points lower				0.059***
				(0.020)
Observations	512	508	538	550
R^2	0.035	0.019	0.017	0.020

Notes: OLS regression results showing the probability of firms adjusting total investment. The dependent variable is a dummy variable equal to one if a firm adjusts its investment plans in response to the vignettes. All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.2. Extensive margin: Probability of firms adjusting investment across investment category

	(1)	(2)	(3)	(4)
Dependent variable: Investment in machinery & equipment				
0.50 percentage points higher	0.075***			
	(0.021)			
0.25 percentage points higher		0.035**		
		(0.017)		
0.25 percentage points lower			0.022	
			(0.016)	
0.50 percentage points lower				0.047***
				(0.018)
Observations	507	508	535	549
R^2	0.030	0.014	0.010	0.017
Dependent variable: Investment in construction				
0.50 percentage points higher	0.035***			
	(0.013)			
0.25 percentage points higher		0.039***		
		(0.013)		
0.25 percentage points lower			0.029**	
			(0.012)	
0.50 percentage points lower				0.034***
				(0.012)
Observations	507	504	531	543
R^2	0.026	0.032	0.020	0.017
Dependent variable: Investment in research & development				
0.50 percentage points higher	0.013			
	(0.011)			
0.25 percentage points higher		0.023*		
		(0.012)		
0.25 percentage points lower			0.009	
			(0.010)	
0.50 percentage points lower				0.022*
				(0.012)
Observations	501	502	528	539
R^2	0.030	0.016	0.006	0.010

Notes: OLS regression results showing the probability of firms adjusting investments across investment categories. The dependent variable is a dummy variable equal to one if a firm adjusts its investment plans in response to the vignettes. All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.3. Extensive margin: Logit estimates for total investment adjustment

	(1)	(2)	(3)	(4)
Dependent variable: Total investment				
0.50 percentage points higher	1.421***			
	(0.406)			
0.25 percentage points higher		0.971**		
		(0.420)		
0.25 percentage points lower			0.814*	
			(0.441)	
0.50 percentage points lower				1.132***
				(0.419)
Observations	512	508	538	550

Notes: Logit regression results for the probability that a firm adjusts its total investment plans in response to the vignettes. The dependent variable is a binary indicator equal to one if a firm adjusts and zero otherwise. Reported coefficients are in log-odds units. All regressions include firm size and sector fixed effects. Robust standard errors are reported in parentheses. Significance levels: $p<0.1$; $p<0.05$; $p<0.01$.

Table C.4. Extensive margin: Logit estimates for investment adjustment across investment category

	(1)	(2)	(3)	(4)
Dependent variable: Investment in machinery & equipment				
0.50 percentage points higher	1.518***			
	(0.462)			
0.25 percentage points higher		0.958**		
		(0.487)		
0.25 percentage points lower			0.685	
			(0.499)	
0.50 percentage points lower				1.156**
				(0.475)
Observations	507	508	535	549
Dependent variable: Investment in construction				
0.50 percentage points higher	2.366**			
	(1.070)			
0.25 percentage points higher		2.433**		
		(1.060)		
0.25 percentage points lower			2.219**	
			(1.089)	
0.50 percentage points lower				2.283**
				(1.095)
Observations	507	504	531	543
Dependent variable: Investment in research & development				
0.50 percentage points higher	1.003			
	(0.852)			
0.25 percentage points higher		1.380*		
		(0.775)		
0.25 percentage points lower			0.751	
			(0.873)	
0.50 percentage points lower				1.355*
				(0.807)
Observations	501	502	528	539

Notes: Logit regression results for the probability that a firm adjusts its investment plans in response to the vignettes across investment categories. The dependent variable is a binary indicator equal to one if a firm adjusts and zero otherwise. Reported coefficients are in log-odds units. All regressions include firm size and sector fixed effects. Robust standard errors are reported in parentheses. Significance levels: $p<0.1$; $p<0.05$; $p<0.01$.

C.2 Average investment adjustments

Table C.5. Average adjustment of total investment

	Overall				Intensive margin			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Total investment								
0.50 percentage points higher	−0.054***				−0.429**			
	(0.015)				(0.181)			
0.25 percentage points higher		−0.040***				−0.401**		
		(0.013)				(0.159)		
0.25 percentage points lower			0.012				0.225	
			(0.010)				(0.158)	
0.50 percentage points lower				0.021**				0.228
				(0.009)				(0.166)
Observations	512	508	538	550	38	28	27	35
R^2	0.027	0.030	0.008	0.019	0.146	0.276	0.153	0.222

Notes: OLS regression results showing average adjustment of total investment. The dependent variable is the investment adjustment reported in response to the vignettes. Columns 1–4 include investment revisions from all firms (overall), while columns 5–8 focus on firms that adjust their investment following a change in the policy rate (intensive margin). All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.6. Average adjustment of investment across investment category

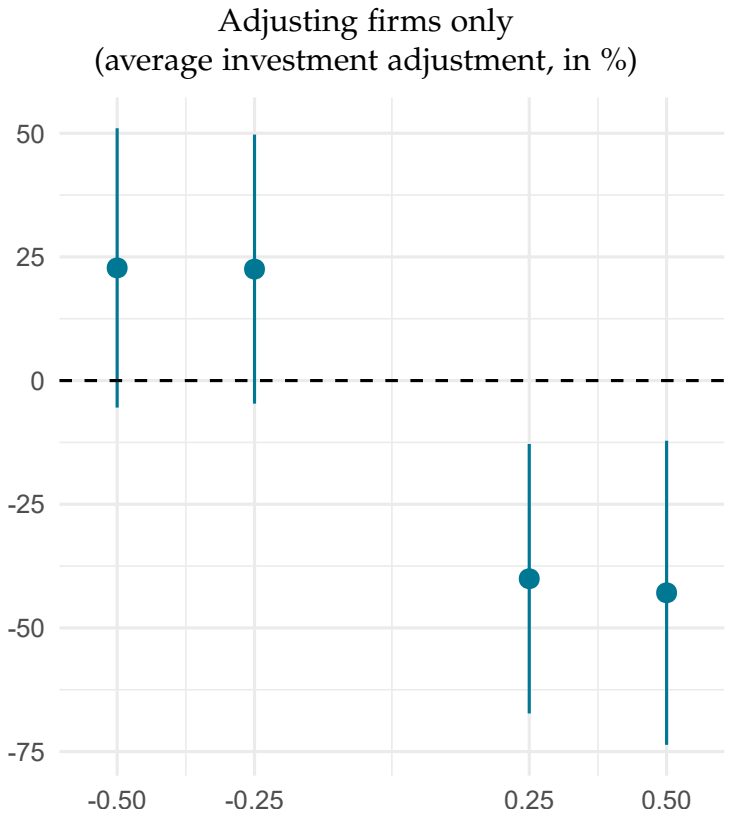
	Overall				Intensive margin			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Investment in machinery & equipment								
0.50 percentage points higher	−0.057***				−0.600**			
	(0.016)				(0.233)			
0.25 percentage points higher		−0.031***				−0.389**		
		(0.011)				(0.194)		
0.25 percentage points lower			0.012				0.249	
			(0.009)				(0.214)	
0.50 percentage points lower				0.014				0.161
				(0.010)				(0.256)
Observations	507	508	535	549	31	21	19	27
R^2	0.026	0.028	0.008	0.011	0.186	0.338	0.169	0.192
Dependent variable: Investment in construction								
0.50 percentage points higher	−0.013***				−0.485***			
	(0.005)				(0.055)			
0.25 percentage points higher		−0.015***				−0.496**		
		(0.005)				(0.202)		
0.25 percentage points lower			0.006*				−0.046	
			(0.003)				(0.038)	
0.50 percentage points lower				0.005				−0.345
				(0.003)				(0.240)
Observations	507	504	531	543	11	12	10	12
R^2	0.033	0.034	0.011	0.013	0.623	0.393	0.448	0.387
Dependent variable: Investment in research & development								
0.50 percentage points higher	−0.010				−0.605			
	(0.009)				(0.500)			
0.25 percentage points higher		−0.020**				−0.675		
		(0.009)				(0.457)		
0.25 percentage points lower			−0.0001				−0.038	
			(0.004)				(0.439)	
0.50 percentage points lower				0.006				0.194
				(0.009)				(0.534)
Observations	501	502	524	538	10	10	3	10
R^2	0.014	0.014	0.007	0.010	0.116	0.288	0.001	0.009

Notes: OLS regression results showing average investment adjustment across investment categories. The dependent variable is the investment adjustment reported in response to the vignettes. Columns 1–4 include investment revisions from all firms (overall), while columns 5–8 focus on firms that adjust their investment following a change in the policy rate (intensive margin). All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.7. Estimates of investment responses to monetary policy shocks from the literature

Source	Geography	Time	Shock	Effect	Peak
Cloyne et al. (2023)	US	1986:Q1–2016:Q4	25 bp increase in 1-year interest rate	−0.6% to −0.8%	12 quarters
David and Gourio (2023)	US	1969:Q1—2007:Q4	100 bp increase in 1-year interest rate	−1.7%	10 quarters
Durante et al. (2022)	Germany, Spain, France, Italy	2000–2016	10 bp increase in 3-month EONIA swaps	−3.4 pp	1 year
Ottonello and Winberry (2020)	US	1983:Q4–2014:Q4	100 bp decrease in interest rate (implied)	2.1 pp	2–4 quarters
Paranhos (2024)	US	1983:Q4–2014:Q4	100 bp decrease in interest rate (implied)	1.4–2.5 pp	Impact

Figure C.1. Intensive-margin investment response



Notes: The figure shows the average adjustment of investment plans (vertical axis, in percent) in response to hypothetical changes in the SNB policy rate (horizontal axis, in percentage points) by all firms that adjust their investment following a change in the policy rate (intensive margin). The bars represent 90 percent confidence intervals based on robust standard errors. Investment adjustments are calculated as in Equation (1) and winsorized at the 1st and 99th percentiles. The corresponding estimation results are shown in Table C.5.

C.3 Unconditional investment expectation adjustments

Using the panel structure of our data, we analyze how firms adjust their investment expectations unconditionally—outside the context of our experimental treatment—along the extensive and intensive margins. This provides a benchmark against which to assess the responses observed in our experimental setting.

Each firm i reports expected and realized investment expenditures for calendar year t across multiple survey waves. This allows us to construct both investment expectation revisions and errors. The expectation revision is defined as the log-difference between the expected investment for year t reported in the autumn wave of year $t-1$ and the updated expectation reported in the spring wave of year t. This captures changes in expectations over a half-year horizon. The expectation error is defined as the log-difference between realized investment in year t, reported in the spring wave of year $t+1$, and the original expectation reported in the autumn wave of year $t-1$. This captures the forecast error over a one-and-a-half-year horizon.

To construct our sample, we exclude firm-year observations where realized investment reported in the spring and autumn waves of year $t+1$ diverges by more than 10%, interpreting such discrepancies as reporting errors. We also drop outliers by excluding observations below the 1st and above the 99th percentiles of the within-year distributions.

Figure C.2 and Table C.8 summarize the unconditional distributional properties of investment expectation revisions and errors, based on pooled firm-year observations from 2016 to 2024. Panel (a) in the figure depicts expectation revisions, and Panel (b) shows expectation errors.

Along the extensive margin, adjustments are frequent. Approximately two-thirds of firm-year observations involve revisions of expectations over the half-year horizon. Over the longer forecast horizon of one and a half years, up to 85% of firm-year observations exhibit expectation errors—that is, realized investment differs from the earlier expectations reported. This finding is consistent with the notion that firms are generally better at forecasting investment over shorter horizons than longer ones.

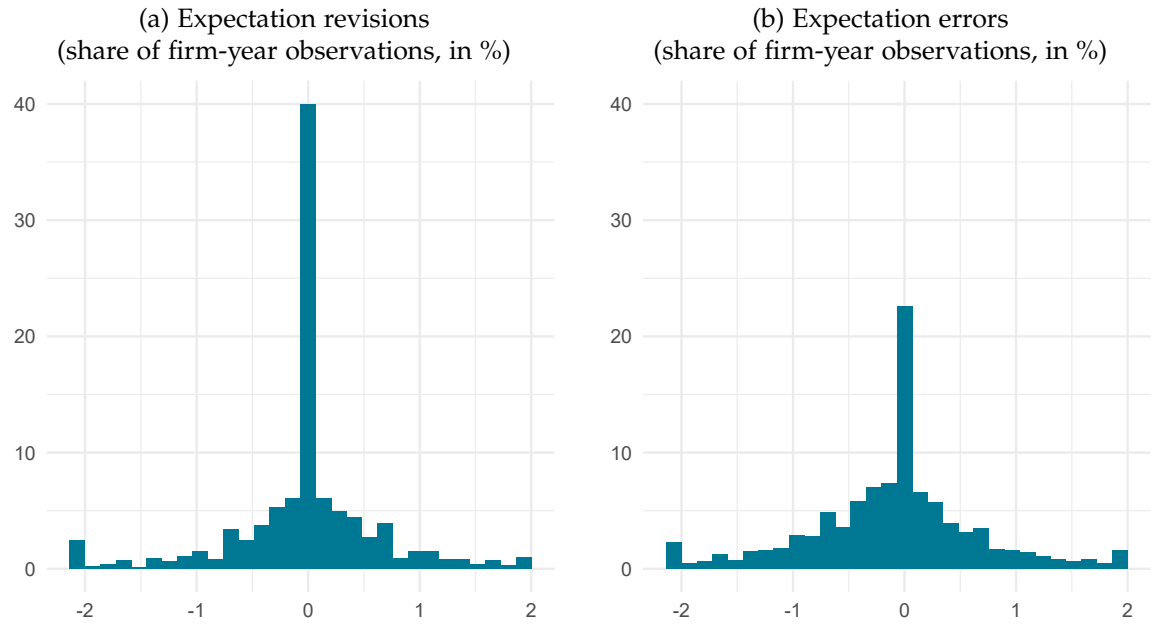
Turning to the intensive margin, we observe three notable features of the distributions of investment expectation adjustments. First, average adjustments are negative: expectation revisions are, on average, -6%, while expectation errors are

-12%. These negative averages are not primarily driven by small revisions but by substantial changes among firms that do revise their expectations. Conditional on adjustment, upward revisions average +55%, while downward revisions average -75%.

Second, the distributions are negatively skewed, indicating that downward adjustments tend to be larger in magnitude than upward adjustments. Conditional on adjustment, negative revisions and errors average -75% and -70%, respectively, compared to +55% and +60% for positive adjustments.

Third, the distributions exhibit excess kurtosis, with fat tails reflecting the presence of very large revisions and errors.

Figure C.2. Unconditional investment expectation adjustments



Notes: The figure shows unconditional investment expectation adjustments based on pooled firm-year observations from 2016 to 2024. Panel (a) depicts expectation revisions, and Panel (b) shows expectation errors. The y-axis shows the share of firm-year observations (in percent). Investment expectation revisions and errors are winsorized at $[-2, 2]$.

Table C.8. Summary statistics of investment expectation adjustments

	Expectation revisions	Expectation errors
Observations	5833	4175
Mean	-0.064	-0.116
Std. Dev.	0.886	0.866
Skewness	-3.217	-0.830
Kurtosis	24.109	12.029
Percentiles		
10th	-0.693	-1.054
25th	-0.182	-0.463
50th	0.000	0.000
75th	0.182	0.231
90th	0.693	0.762
Extensive margin		
Share of adjustments	0.670	0.840
Share of negative adjustments	0.334	0.480
Share of negative adjustments	0.336	0.360
Intensive margin		
Mean of negative adjustments	-0.752	-0.702
Mean of positive adjustments	0.558	0.614

Notes: This table provides moments of the unconditional investment expectation adjustments distributions based on pooled firm-year observations from 2016 to 2024.

C.4 Investment financing sources

Table C.9. Average adjustment of total investment as a function of external investment financing shares

	(1)	(2)
Dependent variable: Total investment		
Higher MP rate	-0.036^{***}	
	(0.009)	
Lower MP rate		0.011
		(0.007)
External financing	-0.0003	-0.0003
	(0.0003)	(0.0002)
Higher MP rate * external financing	0.001^{**}	
	(0.0003)	
Lower MP rate * external financing		0.0002
		(0.0003)
Observations	668	728
R^2	0.031	0.015

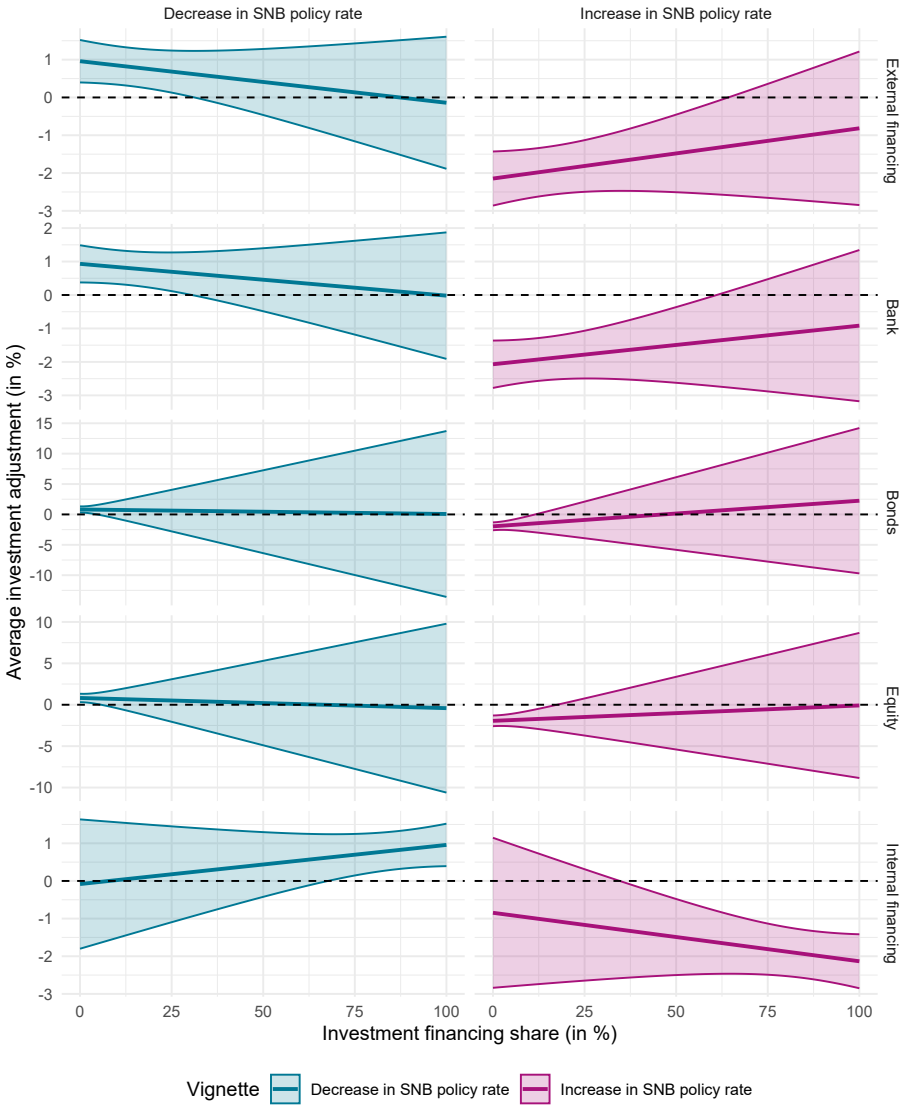
Notes: OLS regression results assessing the influence of external investment financing shares on firms' adjustment of total investment. The dependent variable is the investment adjustment reported in response to the vignettes and normalized to reflect a monetary policy shock of ± 25 basis points. The treatment variable pools the $+25$ and $+50$ basis point surprises as the "higher MP rate" group, and the -25 and -50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.10. Average investment adjustment as a function of external investment financing shares

	(1)	(2)
Dependent variable: Investment in machinery & equipment		
Higher MP rate	−0.033***	
	(0.009)	
Lower MP rate		0.005
		(0.006)
External financing	−0.0003	−0.0003
	(0.0002)	(0.0002)
Higher MP rate * external financing	0.0004	
	(0.0003)	
Lower MP rate * external financing		0.0001
		(0.0002)
Observations	664	724
R^2	0.025	0.013
Dependent variable: Investment in construction		
Higher MP rate	−0.009**	
	(0.004)	
Lower MP rate		0.003
		(0.002)
External financing	−0.00002	−0.00001
	(0.0001)	(0.0001)
Higher MP rate * external financing	0.00004	
	(0.0001)	
Lower MP rate * external financing		0.00003
		(0.0001)
Observations	663	718
R^2	0.033	0.005
Dependent variable: Investment in research & development		
Higher MP rate	−0.013	
	(0.008)	
Lower MP rate		0.002
		(0.005)
External financing	−0.00000	−0.00000
	(0.0002)	(0.0001)
Higher MP rate * external financing	0.0001	
	(0.0003)	
Lower MP rate * external financing		−0.00003
		(0.0002)
Observations	657	708
R^2	0.008	0.008

Notes: OLS regression results assessing the influence of external investment financing shares on firms' adjustment of investments across investment categories: machinery & equipment, construction, and research & development. The dependent variable is the investment adjustment reported in response to the vignettes and normalized to reflect a monetary policy shock of ±25 basis points. The treatment variable pools the +25 and +50 basis point surprises as the "higher MP rate" group, and the −25 and −50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Figure C.3. Average investment adjustment as a function of all sources of investment financing



Notes: The figure shows estimated marginal effects of monetary policy shocks on firms' investment responses as a function of shares of investment financing sources separately for rate cuts in Panel (a) and rate hikes in Panel (b). The x-axis displays the share of investment financed externally (in percent), and the y-axis shows the average adjustment in investment plans (in percent) relative to the control group. Investment revisions are normalized to reflect a monetary policy shock of ±25 basis points. Shaded areas show 90 percent confidence intervals based on robust standard errors. The corresponding estimation results are shown in Table C.11 in Appendix C.4.

Table C.11. Average investment adjustment as a function of all sources of investment financing

	Dependent variable: Total investment				
	(1)	(2)	(3)	(4)	(5)
Higher MP rate	0.025	-0.036^{***}	-0.035^{***}	-0.027^{***}	-0.027^{***}
	(0.023)	(0.007)	(0.007)	(0.007)	(0.007)
Higher MP rate * internal financing	-0.001^{**}				
	(0.0002)				
Higher MP rate * external financing		0.001^{**}			
		(0.0003)			
Higher MP rate * bank loans			0.001^{**}		
			(0.0003)		
Higher MP rate * bonds				0.001^{***}	
				(0.0002)	
Higher MP rate * equity					0.0003^{***}
					(0.0001)
Observations	668	668	668	668	668
R^2	0.030	0.031	0.029	0.023	0.022
Lower MP rate	0.034	0.011^{*}	0.011^{*}	0.014^{**}	0.014^{**}
	(0.025)	(0.006)	(0.005)	(0.006)	(0.006)
Lower MP rate * internal financing	-0.0002				
	(0.0003)				
Lower MP rate * external financing		0.0002			
		(0.0003)			
Lower MP rate * bank loans			0.0003		
			(0.0003)		
Lower MP rate * bonds				-0.0001	
				(0.0002)	
Lower MP rate * equity					-0.0001
					(0.0001)
Observations	728	728	728	728	728
R^2	0.015	0.015	0.015	0.012	0.012

Notes: OLS regression results assessing the influence of investment financing sources on firms' adjustment of total investment. The dependent variable is the investment adjustment reported in response to the vignettes and normalized to reflect a monetary policy shock of $\pm$25 basis points. The treatment variable pools the $+25$ and $+50$ basis point surprises as the "higher MP rate" group, and the -25 and -50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

C.5 Heterogeneity analyses

Table C.12. Heterogeneous asymmetry in investment responses (intensive margin)

Panel A: Firm size and sector

	S	M	L	Manufacturing	Construction	Services
Dummy: Treatment	0.165	0.426***	0.651***	0.409***	−0.125	0.328***
	(0.101)	(0.159)	(0.194)	(0.138)	(0.138)	(0.068)
Dummy: Rate cut	−0.223***	−0.012	−0.313***	−0.192**	−0.143	−0.148**
	(0.071)	(0.083)	(0.109)	(0.080)	(0.129)	(0.072)
Constant	0.133	−0.310*	−0.272*	−0.035	0.333***	0.019
	(0.114)	(0.185)	(0.161)	(0.138)	(0.000)	(0.063)
Size	No	No	No	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	No	No	No
Observations	48	36	20	39	9	56
R^2	0.167	0.177	0.330	0.277	0.206	0.098

Panel B: Investment quartiles and financing constraints

	Q1	Q2	Q3	Q4	Constrained	Unconstrained
Dummy: Treatment	0.636***	0.096	0.097	0.237**	−0.062	0.382***
	(0.081)	(0.088)	(0.091)	(0.113)	(0.105)	(0.101)
Dummy: Rate cut	0.030	−0.239***	0.044	−0.263***	0.083	−0.201***
	(0.052)	(0.087)	(0.076)	(0.099)	(0.107)	(0.059)
Constant	−0.097	0.270***	−0.132	−0.131	0.303	−0.035
	(0.107)	(0.057)	(0.087)	(0.162)	(0.217)	(0.146)
Size	Yes	Yes	Yes	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18	28	27	26	18	86
R^2	0.906	0.236	0.109	0.259	0.107	0.216

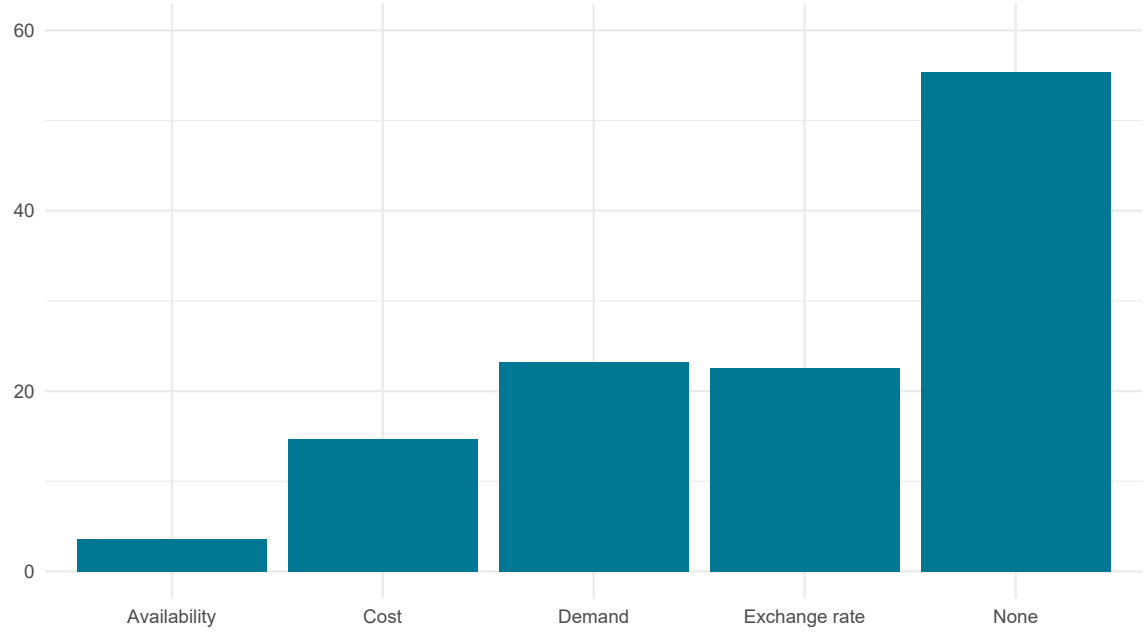
Panel C: Export intensity

	0-5%	6-33%	34-66%	67-100%
Dummy: Treatment	0.322*	0.066	0.448***	−0.054
	(0.190)	(0.178)	(0.089)	(0.188)
Dummy: Rate cut	−0.135**	−0.074	−0.289***	−0.142
	(0.066)	(0.186)	(0.102)	(0.097)
Constant	−0.015	0.150	0.154***	0.415**
	(0.206)	(0.135)	(0.000)	(0.204)
Size	Yes	Yes	Yes	Yes
NOGA letters	Yes	Yes	Yes	Yes
Observations	68	16	5	12
R^2	0.108	0.175	0.790	0.783

Notes: OLS regression results showing the average (intensive margin) adjustment of total investment. The dependent variable is the normalized investment response from Equation (5), defined such that larger values reflect stronger reactions in the intended direction of the monetary policy shock. Size and sector (NACE Rev. 2 sections) fixed effects are included as indicated in the corresponding rows of the table. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

C.6 Transmission channels

Figure C.4. Perceived transmission channels of monetary policy to investment plans



Notes: This figure shows the share of firms that consider each listed channel as relevant for how monetary policy decisions by the SNB would affect their investment plans for the year 2025. Firms were asked to select the most relevant channel through which a hypothetical policy rate change would influence their investment planning. The available response options were: (i) change in demand for their products or services, (ii) change in the cost of external finance, (iii) change in the availability of external financing, (iv) change in the exchange rate of the euro against the Swiss franc, and (v) no effect. Responses are based on single-choice selections.

C.7 Alternative specifications of the outcome variable

Table C.13. Intensive-margin response using alternative specifications of the outcome variable

	Pct. diff. (1)	Log. diff. (2)	Diff. per FTE (3)	Pct. diff. (4)	Log. diff. (5)	Diff. per FTE (6)
Dependent variable: Total investment						
Higher MP rate	−0.046***	−0.043***	−542.593***			
	(0.010)	(0.010)	(117.447)			
Lower MP rate				0.015**	0.017**	63.138
				(0.007)	(0.008)	(57.200)
Observations	793	676	777	874	741	863
R^2	0.050	0.052	0.087	0.030	0.045	0.018
Dependent variable: Investment in machinery & equipment						
Higher MP rate	−0.044***	−0.044***	−170.543***			
	(0.010)	(0.010)	(39.900)			
Lower MP rate				0.010	0.022**	30.041
				(0.007)	(0.010)	(19.751)
Observations	788	625	773	869	681	858
R^2	0.043	0.055	0.073	0.043	0.071	0.038
Dependent variable: Investment in construction						
Higher MP rate	−0.015***	−0.010***	−123.092***			
	(0.004)	(0.003)	(29.930)			
Lower MP rate				0.005**	0.037***	11.857
				(0.002)	(0.012)	(9.399)
Observations	787	374	772	863	433	853
R^2	0.085	0.103	0.091	0.023	0.097	0.017
Dependent variable: Investment in research & development						
Higher MP rate	−0.018**	−0.013	−48.199***			
	(0.007)	(0.020)	(17.960)			
Lower MP rate				0.003	0.021	26.816
				(0.006)	(0.019)	(19.989)
Observations	781	236	766	852	262	847
R^2	0.071	0.054	0.029	0.016	0.082	0.012

Notes: OLS regression results assessing the robustness of the intensive-margin investment response to alternative specifications of the outcome variable. The dependent variable is the investment adjustment reported in response to the vignettes. Columns 1 and 4 report results for investment revisions calculated as percentage changes as in Equation (1) ("Pct. diff.", baseline); Columns 2 and 5 for investment revisions calculated as log-differences (""Log. diff."); Columns 3 and 6 for investment revisions calculated as FTE-normalized absolute differences in investments ("Diff. per FTE"). The treatment variable pools the +25 and +50 basis point surprises as the "higher MP rate" group, and the −25 and −50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). All regressions include size and sector fixed effects. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

C.8 Outlier treatment through winsorization and trimming

Table C.14. Robustness of intensive-margin response to winsorization

	No	P01/P99	P02/P98	P05/P95	No	P01/P99	P02/P98	P05/P95
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Total investment								
Higher MP rate	-0.046^{***}	-0.046^{***}	-0.036^{***}	0.000				
	(0.010)	(0.010)	(0.007)	(0.000)				
Lower MP rate					0.102	0.015^{**}	0.007	0.000
					(0.068)	(0.007)	(0.005)	(0.000)
Observations	793	793	793	793	870	874	874	874
R^2	0.048	0.050	0.054		0.006	0.030	0.021	
Dependent variable: Investment in machinery & equipment								
Higher MP rate	-0.045^{***}	-0.044^{***}	-0.029^{***}	0.000				
	(0.010)	(0.010)	(0.006)	(0.000)				
Lower MP rate					0.162	0.010	-0.0004	0.000
					(0.137)	(0.007)	(0.003)	(0.000)
Observations	787	788	788	788	864	869	869	869
R^2	0.047	0.043	0.053		0.005	0.043	0.018	
Dependent variable: Investment in construction								
Higher MP rate	-0.026^{***}	-0.015^{***}	0.000	0.000				
	(0.007)	(0.004)	(0.000)	(0.000)				
Lower MP rate					0.184	0.005^{**}	0.000	0.000
					(0.173)	(0.002)	(0.000)	(0.000)
Observations	787	787	787	787	858	863	863	863
R^2	0.094	0.085			0.015	0.023		
Dependent variable: Investment in research & development								
Higher MP rate	-0.018^{**}	-0.018^{**}	-0.018^{**}	-0.018^{**}				
	(0.007)	(0.007)	(0.007)	(0.007)				
Lower MP rate					0.003	0.003	0.003	0.003
					(0.006)	(0.006)	(0.006)	(0.006)
Observations	781	781	781	781	852	852	852	852
R^2	0.071	0.071	0.071	0.071	0.016	0.016	0.016	0.016

Notes: OLS regression results assessing the robustness of the intensive-margin investment response to different thresholds for winsorizing outliers. The dependent variable is the investment adjustment reported in response to the vignettes. The treatment variable pools the +25 and +50 basis point surprises as the "higher MP rate" group, and the −25 and −50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). Columns 1 and 5 report results without winsorization. Columns 2 and 6 winsorize the dependent variable at the 1st and 99th percentiles; Columns 3 and 7 at the 2nd and 98th percentiles; and Columns 4 and 8 at the 5th and 95th percentiles. All regressions include size and sector fixed effects. Robust standard errors are reported in parentheses. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.

Table C.15. Robustness of intensive-margin response to trimming

	No	P01/P99	P02/P98	P05/P95	No	P01/P99	P02/P98	P05/P95
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: Total investment								
Higher MP rate	-0.046^{***}	-0.048^{***}	-0.012^{***}	0.000				
	(0.010)	(0.010)	(0.004)	(0.000)				
Lower MP rate					0.102	0.002	0.001	0.000
					(0.068)	(0.006)	(0.003)	(0.000)
Observations	793	792	764	732	870	860	843	820
R^2	0.048	0.053	0.026		0.006	0.006	0.018	
Dependent variable: Investment in machinery & equipment								
Higher MP rate	-0.045^{***}	-0.045^{***}	-0.009^{***}	0.000				
	(0.010)	(0.010)	(0.003)	(0.000)				
Lower MP rate					0.162	-0.002	-0.002	0.000
					(0.137)	(0.006)	(0.001)	(0.000)
Observations	787	787	758	740	864	856	840	829
R^2	0.047	0.047	0.047		0.005	0.006	0.028	
Dependent variable: Investment in construction								
Higher MP rate	-0.026^{***}	-0.004^{**}	0.000	0.000				
	(0.007)	(0.002)	(0.000)	(0.000)				
Lower MP rate					0.184	-0.001	0.000	0.000
					(0.173)	(0.002)	(0.000)	(0.000)
Observations	787	773	763	763	858	850	842	842
R^2	0.094	0.020			0.015	0.007		
Dependent variable: Investment in research & development								
Higher MP rate	-0.018^{**}	-0.001	0.000	0.000				
	(0.007)	(0.001)	(0.000)	(0.000)				
Lower MP rate					0.003	0.000	0.000	0.000
					(0.006)	(0.000)	(0.000)	(0.000)
Observations	781	767	763	763	852	841	841	841
R^2	0.071	0.035			0.016			

Notes: OLS regression results assessing the robustness of the intensive-margin investment response to different thresholds for trimming outliers. The dependent variable is the investment adjustment reported in response to the vignettes. The treatment variable pools the +25 and +50 basis point surprises as the "higher MP rate" group, and the −25 and −50 basis point surprises as the "lower MP rate" group. The sample includes all firms, including those that did not revise their investment plans ("non-adjusters"). Columns 1 and 5 report results without trimming. Columns 2 and 6 trim the dependent variable at the 1st and 99th percentiles; Columns 3 and 7 at the 2nd and 98th percentiles; and Columns 4 and 8 at the 5th and 95th percentiles. Robust standard errors are reported in parentheses. All regressions include size and sector fixed effects. Levels of significance: *p<0.1; **p<0.05; ***p<0.01.