ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Dibiasi, Andreas; Erhardt, Katharina

Working Paper

Young Firms Under Pressure: Heterogeneous Investment Responses to a Trade Shock

CESifo Working Paper, No. 12098

Provided in Cooperation with:
Ifo Institute – Leibniz Institute for Economic Research at the University of Munich

Suggested Citation: Dibiasi, Andreas; Erhardt, Katharina (2025) : Young Firms Under Pressure: Heterogeneous Investment Responses to a Trade Shock, CESifo Working Paper, No. 12098, Munich Society for the Promotion of Economic Research - CESifo GmbH, Munich

This Version is available at:
https://hdl.handle.net/10419/327708

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

CES ifo Working Papers

12098
2025

August 2025

Young Firms Under Pressure: Heterogeneous Investment Responses to a Trade Shock

Andreas Dibiasi, Katharina Erhardt

CES ifo

Imprint:

CESifo Working Papers

ISSN 2364-1428 (digital)

Publisher and distributor: Munich Society for the Promotion
of Economic Research - CESifo GmbH

Poschingerstr. 5, 81679 Munich, Germany
Telephone +49 (0)89 2180-2740

Email office@cesifo.de
https://www.cesifo.org

Editor: Clemens Fuest

An electronic version of the paper may be downloaded free of charge
· from the CESifo website: www.ifo.de/en/cesifo/publications/cesifo-working-papers
· from the SSRN website: www.ssrn.com/index.cfm/en/cesifo/
· from the RePEc website: https://ideas.repec.org/s/ces/ceswps.html

Young Firms under Pressure: Heterogeneous Investment Responses to a Trade Shock*

Andreas Dibiasi† Katharina Erhardt‡

August 27, 2025

Abstract

This paper studies heterogeneous firm responses to a sudden trade-induced profitability shock – the 2015 Swiss franc appreciation. Using firm-level investment data and a novel measure of exposure, we document that this trade shock causes large and persistent investment declines among affected firms. Examining heterogeneous responses among firms with similar exposure, we find that differences in responsiveness are not explained by economic fundamentals but are strongly linked to firm age and managerial experience. Younger firms and those led by less experienced managers react substantially more strongly. We argue that these empirical patterns are consistent with a model of Bayesian learning, in which firms update their beliefs about profitability over time. The results provide important insights into the long-lasting effects of trade shocks on business dynamism, capital investment, and local employment.

JEL classifications: F14, D22, G31, L25

Keywords: Trade shocks; Firm-level investment; Exchange rate shocks

*We are grateful for comments from Filippo Biondi, Carsten Eckel, Rafael Lalive, Giulia Sabbadini, Jan Schymik, Joel Stiebale, as well as from participants at ETSG 2023 in Surrey, the FIW Conference in Vienna, the 5th Dolomiti Macro Meetings, and the seminar at the University of Duesseldorf.

†ETH Zurich, KOF, Address: Leonhardstrasse 21, 8092 Zurich, Switzerland; Email: dibiasi@kof.ethz.ch

‡University of Düsseldorf, Düsseldorf Institute for Competition Economics (DICE), CESifo, Address: Universitätsstr. 1, 40225 Düsseldorf, Germany; Email: erhardt@dice.hhu.de

1 Introduction

Firms face constant changes to their profitability, with trade shocks being a prominent example.[1] Economic theory predicts that such shocks trigger the reallocation of production factors toward more profitable firms – an essential mechanism for sustaining efficiency in the economy (Hopenhayn and Rogerson, 1993; Foster, Haltiwanger and Krizan, 2001; Melitz, 2003). Yet recent empirical work documents a slowdown in these reallocation dynamics, with potentially significant implications for aggregate productivity growth (Decker et al., 2016).

One possible explanation for this observation is that the responsiveness of firms to such shocks has declined. Consequently, recent research has turned to identifying macroeconomic trends that may account for the reduced responsiveness. For example, Decker et al. (2020) highlight the role of rising adjustment costs, while Biondi et al. (2025) argue that increasing market power has contributed to the observed decline.

In this paper, we take a more microeconomic perspective and investigate what underlies individual firms' responsiveness to shocks. We exploit an exogenous and unanticipated change in firms' profitability to examine how firms adjust their investment behavior in response. Our analysis focuses on identifying firm-level heterogeneity in these responses and reveals a striking pattern: younger firms are significantly more responsive to the same shock – reacting up to eight times more strongly than their older counterparts – even when controlling for a vast set of firm-level fundamentals. Moreover, we document that executives' experience (in the same firm) reduces firms' responsiveness to shocks, especially in the case of young firms. We argue that these empirical patterns are consistent with a model of Bayesian learning in the spirit of Jovanovic (1982) and Berman, Rebeyrol and Vicard (2019) where firms update their beliefs about their profitability over time. In such a setting, younger firms place greater weight on new information, leading them to respond more intensely to shocks.

[1] Recent evidence even suggests that the dispersion of these shocks has risen over time (Decker et al., 2020).

Our identification strategy relies on a unique and plausibly exogenous exchange rate shock that hit Switzerland in 2015. On January 15, the Swiss National Bank (SNB) unexpectedly abandoned its minimum exchange rate policy of CHF 1.20 per Euro. This surprise decision triggered a sharp nominal and real appreciation of the Swiss Franc, immediately altering the competitive landscape for Swiss firms both domestically and internationally (Arni et al., 2024). Using firm-level data on various types of investment, this study is the first to examine firms' investment responses to the shock, exploiting a pre-shock measure of firm-level exposure to the trade shock for identification.[2]

To this end, we generate a composite measure of exposure to the trade shock that increases in firms' pre-shock export status and the pre-shock import competition these firms face in domestic markets, while the measure decreases in firms' pre-shock import intensity. We validate that our measure captures the pre-determined change in the competitive environment of firms by showing that firms with an exposure above the median see a relative decline of their sales by almost 11% after the shock occurred, but are not differentially affected prior to the shock.

We document that the average investment response to the trade shock is large and persistent. The differential decline in cumulative firm-level investment in the three years after the shock compared to the three years prior to the shock is 11% for firms whose exposure to the trade shock is above the median exposure in the sample. The investment response is particularly pronounced for construction investments amounting to 30% for more exposed firms. Moreover, firms above the median exposure to the shock reduce their employment by 6%. Finally, the probability to have exited the market by 2020 is 2.4 percentage points higher for firms with above-median exposure to the shock.

Turning to heterogeneity in firm responses, we find no systematic differences based on commonly studied economic fundamentals such as financial constraints, productivity, size, foreign ownership, or adjustment costs (proxied by capital irreversibility).

[2]While Binding and Dibiasi (2017) document how the uncertainty component of this shock led firms to revise their investment expectations in early 2015, our study is the first to study realized investment responses.

However, the impact of the shock was substantially more pronounced among younger firms – defined as those 10 years old or less in the year prior to the shock: These firms reduce their investment by more than 50% in response to a shock exposure moving from the 25th percentile to the 75th percentile, while the reduction in investment to such a change in exposure amounts to only 6% for older firms. Young firms not only exhibited significantly stronger investment responses but were also considerably more vulnerable to failure and market exit in the years that followed.

Two main channels proposed in the literature to explain the differential investment behavior of young firms are financial constraints and adjustment costs (Durante, Ferrando and Vermeulen, 2022; Cloyne et al., 2023; Krusell, Thurwachter and Weiss, 2024). However, our data suggest that these explanations are unlikely to account for our findings. An alternative explanation is that younger firms may be more vulnerable to the shock due to their comparatively limited market reputation. Yet, our analysis reveals no significant difference in sales responses between young and mature firms.

Instead, we find evidence that a substantial part of the pronounced investment response is driven by limited experience. Observable characteristics of firm executives play a significant role: firms led by younger managers or by managers with shorter tenure at the firm respond significantly more to the trade shock. Combined with the generally stronger reaction of young firms, this pattern suggests that limited experience – whether at the firm or managerial level – amplifies firms' responsiveness to shocks. This evidence is consistent with a model of Bayesian learning in the spirit of Jovanovic (1982) and Berman, Rebeyrol and Vicard (2019). If firms learn about their market environment over time, then early-life shocks may carry greater informational content and thus trigger stronger responses.

Consistent with this explanation, we find that the pronounced responsiveness of young firms is mitigated when the manager has more experience. Furthermore, among young firms, the most productive ones are indeed less responsive to the shock, in line with standard theoretical predictions. However, to react like an average older firm, a young

firm must be above the 80th percentile in the productivity distribution of all firms– highlighting that only exceptionally productive young firms behave similarly to their older counterparts.

The finding that characteristics such as firm age and manager experience determine firms' responsiveness to shocks has important aggregate implications. First, young firms play a crucial role in job creation, especially in the long run. Despite their high failure rates, these firms are responsible for the majority of new jobs, underscoring their importance in driving employment growth over time (Haltiwanger, Jarmin and Miranda, 2013).

Second, the strong investment response of young firms offers valuable insights for the literature exploring the decline in business dynamism that has been evident since the 1980s (Decker et al., 2016). While previous research has pointed to rising adjustment frictions and market power as a potential cause, our study highlights that young firms are particularly sensitive to shocks in their competitive environment. This heightened responsiveness can lead to excess exit rates and reduced initial firm scale, which often persist throughout the life cycle. Consequently, cohorts of firms exposed to adverse shocks in their formative years may experience stunted growth, ultimately reducing their contribution to capital formation and job creation in later years and making economic shocks more enduring. Given that international trade exposure – and consequently, import competition – has increased over recent decades, the pronounced sensitivity of young firms' investments may be an important factor in explaining the observed decline in business dynamism.

Finally, this heterogeneity in investment response among young firms may also help explain the prolonged impact of trade shocks on local labor markets (Autor, Dorn and Hanson, 2013; Dix-Carneiro and Kovak, 2017). In line with previous work on this topic, our evidence confirms that all firms experiencing negative exposure to the shock reduce employment as it occurs. However, since young firms significantly curtail investment, this also dampens *future* employment growth, which, over the long term, is typically driven by these – at the time of the shock young – firms.

The importance of newborn firms and young firms for aggregate long-run outcomes has

been studied in recent work by Adelino, Ma and Robinson (2017) and Sedláček and Sterk (2017). Adelino, Ma and Robinson (2017) emphasize the role of negative demand shocks induced by import competition for the entry of new firms and find that entry is reduced substantially and, hence, future employment growth in a region. Interestingly, Adelino, Ma and Robinson (2017) find that already established young and old firms have a comparable employment response. Our findings align in showing no significant difference in the employment response between young and mature firms. However, we observe that young firms exhibit a markedly stronger investment response and a higher probability of exit in the periods following exposure to the shock. This heightened vulnerability may result in lower employment contributions from these firms in subsequent years. Sedláček and Sterk (2017) develop a model in which changes in market conditions at the time of firm entry lead to substantial and slow-moving fluctuations in employment, influencing the composition of firms within each birth cohort. While their focus is on employment fluctuations, the heterogeneous investment responses we document suggest an additional mechanism through which market shocks could shape the composition and future trajectory of young firms, with significant implications for long-term employment growth.

Our results contribute to several distinct areas of research. Most directly, we add to the literature investigating the investment behavior of young firms. Relying on balance sheet data to proxy investment, several papers find evidence for heightened investment sensitivity of young firms to monetary policy (Durante, Ferrando and Vermeulen, 2022; Cloyne et al., 2023; Krusell, Thurwachter and Weiss, 2024). Frictional capital markets, in particular, have long been considered a major obstacle for small and young firms (Petersen and Rajan, 1994) with important consequences for their economic behavior, such as their decisions regarding financing (Puri and Zarutskie, 2012; Robb and Robinson, 2014), labor (Brown and Medoff, 2003; Michelacci and Quadrini, 2009; Ouimet and Zarutskie, 2014), and business focus (Ewens, Nanda and Rhodes-Kropf, 2018). Our paper demonstrates that young firms are also different in their investment response to changing economic conditions.

An important body of literature emphasizes the role of managers for corporate decision-making and shaping various firm outcomes, particularly firm productivity (Bertrand and Schoar, 2003; Bloom and Van Reenen, 2007) or financing decisions (Malmendier and Tate, 2005; Malmendier, Tate and Yan, 2011). Much of this research focuses on management practices and examines whether and how these practices can be improved (see, e.g., Gosnell, List and Metcalfe, 2020). In particular, Adhvaryu, Kala and Nyshadham (2022) show that effective management practices can help firms cope with adverse shocks. Sadun et al. (2025) provide evidence that management quality contributes to firm dynamism, demonstrating that well-managed firms face lower costs of plant entry and exit. Malmendier, Tate and Yan (2011) show that CEOs' Great Depression experience and military service histories help to explain corporate financing decisions. We contribute to this literature by highlighting the importance of observable manager characteristics – particularly managerial experience *in the same firm* – in shaping how firms respond to profitability shocks.

The paper is organized as follows. Section 2 describes the exchange rate shock. Section 3 presents the data. Section 4 discusses the empirical strategy and presents the effects of the exchange rate shock. Section 5 concludes.

2 The CHF Exchange Rate Shock of 2015

In response to the European debt crisis, the Swiss franc—widely regarded as a safe-haven currency—appreciated sharply, prompting the Swiss National Bank (SNB) to establish an exchange rate floor against the euro on September 6, 2011. This policy aimed to shield the Swiss economy from deflationary pressures and adverse impacts on competitiveness. The SNB set a minimum exchange rate of 1.20 CHF per euro, committing to defend this threshold with all tools available to the central bank. This floor remained in place for more than three years until January 15, 2015 (Bonadio, Fischer and Sauré, 2020). The following section examines the SNB's removal of the exchange rate floor, an event we use

to identify an unexpected exchange rate shock in our empirical analysis.

For three years following its initial announcement, the Swiss National Bank (SNB) actively defended the exchange rate floor of 1.20 CHF per euro. In the days and weeks leading up to the removal of this floor, SNB officials continued to emphasize its importance, giving no indication of an impending change. Notably, articles in the influential Swiss newspaper Neue Zürcher Zeitung reported that even the Swiss federal executive council, the Bundesrat, was not informed in advance of the SNB's decision to return to a flexible exchange rate (Flückiger, 2015).

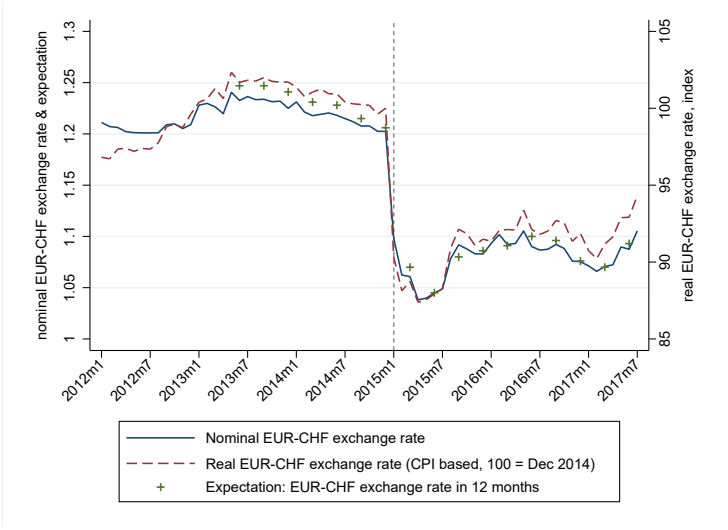

Figure 1: EUR-CHF exchange rate, 2012 to 2017

Notes: Sources: Arni et al. (2024) based on data from SNB and Deloitte CFO Survey Switzerland (www.deloitte.com/ch/cfosurvey). The EUR-CHF exchange rate is measured as the amount of Swiss francs needed to purchase one euro.

The SNB cited two primary reasons for ending the floor policy. First, a divergence in currency trends was emerging: the U.S. dollar was appreciating while the euro (and consequently the Swiss franc) was weakening, a trend expected to continue due to further monetary easing by the European Central Bank. Second, SNB President Thomas Jordan indicated that Swiss businesses had used the period of exchange rate stability to adapt to competitive pressures, suggesting the floor had served its intended temporary role.

Despite these justifications, the decision to abandon the exchange rate floor on January 15, 2015, came as a shock to markets and observers alike. Many had anticipated a gradual,

well-signaled exit from the floor policy, particularly given ongoing low inflation in Switzerland and economic challenges in Europe. The unexpected timing and abrupt nature of this decision led to significant market response, with the EUR/CHF rate plummeting from 1.20 to 0.88 immediately after the announcement before stabilizing around 0.99 by day's end. This sharp appreciation of the Swiss franc, reaching an 11% gain against the euro by the end of January, marks an exogenous shock with lasting consequences for the competitiveness of Swiss firms (Bonadio, Fischer and Sauré, 2020).

Figure 1, adapted from Arni et al. (2024), illustrates the trends in the nominal EUR-CHF exchange rate (solid blue line) and the monthly real EUR-CHF exchange rate (dashed red line) over the period from 2012 to 2017. The graph reveals that the Swiss franc's appreciation following the removal of the minimum exchange rate was abrupt, substantial, and sustained. CFOs' expectations for the future EUR-CHF exchange rate (green markers) also dropped sharply, indicating that a rapid return to pre-shock levels was not anticipated.

The Swiss exchange rate shock is particularly well-suited as an event study for examining Swiss firms' responses to competitive changes that mimic a trade shock, as it significantly alters firms' terms of trade. First, the shock was unexpected, making it an exogenous event. Second, it was large in scale. Third, the shock led to a real appreciation of the Swiss franc, as shown by the red dashed line in Figure 1, altering the terms of trade for Swiss firms in varied ways based on their import, export, and domestic competition exposures (Arni et al., 2024). Evidence from Arni et al. (2024) indicates that Swiss firms' employment responses depended heavily on their roles as importers or exporters and on the level of domestic competition they faced. Additionally, they document strong downward wage rigidities which help explain the pronounced real effects of the exchange rate shock.

Since the exchange rate shock in January 2015 was preceded by three years of a very stable exchange rate, and the adjustment to the new regime was very rapid (Bonadio, Fischer and Sauré, 2020), the three years before and after the shock offer an excellent window

for analyzing differential behavior in two markedly different competitive environments.

3 Data

In this section, we describe the data used in this study, which combines multiple sources to provide a comprehensive analysis. First, we utilize data from the KOF Investment Survey. Second, we incorporate data from the KOF Innovation Survey. These datasets enable us to capture various firm-level responses both before and after the trade shock. Lastly, we leverage firm-level trade data from the Swiss Customs Administration to quantify firms' exposure to the trade shock prior to its occurrence. We merge these datasets to construct a firm-level panel with yearly observations.

3.1 The KOF Investment Survey

The KOF Swiss Economic Institute at ETH Zurich conducts business surveys in Switzerland. Our empirical analysis is based on data from their investment survey. Since 2012, KOF has conducted the investment survey bi-annually among a large panel of private firms. Prior to 2012, the surveys were conducted once a year. Currently, the panel contains roughly 8,000 unique firms. The average response rate between 2012 and 2015 amounts to 34%. The firms in the sample cover all industries excluding agriculture and account for 34% of total employment (FTE) in Switzerland within the respective sectors. Respondents are mostly the CEOs or CFOs of the firms (see Abberger, Bannert and Dibiasi, 2014 for a general assessment of respondents' characteristics in KOF business surveys). Appendix A describes the KOF investment survey in greater detail.

In our main analysis, we examine the differential investment responses of firms during two distinct periods: the three years under the minimum exchange rate policy (2012–2014) and the three years following its termination (2015–2017). These periods represent two markedly different competitive environments for Swiss firms, as illustrated in Figure 1.

We observe various firm variables on a yearly frequency. Besides firms' gross fixed capital

formation, we also observe investment in construction and machinery and equipment, separately. We also observe firms' FTE employment. Another interesting feature of the KOF Investment Survey is that firms are asked about their investment for several years. For instance, in the survey in spring 2014, firms were asked for quantitative information on investment activity in 2012, 2013 and 2014. Some of the investment data are hence actual (i.e. realised) investment made in the past, and some of the data refer to planned investment in the current year. This data structure offers two advantages. First, our panel data set on realised investment is fairly balanced despite unit non-responses to the individual surveys because a firm is asked to provide realised investment for the same investment year in three different surveys. Second, we can reduce the measurement error in the investment data for a particular year and firm by using the mean from different surveys for that firm in case it participated in more than one of the surveys that levy information on realised investment for that year. Based on the various waves of the KOF investment survey, we construct a firm-level panel data set providing yearly data on realised investment for the period 2012–2017. Dropping firms that are non-profit organizations, the final data set covers 3,134 different firms with 15'294 firm-year observations.[3] While the KOF Investment Survey provides detailed investment data and FTE employment, it only sporadically levies sales data. Because of this, we fill in sales data as provided in the KOF Innovations Survey, a survey that is conducted on the same panel as the KOF Investment Survey and use this information in case of missing values in the KOF Investment Survey.

[3]This sample contains only those firms that are included in our difference-in-differences analysis and consists of firms that invest at least once in the years prior to the shock and after the shock. In Appendix B, we re-run our analysis using a larger panel that covers the period 2009–2019 with 7'998 different firms and 43'213 firm-year observations. We also provide results for the sample that is not restricted to the difference-in-differences sample in Columns (1) and (2) of Table 10. The results remain unchanged. Since the SNB policy we exploit was introduced in September 2011 and abandoned in January 2015, comparing outcomes between 2012–2014 and 2015–2017 allows us to examine a symmetric window around the shock with a very stable exchange rate environment within the two periods.

3.2 Trade Data

Our third data source is provided by the Swiss Customs Administration. This dataset contains firm-level transaction records for the import and export of goods between 2012 and 2017. It includes detailed information on the value and quantity (measured in mass or units) of traded goods. Since the dataset includes firms' names, addresses, and, for some years, tax identifiers, firms can be identified and matched to their unique Swiss firm identifier (UID) following the methodology outlined by Egger and Erhardt (2016). The UID enables us to link the trade data with the two KOF surveys.

3.3 Exposure

We end up with an unbalanced dataset comprising 3,134 firms and 15'294 firm-year observations spanning 2012–2017. Detailed descriptive statistics are presented in Table 1. To analyze the impact of the exchange rate shock on firms, we construct a firm-level variable that measures their exposure to the shock. This variable captures the various channels through which the sudden appreciation of the Swiss Franc affected firms' competitive environment. As demonstrated by Arni et al. (2024), Swiss firms experienced the trade shock through its effects on both output and input markets.

The trade shock negatively impacted the domestic output market for all Swiss firms by increasing import competition. For exporting firms, the shock further reduced their competitiveness in international markets. Conversely, the shock lowered the cost of imported inputs, improving input market conditions for firms that heavily rely on such imports. Together, these three channels—the domestic output market, export markets, and input markets—define the changes in firms' market conditions following the exchange rate shock.

To capture all these channels, we construct a composite exposure measure that integrates all three channels of influence. By using pre-shock indicators of exposure to output and input markets, we ensure that our measure is exogenous to the shock itself while still

determining its impact on individual firms.

Our exposure measure is intended to capture the differential change in the competitive environment for firms based on characteristics prior to the shock. This can be explicitly tested in the data by analyzing how firms' post-shock sales respond to the shock, depending on their pre-shock exposure. Additionally, we will test for pre-trends to confirm that differential effects on firm-level outcomes only emerged after the shock occurred, ensuring the validity of our approach.

The three channels that together constitute the composite measure used in the analysis are measured by means of the following variables. To capture the exposure to export markets, we use firms' pre-shock export status:

$$\text{Exporter}_i = \begin{cases} 1 & \text{if } \frac{1}{3} \sum_{j=2012}^{2014} \text{Exports}_{i,j} > 100,000 \text{ CHF} \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

In our main analysis, we set the threshold for exporting firms at an average export value of 100,000 CHF prior to the shock to ensure that exports constitute a relevant share of the firm's sales. Since our data on firm-level sales is incomplete, we use this nominal threshold instead of firms' export share in overall sales. To demonstrate that our results are insensitive to this choice, we present our main results using alternative definitions of exporting status in Table 9 in the Appendix. Specifically, we use two alternative nominal thresholds (0 CHF and 10,000 CHF) in Columns (2)–(3) and (6)–(7), as well as an indicator based on firms' survey responses to whether their exports constituted more than 2.5% of their sales (using pre-shock data). The survey-based indicator has the advantage of being based on all types of trade, including services trade, which is not captured in the data on goods exports and imports provided by the Swiss Customs Administration. However, since the remaining trade-related variables can only be constructed based on goods trade data, we use the export indicator based on goods trade in the main analysis to ensure consistency.

To account for the fact that firms' competitiveness is less affected by the exchange rate

shock the more they rely on imported inputs, we measure the share of imports in firms' total trade during the pre-shock years.[4]

$$\text{Import Share}_i = \frac{\sum_{j=2012}^{2014} \text{Imports}_{i,j}}{\sum_{j=2012}^{2014} \text{Imports}_{i,j} + \sum_{j=2012}^{2014} \text{Exports}_{i,j}} \tag{2}$$

Import Share_i represents the proportion of firm i's imports in its total trade (exports + imports). This measure helps predict the expected impact of an exchange rate change on the firm. If Import Share_i is close to one, the firm primarily relies on imports and is therefore less negatively affected by an appreciation of the Swiss Franc.

Finally, we adopt the definition of import competition from Arni et al. (2024) to measure firms' vulnerability to increased foreign competition in their domestic markets at the 4-digit sector level. Following their approach, import competition is defined as the value of domestic sales of foreign origin competing with the output of a given sector relative to total domestic employment in the respective sector. In order to define which products compete with the output of different sectors, we rely on the product composition of each sector's output:

$$\text{Import Competition}_s = log\left(\frac{1}{\sum_{j=2012}^{2014} \text{No Employees}_{s,j}} \sum_{j=2012}^{2014} \sum_{p} \theta_{ps,pre} \text{Imports}_{p,j}\right), \tag{3}$$

where $\theta_{ps,pre}$ represents the share of Swiss export sales of product p originating from sector s, calculated using pre-shock data (2012–2014). $\text{No Employees}_{s,j}$ is the total employment in sector s in year j, sourced from the Swiss Structural Business Statistics (STATENT).[5] $\text{Imports}_{p,j}$ denotes total Swiss imports of product category p in year j.

[4] Ideally, we would measure firms' exports as a share of total sales and imported inputs as a share of total input expenditure. However, due to data limitations, we do not observe domestic sales or input expenditures.

[5] Compare https://www.bfs.admin.ch/bfs/en/home/services/geostat/swiss-federal-statistics-geodata/business-employment/structural-business-statistics-statent-from-2011-onwards.html.

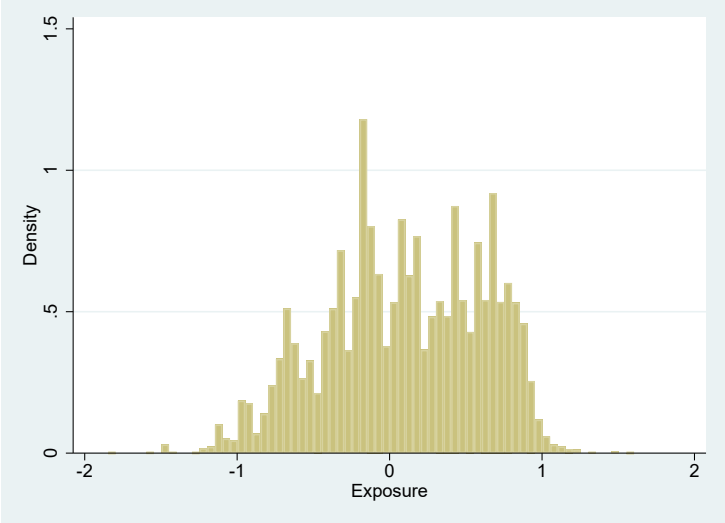

Figure 2: Distribution of the exposure variable.

Notes: This figure shows the density of our exposure measure defined in Equation 4. Higher values of exposure indicate that an appreciation worsens a firm's competitive position.

We combine the three measures defined above to create a composite measure of exposure to the trade shock. In order to assign all three channels an approximately equal weight, we normalize the continuous variables Import Share$_i$ and Import Competition$_s$ and construct the following exposure measure:

$$\text{Exposure}_i = \frac{(\text{Exporter}_i - \widetilde{\text{Import Share}}_i + \widetilde{\text{Import Competition}}_s)}{3} \tag{4}$$

where $\tilde{}$ indicates that the variables have been standardized to zero mean and unit variance through the following transformation $\tilde{x}_i = \frac{x_i - \bar{x}}{\sigma_x}$. Figure 2 presents the exposure measure. The measure has a mean of 0.095 and a median of 0.01.

In our analysis, we will mainly rely on the continuous exposure measure, but we will additionally define a binary variable $Exposed_i$ that indicates if a firm's exposure is larger than the median exposure in the data. Equation 5 formally defines the variable.

$$\text{Exposed}_i = \begin{cases} 0 & \text{Exposure}_i < p50 \\ 1 & \text{Exposure}_i \geq p50 \end{cases} \tag{5}$$

where $p50$ represents the median of the variable $Exposure_i$.

3.4 Further variables

Table 1 presents several pre-shock firm characteristics by degree of exposure. The first panel reports the underlying dimensions of the exposure measure. In line with our definition, exposure is associated with a higher likelihood of exporting, a lower import share, and greater import competition.

We present our main outcome variables in the second panel. On average, exposed firms invest slightly more prior to the shock and are larger in terms of sales and employment. An additional outcome of interest, constructed using information from Bureau van Dijk's ORBIS database on exit dates, is an indicator of the probability of the firm surviving until 2020. On average, exposed firms are less likely to survive until 2020 by 2 pp.[6]

The third panel describes general firm characteristics. In 2014, the average firm is approximately 39 years old, with 16% of firms being 10 years old or younger. Firm age varies little across exposure categories.

The KOF investment survey also provides firm-level information on financial constraints and capital adjustment costs, elicited through two specific survey questions. The Autumn questionnaire of the KOF investment survey—a biannual survey conducted each Spring and Autumn—contains a question that asks firms which factors influence their investment activity and in which direction the factor influences investment, i.e., positive or negative. One of these factors includes financial resources and expected profit (see the subsequent survey question). We use the responses to this question to approximate the extent to which financial factors constrain firms' investment activities.

We quantify financial constraints by assigning numerical values to each survey response, ranging from -2 ("strongly positively affected") to $+2$ ("strongly negatively affected") such that higher values correspond to more severe constraints, and compute firm-level averages for the pre-shock (2012–2014) and post-shock (2015–2017) periods. Prior to the

[6]Note that we chose 2020 as a pre-COVID date, but the results generally hold when using other years.

shock, the average reported constraint is -0.23 with no substantial difference between exposed and non-exposed firms. We also construct a binary indicator that flags a firm as heavily financially constrained if it reported being "strongly negatively affected" (i.e., a response of 2) by financial factors.

Survey Question: Financial Constraints

Our investment activity will be positively/negatively influenced by the following factors:

	++	+	=	-	- -	n.a.
Financial resources /expected profit	□	□	□	□	□	□

The KOF investment survey provides unique information on firms' perceptions of capital irreversibility. In Autumn 2014, just prior to the January 2015 exchange rate shock, the survey started to include a survey question on the degree of irreversibility of capital investments (see survey question below). Following Guiso and Parigi (1999), we construct a binary indicator for capital irreversibility. The indicator equals one if a firm reported that no market existed for its machinery or equipment used in producing its main products or services, or if such a market existed but is very difficult to access, with potential for very low selling prices. Based on this classification, 71% of firms reported irreversible capital. We find no systematic differences in this measure between firms with high and low exposure to the trade shock.

Survey Question: Captial Irreversibity

Bearing in mind the type of equipment or machinery used in producing your main product or services, we would like to know whether a secondhand market exists where it could be sold if needed.

□ Yes, and it is relatively easy to find a buyer in a short time willing to pay a reasonable price.

□ Yes, but it takes time to find a buyer, and selling prices are not very rewarding.

□ Yes, but it is very difficult to find a buyer, and selling prices can become very low.

□ No, there is no such market.

In order to construct a productivity measure, we use normalized labor productivity based on the average of sales over employment in the pre-shock years.[7] Firms exposed to the shock are, on average, more productive, which is in line with exporting firms being particularly affected.

We complement the firm-level information contained in the survey with data provided by Bureau van Dijk's ORBIS database, and see that about 27% of firms are owned by a foreign entity, and nearly 20% have a foreign subsidiary. Firms exposed to the shock are more likely to be multinational enterprises or subsidiaries of multinationals, as these types of firms are also more likely to engage in exporting.

The fourth panel summarizes various measures of firm size prior to the shock. The fifth panel documents industry composition. Non-exposed firms ($Exposed_i = 0$) are predominantly active in the service sector (60%), whereas exposed firms are mostly concentrated in manufacturing (63%). This illustrates that a large share of the variation in exposure stems from variation across sectors, with manufacturing firms being particularly strongly affected by increased import competition.

The final panel documents manager characteristics. Using information on firms' executives from Bureau van Dijk's ORBIS database, we collect data on managers' age, gender, management experience (within the firm and overall), and turnover within the management board. For each firm, we compute the average over all executives active in the firm in 2014. On average, managers are 53 years old, have 6 years of tenure at the current firm, and 10 years of overall management experience. Management turnover is relatively low, with a standard deviation of 0.16 in board composition changes in the last 10 years. Only

[7] Since sales data are sparse, we construct our productivity measure using information on both sales and employment from the 2009–2014 period.

3% of management boards are all female. Only small differences are observed between exposed and non-exposed firms in terms of manager characteristics.

		No. of firms	Averages All Firms	Exposed 0	Exposed 1
Exposure	Exporter	3,134	0.34	0.07	0.59
	Import Share	3,134	0.09	0.62	-0.42
	Import Competition	3,134	0.10	-0.44	0.63
Outcomes	Log Investment	3,134	12.90	12.78	13.02
	Log Employment	3,307	3.98	3.92	4.04
	Log Sales	1,557	16.70	16.50	16.89
	Survive until 2020	4,444	0.92	0.93	0.91
Traits	Young ($\leq$ 10 years)	3,094	0.16	0.17	0.16
	Financial constraints (-2 to 2)	2,404	-0.23	-0.23	-0.23
	Capital Irreversibility	1,711	0.71	0.71	0.70
	Productivity	2,383	0.03	-0.06	0.10
	Has international subsidiary	2,949	0.20	0.12	0.29
	Has international shareholder	2.949	0.27	0.21	0.33
Firm size	Small (<50 employees)	2,970	0.43	0.47	0.38
	Medium ($\geq$ 50 & $<$ 250)	2,970	0.39	0.34	0.43
	Large (>250)	2,970	0.18	0.19	0.18
Industries	Share Manufacturing	3,134	0.45	0.26	0.63
	Share Construction	3,134	0.08	0.14	0.03
	Share Service Sector	3,134	0.47	0.60	0.35
Managers	Age*	2,503	53.41	53.72	53.12
	Tenure in firm*	2,956	6.00	6.19	5.83
	Overall management experience*	2,956	9.68	9.73	9.64
	Management volatility	2,962	0.16	0.15	0.17
	Female board	2,956	0.03	0.04	0.02

*Mean over all executives in firm

Table 1: Summary statistics of the main variables.

Notes: Averages of covariates refer to pre-shock years in the baseline difference-in-differences sample (Table 3, Column (1)). Averages of the outcome variables refer to their respective difference-in-differences sample (Table 3).

4 Empirical analysis

In our first analysis, we study the effects of the exchange rate shock on firm-level outcomes by means of the following difference-in-differences (DiD) model:

$$\Delta \ln(y_i) = \alpha_0 + \alpha_1 \text{ Exposure}_i + \epsilon_i, \tag{6}$$

where $\Delta \ln(y_i)$ represents the difference of the average or cumulative firm-level outcome y between the post-shock period (2015-2017) and the pre-shock period (2012-2014). The coefficient α_1 identifies the differential effect of the outcomes of interest after the shock (first difference) as the exposure to the shock increases (second difference). In order to take into account the lumpiness of investment, we consider the cumulative investment in the three years prior to the shock and the cumulative investment in the three years after the shock. For other firm-level variables, such as sales and employment, we will consider the average in the pre- and post-period, respectively.

In order to examine how the impact of the shock varies over time and in order to test for (the absence of) pre-trends, we accompany the analysis with an event-study of the form:

$$\ln(y_{it}) = \beta_0 + \theta_i + \eta_t + \sum_{\substack{k=2012,\ldots,2017 \\ k \neq 2014}} \beta_k \text{ Exposed}_i \times \mathbb{1}(\text{T}_t = k) + \epsilon_{it}. \tag{7}$$

The event study model provides an estimate of the differential outcome for firms that are exposed to the shock in any given year. The estimates correspond to the coefficients $\beta_{2012}, ..., \beta_{2017}$. Because we normalize β_{2014} to zero, the treatment effects for each year are estimated relative to 2014, the year before the shock. Firm-specific fixed effects account for any time-invariant firm characteristics that are constant over time. Year-specific fixed effects account for year-specific effects that are common to all firms.

4.1 Validation of the exposure measure

Before assessing the shock's impact on investment, we first examine how well our measure of exposure – constructed from pre-shock variables – captures the impact of the exchange rate shock on the competitive environment of firms. If our exposure measure is valid, we expect it to have a stronger impact on the sales of more exposed firms relative to less exposed ones after the shock occurred in 2015. Moreover, we would expect the measure to *not* differentially impact sales in the years prior to the shock. This latter common-trend assumption must also hold for our main outcome of interest.

We first test for the validity of our exposure measure by estimating our DiD specification (Equation 6) and the event study counterpart (Equation 7) using sales as the dependent variable. Columns (1) and (2) of Table 2 present the estimation results for the DiD specification and the left panel in Figure 3 plots the year-specific coefficients. Note that sales data are not available for the years 2013 and 2017.[8] We find that our exposure measure clearly affects the sales of exposed firms: Firms categorized as exposed – i.e., those with an exposure measure above the median – experience, on average, an 11% decrease in sales relative to firms classified as not exposed (Column 1). A similar coefficient is obtained on the continuous exposure variable (Column 2). Moving from an exposure at the 25th percentile (-0.25) to the 75th percentile of exposure (0.58) decreases sales by 11% (-.133×(.58 +.25)). At the same time, sales of exposed and non-exposed firms are not on a differential trend prior to the shock (Figure 3, left panel).

Our identification strategy also relies on the assumption of common trends in our main variable of interest, (log) investment. To this end, we estimate the event study (Equation 7) also for our main outcome of interest, (log) investment. The estimated series of coefficients on the variable of interest, β_{1jk}, and their 90% confidence intervals, are plotted in the right panel of Figure 3.

[8] We use sales data from the KOF Innovation Survey, which collects sales data in even years. Therefore, sales data are not available for the years 2013 and 2017. In 2015, the KOF Investment Survey included an exceptional data collection effort, gathering sales information as part of a special survey (Sonderumfrage).

	(1)	(2)	(3)	(4)	(5)	(6)
			Δ Sales (in logs)			
$Exposed_i$	-0.113***					
	(0.037)					
$Exposure_i$		-0.133***				
		(0.043)				
$Exporter_i$			-0.111**			-0.039
			(0.045)			(0.049)
$\widetilde{Import\ Share}_i$				0.017		0.015
				(0.019)		(0.020)
$\widetilde{Import\ Competition}_i$					-0.090***	-0.079***
					(0.026)	(0.029)
Observations	1,557	1,557	1,557	1,557	1,557	1,557

Table 2: Effect of shock exposure on sales.

Notes: This table shows the effect of the trade shock on sales by exposure, estimated using Equation (6). Columns (1) and (2) report the coefficients for the variables $Exposed_i$ and $Exposure_i$, respectively. Columns (3) to (6) re-estimate Equation 6 using the subcomponents that enter the exposure measure, as defined in Equation 4. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

As for sales, we do not observe a significant effect of our exposure measure on investment in the years leading up to 2015. This gives support to the validity of the central identifying assumption that the groups of firms would have displayed a common trend in the outcome absent the shock.[9]

Our exposure measure captures three channels – export markets, input markets, and the domestic output market – through which the exchange rate shock changed firms' market conditions. These three factors enter our overall exposure measure equally. To understand the individual importance of each channel in transmitting the exchange rate shock to the competitive environment of firms, we re-estimate the effect of the exchange rate shock on log sales using the three variables separately instead of the composite exposure measure.

[9]In Figure 3, we confine our analysis to the year 2012 to 2017. Figure 6 in Appendix B presents an event study graph for the years 2009 to 2019. The results are very similar.

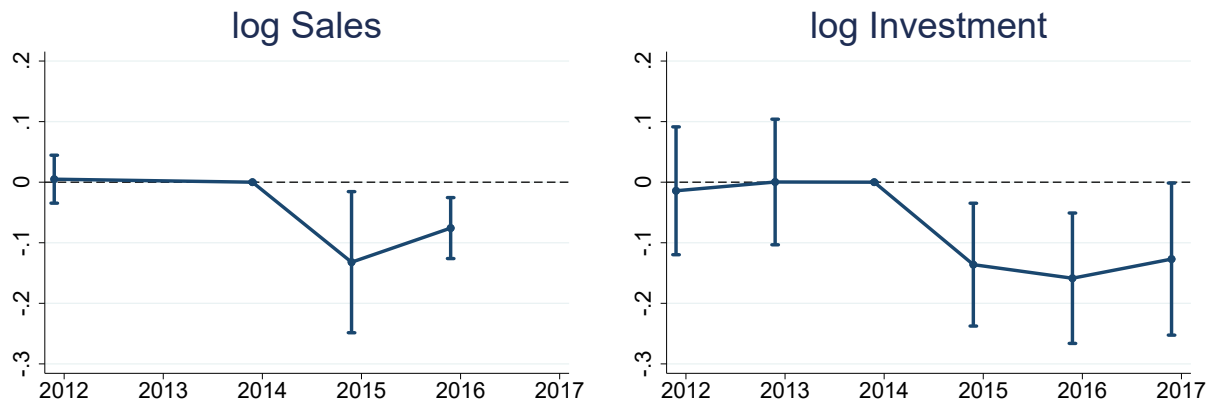

Figure 3: Event study: Exposed firms' (log) sales and (log) investment in the years around the exchange rate shock in 2015 relative to non-exposed firms.

Notes: The figures show the differential effect of the exchange rate shock on log sales and log investment for exposed firms relative to non-exposed firms during the period 2012–2017. The underlying regression is based on Equation (7). The coefficients in the plot correspond to $\beta_{2012}, ..., \beta_{2017}$. Unfortunately, we do not observe yearly sales data for 2013 and 2017. Therefore, no coefficients are available for these two years.

Columns (3)-(6) of Table 2 present the corresponding results. We find that the subcomponents influence the change in sales in the expected direction. Exporting firms, i.e. firms that exported prior to 2014, experienced a decrease in sales of 11%. The import share has the expected positive, although statistically insignificant, effect on sales. Finally, facing higher import competition caused a stronger deterioration of a firm's competitive environment. Moving from an import competition exposure at the 25th percentile (-0.62) to the 75th percentile (0.81) implies a decline in sales of 13%. In Column (6), we consider all three channels jointly and find that among the three channels, import competition appears to be the most important channel.

The relevance of import competition for our exposure measure carries important implications: a large part of the variation we exploit in this paper stems from sector-level variation. In fact, our results are robust to using import competition alone as the measure of exposure, as we demonstrate in Table 8 and Figure 7 in the Appendix.

This also implies that we cannot absorb any sector-level trends in our analysis, as doing so would eliminate important variation. A significant part of the variation exploited in this

analysis even stems from the differential effect the shock has on firms in manufacturing relative to firms in services and construction, as shown in Columns (4) and (8) of Table 9 in the Appendix. Note, however, that the various pre-trend analyses confirm the validity of our measure even in the absence of controls for sector-level trends.

4.2 Firm-level responses to the exchange rate shock

Figure 3 illustrates a substantial negative effect of the shock on yearly firm-level investment. In Table 3, we present the estimates of the corresponding difference-in-difference model specified in Equation 6. Panel A presents results using our continuous exposure variable, while Panel B uses the binary variable.

In Column (1), we present the coefficients for the model that uses the difference in the log of cumulative total investment in the years prior to the shock (2012-2014) and the log of cumulative total investment in the years after the shock (2015-2017) as the dependent variable. The negative coefficient in Panel A indicates that moving from the 25th percentile of exposure (-0.25) to the 75th percentile of exposure (0.58) implies a reduction of cumulative investment by 13% in the three years after the exchange rate shock (-.156×(.58 +.25)). The coefficient in Panel B implies that firms with an above-median exposure to the shock reduce their cumulative investment in the three years after the shock by 11% compared to the pre-shock years.

Our data allows us to explore in greater detail the effect of the exchange rate shock on additional firm-level outcomes. In Columns (2) and (3), we separate total investment into investment in equipment and machinery and construction investment. While we find that both types of investment are reduced in response to the shock, the effect is substantially more pronounced for construction investment, amounting to 30% as we move from the 25th percentile of exposure to the 75th. Note that we do not observe these separate investments for all firms. Hence, both effects are larger than the effect on total investment.

Beyond the investment responses, we show that firms also reduce their employment by

examining the differential effect of the shock on exposed firms with respect to their average number of full-time employees. We find a reduction in employment by around 4% for firms at the 75th percentile of exposure compared to firms at the 25th percentile (-0.05 × (.58 +.25)).[10] Finally, we use Bureau van Dijk's ORBIS database to construct an indicator for firm survival until 2020 and find a negative impact of the shock on their survival. Firms with shock exposure above the median are 2.4% less likely to survive until 2020 compared to an average survival probability of 93% for non-exposed firms.

	(1)	(2)	(3)	(4)	(5)
	Δ Total investment (in logs)	Δ Investment in equipment (in logs)	Δ Investment in construction (in logs)	Δ Employment (in logs)	Survive until 2020 (Dummy)
Panel A					
Exposure_i	-0.156***	-0.186***	-0.364***	-0.052***	-0.027***
	(0.052)	(0.052)	(0.097)	(0.018)	(0.007)
Panel B					
Exposed_i	-0.111*	-0.135**	-0.300***	-0.065***	-0.024***
	(0.057)	(0.057)	(0.107)	(0.021)	(0.008)
Observations	3,134	2,691	1,528	3,307	4,444

Table 3: Effects of the exchange rate shock on firm-level outcomes.

Notes: This table shows the effect of the trade shock on investment, employment, and firm survival by exposure, estimated using Equation (6). The coefficients indicate the difference between the pre-shock period (2012–2014) and the post-shock period (2015–2017). Column (1) refers to cumulative total investment. Column (2) refers to cumulative investment in equipment and machinery, and Column (3) refers to cumulative construction investment. Column (4) refers to average full-time equivalent employment. Column (5) refers to firm survival until 2020, measured as an indicator that takes the value one if a firm is still active in 2020. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We use cumulative investment over three years as our main outcome variable due to the lumpy nature of investment. The difference-in-differences sample is therefore composed

[10]This is consistent with the evidence by Arni et al. (2024) who examine the same shock and work with a linked employer-employee sample to understand the effect of the trade shock on various worker-level outcomes.

of firms that report non-zero investment in at least one year both prior to and after the shock. We present a series of robustness exercises in Table 10 in the Appendix. In Columns (1) and (2), we present results from panel specifications with year-specific log(investment) on the left-hand side, without restricting the sample to firms that are investing both pre- and post-shock. In Column (1), we introduce an indicator for the years after the shock (Post), while in Column (2) we allow for year-specific coefficients. Column (3) uses the same specification as Column (2), but is limited to the firms included in the difference-in-differences sample. All results are strongly aligned with the main regression (Table 3). Columns (4) and (5) use two variables to measure the extensive investment margin. In Column (4), we code only zero reported investment as zero investment. In Column (5), we also code firms with missing investment information (item non-response) as non-investing. Both columns indicate that there is little variation on the extensive investment margin.

4.3 Response heterogeneity

So far, we have shown that pre-shock exposure to the trade shock is associated with reduced firm investment after 2015. We now turn to response heterogeneity: Do firms with similar levels of exposure react differently to the shock depending on their characteristics? Understanding this variation in responses can shed light on the underlying economic mechanisms and enhance our understanding of the shock's aggregate effects.

A growing body of literature highlights that young firms may be differently affected by aggregate shocks (Sedláček and Sterk, 2017; Adelino, Ma and Robinson, 2017). Recently, Krusell, Thurwachter and Weiss (2024) have shown that, based on a machine learning algorithm, firm age is the strongest predictor of differences in investment elasticities following a monetary policy shock. Motivated by this, we analyze response heterogeneity by examining young and old firms, where young firms are defined as those that are 10 years old or younger in the year preceding the shock.

The results in Column (1) of Table 4 show that young firms' investment is significantly

more sensitive to the shock. On average, the interaction of our exposure variable with the young firm indicator reveals that a young firm moving from the 25th to the 75th percentile in exposure reduces cumulative investment over three years by more than 50%. In contrast, older firms with the same level of exposure experience only a 6% decline. This suggests that young firms' negative investment response is more than eight times greater than that of older firms.

Firm age correlates with other factors that could explain this stronger responsiveness of young firms. As emphasized by Haltiwanger, Jarmin and Miranda (2013), it is important to distinguish between young and small firms in analyses of this nature. To address this, we examine response heterogeneity with respect to firm size in Column (2) of Table 4. Firms are classified as small if they employed fewer than 50 people prior to 2015. We find no significant response heterogeneity based on size, contrasting with the pronounced effects observed for young firms. This highlights that firm age, rather than size, drives the observed response. Similarly, when size is measured using pre-shock employment as a continuous variable (results not shown), we find no evidence of size-based response heterogeneity.

One might also be concerned that the stronger investment response of young firms is driven by their higher likelihood of facing financial constraints. A large body of literature explores the impact that limited access to finance has on young firms (Petersen and Rajan, 1994), in particular, with respect to their investment behaviour (Durante, Ferrando and Vermeulen, 2022; Cloyne et al., 2023). To assess this possibility, Column (3) examines whether financially constrained firms prior to the shock – identified based on survey responses – exhibit a stronger reaction to the shock. The results show no significant difference in investment responses between financially constrained and unconstrained firms, suggesting that financial constraints do not account for the heightened sensitivity of young firms.

Since our measure of firm age is based on the entry date recorded in the Swiss business registry, some firms may appear young simply because a Swiss subsidiary of an (older)

foreign multinational was recently established. One might also expect that firms with foreign ownership are more responsive to the shock, since the foreign parent company could reallocate investment away from Switzerland. To address this, we use ownership information from the Bureau van Dijk's ORBIS database to test for response heterogeneity with respect to foreign ownership. The results in Column (4) reveal no evidence of response heterogeneity related to foreign ownership. We also examine whether firms with subsidiaries abroad prior to 2015 exhibit differential investment responses, as such firms may find it easier to shift production – and thus capital and investment – abroad. Again, we find no statistically significant heterogeneity in the investment response based on the presence of foreign subsidiaries.

Productivity may also be correlated with firm age and potentially explain the heightened investment sensitivity of young firms. To test this, we examine whether productivity moderates the investment response, using firms' average productivity prior to the shock (measured as sales per worker). Column (6) shows that while more productive firms tend to reduce investment less after the shock, the interaction between productivity and shock exposure is not statistically significant. This suggests that prior productivity differences do not account for the stronger investment response observed among young firms.

Finally, we investigate whether the degree of capital irreversibility influences the investment response to the shock. The irreversibility measure reflects the difficulty of reversing past capital decisions and may determine how capital could be reallocated after a trade shock (Lanteri, Medina and Tan, 2023). Krusell, Thurwachter and Weiss (2024) argue that a combination of convex and fixed adjustment costs may explain why young firms' investment is more sensitive to monetary policy shocks. Since capital irreversibility affects the (opportunity) cost of investment, we would expect investment sensitivity to be impacted by capital irreversibility if this mechanism underlies the differential behavior of young firms. Capital irreversibility may also be correlated with firm age, as younger firms could face higher resale costs due to less established networks. The results in Column (7) indicate that firms with higher capital irreversibility reduce investment more strongly in

response to the shock, consistent with the real options framework and findings in Dibiasi et al. (2018): when capital is difficult to reallocate, firms become more cautious and delay investment under uncertainty. However, the interaction between capital irreversibility and shock exposure is not statistically significant, suggesting that irreversibility does not meaningfully alter the sensitivity of investment to the trade shock along the measure of shock exposure. Thus, the degree of capital irreversibility also does not explain the heightened investment responsiveness of young firms.

Finally, Columns (8) to (10) include all interaction terms simultaneously. Since coverage varies across variables, we use various subsets of variables to be sure that our results are not driven by the change in sample composition. The effect of young firm remains strong and statistically significant, while none of the other variables generates important investment heterogeneity along the shock exposure measure.

The stronger investment response among young firms documented above is robust to alternative definitions of "young". To illustrate this, we re-estimate the model using several thresholds for the binary variable $Young_i$. Specifically, we begin by classifying as young those firms that are two years old or younger in 2014, and then incrementally expand the definition to include firms up to 30 years of age prior to the shock. Figure 4 plots the estimated coefficients on the interaction term $Exposure_i \times Young_i$ for each specification, where the coefficient for year 10 corresponds to our baseline definition of young firms presented in Column (1) of Table 4. The results confirm that the heightened investment sensitivity among younger firms persists across a wide range of age cutoffs.

The figure shows that the negative effect on investment among young firms is not sensitive to the specific definition of "young". Notably, the lower the threshold used to define "young", the stronger the observed negative effect. This monotonic pattern reinforces the conclusion that the documented response heterogeneity is indeed related to firm age and not to some other unobserved characteristic that accidentally may be more pronounced among firms aged 10 years or younger in our sample. Additionally, the figure indicates that defining "young" as firms 10 years old or younger is a reasonable choice and is not

	Δ Total investment (in logs)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Exposure_i	-0.070	-0.151**	-0.145**	-0.137**	-0.139**	-0.149**	-0.202*	-0.094	-0.110	-0.225*
	(0.053)	(0.063)	(0.057)	(0.064)	(0.060)	(0.059)	(0.111)	(0.091)	(0.102)	(0.136)
$\text{Exposure}_i \times \text{Young}_i$	-0.535***							-0.461**	-0.529**	-0.494*
	(0.185)							(0.211)	(0.257)	(0.287)
$\text{Exposure}_i \times \text{Small}_i$		0.059						0.124	0.103	0.116
		(0.116)						(0.136)	(0.149)	(0.160)
$\text{Exposure}_i \times \text{Financial constraints (pre)}_i$			0.057					0.072	0.055	0.008
			(0.062)					(0.062)	(0.072)	(0.068)
$\text{Exposure}_i \times \text{Had international shareholder}_i$				0.056				0.004	-0.070	-0.108
				(0.111)				(0.121)	(0.130)	(0.149)
$\text{Exposure}_i \times \text{Was international subsidiary}_i$					0.072			-0.072	-0.055	0.008
					(0.127)			(0.137)	(0.152)	(0.176)
$\text{Exposure}_i \times \text{Productivity (Pre)}_i$						0.098			0.073	0.018
						(0.063)			(0.074)	(0.083)
$\text{Exposure}_i \times \text{Capital Irreversibility (Pre)}_i$							0.140			0.226
							(0.133)			(0.148)
Young_i	-0.002							-0.006	-0.028	0.064
	(0.092)							(0.111)	(0.134)	(0.159)
Small_i		0.038						0.002	0.015	0.003
		(0.059)						(0.074)	(0.081)	(0.092)
$\text{Financial constraints (pre)}_i$			-0.001					0.004	0.017	-0.017
			(0.034)					(0.035)	(0.038)	(0.041)
$\text{Had international shareholder}_i$				-0.023				-0.021	-0.059	-0.102
				(0.066)				(0.076)	(0.082)	(0.099)
$\text{Was international subsidiary}_i$					-0.014			0.039	0.025	0.078
					(0.079)			(0.089)	(0.097)	(0.116)
$\text{Productivity (Pre)}_i$						0.081**			0.142***	0.109**
						(0.033)			(0.039)	(0.043)
$\text{Capital Irreversibility (Pre)}_i$							-0.156**			-0.181**
							(0.077)			(0.085)
Observations	3,094	2,969	2,302	2,949	2,949	2,383	1,711	2,173	1,817	1,321

Table 4: Response heterogeneity across various firm-level fundamentals.

Notes: This table shows the heterogeneity in total investment responses across various firm-level fundamentals. Specifically, we re-estimate Equation (6) and interact the variable $Exposure_i$ with different firm-level fundamentals. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

an outlier within the distribution. Finally, the results show that as the definition of "young" expands to include firms 18 years old or older, the difference between "young" and established firms diminishes and eventually converges to zero.

4.4 The role of young firms: Further outcomes and potential channels

The previous section demonstrated that young firms' investment is particularly sensitive to the trade shock. This strong negative relationship between the investment response and pre-shock exposure is evident across the entire range of the exposure variable, as illustrated in the binscatter plot in the first panel of Figure 5, where the slope for young

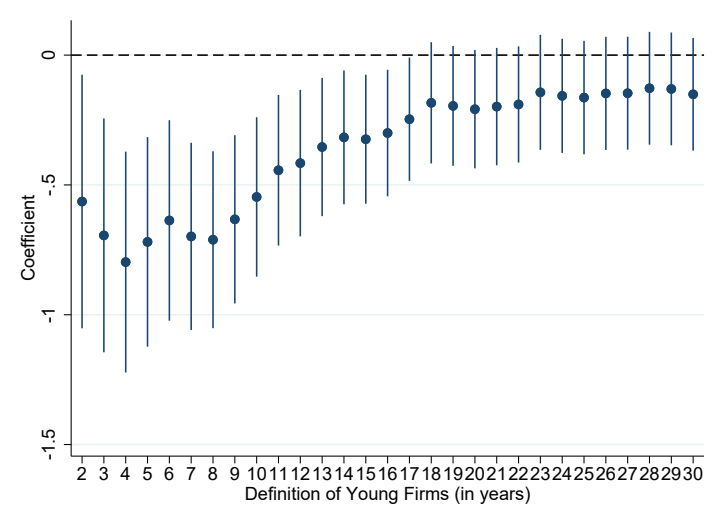

Figure 4: Coefficient on the interaction $\text{Exposure}_i \times \text{Young}_i$ for varying definitions of young firms.

Notes: This figure plots the estimated coefficients on the interaction term $Exposure_i \times Young_i$ for alternative definitions of "young." The underlying specification is estimated according to Equation (6) for cumulative total investment (in logs), including the interaction $Exposure_i \times Young_i$. Values on the x-axis indicate the maximum firm age used to define $Young_i$. For example, a value of 2 means that firms aged 2 years or younger are classified as young. The specification is re-estimated separately for each definition of young.

firms is notably steeper than that for older firms. This implies that not only very negatively treated young firms react strongly to the shock, but also very positively treated young firms tend to have a substantially stronger (positive) response to the shock. In comparison, the slope for older firms is substantially flatter across the entire range of exposure.

One potential explanation for this pronounced difference between young and old firms may lie in the impact of the shock on young firms' sales compared to those of older firms. For example, in a scenario where an established buyer base is less sensitive to price changes or where firm reputation plays a critical role, young firms might experience a larger decline in sales when their competitive environment shifts. However, as shown in the second panel of Figure 5, the sensitivity of sales to exposure is remarkably similar between young and old firms. This observation is formally confirmed by the estimation results presented in Column (1) of Table 11 in Appendix B. These results indicate that the stronger investment response among young firms is not driven by a stronger impact

of shock exposure on the output environment of firms – their sales –, but that young firms respond differently to a demand shock of comparable magnitude.

Another important dimension to consider is whether young firms also adjust their employment more strongly than older firms. Employment – a relatively flexible input compared to capital – might be expected to also exhibit a different responsiveness for young and old firms. However, our findings indicate no significant difference in employment responses between young and old firms. This is evident from Panel 3 of Figure 5 and Column (3) of Table 11 in Appendix B. This lack of differential employment response aligns with existing literature. For instance, Adelino, Ma and Robinson (2017) find that the employment elasticity to shocks does not differ significantly between young and old firms. Similarly, our results show comparable employment elasticities across these groups.

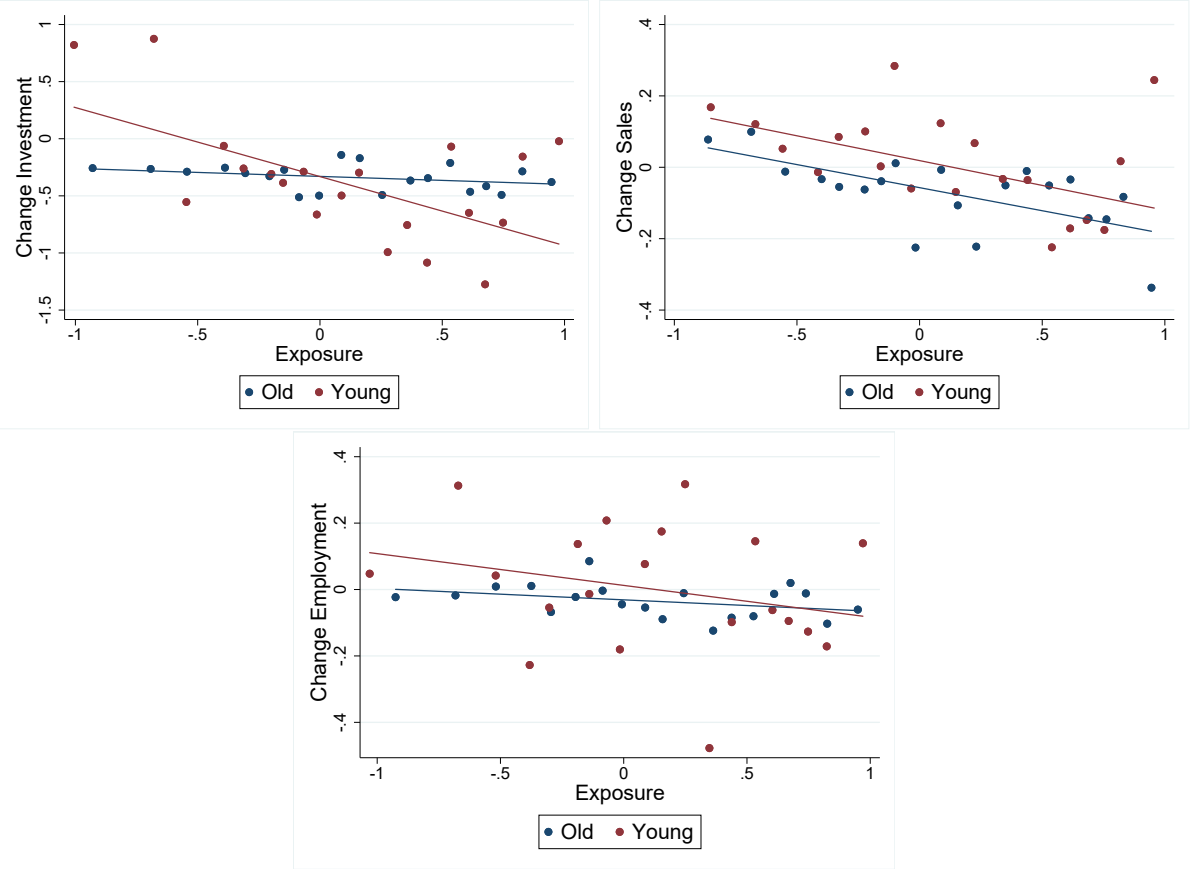

Figure 5: Differential responses in investment, sales and employment by varying degree of exposure for young and old firms.

Since we observe pronounced differences in investment behavior, but not in sales or

employment responses, the relevant explanatory factors may be tied to characteristics specific to investment and capital adjustment. We therefore re-examine the role of financial constraints and capital adjustment frictions – particularly the degree of capital irreversibility – as potential drivers of this disparity. So far, we have shown that neither pre-shock financial constraints nor the pre-shock degree of capital irreversibility is associated with a stronger investment sensitivity. In the next step, we assess whether young firms become more financially constrained or face greater capital irreversibility following the shock. Looking at the level of reported financial constraints, Column (1) of Table 5 shows no significant change for young firms after the shock relative to older, equally exposed firms. However, as Column (2) indicates, young firms are significantly more likely to report that their investment activity was "strongly negatively affected" by financial factors in the aftermath of the shock. Moving from the 25th to the 75th percentile in exposure increases the probability that a young firm reports being "strongly negatively affected" by financial factors by 5 percentage points while there is no effect for older firms. Compared to the pre-shock average—prior to the shock 5% of young firms reported being "strongly negatively affected" by financial factors (3.7% of established firms)—this represents a notable increase. Nevertheless, only a very small share of firms report being heavily financially constrained (less than 4% in total), and – as shown in Column (1) – we do not find an effect on the average reported level of financial constraints. Moreover, excluding firms that report being heavily financially constrained after the shock does not alter the result that young firms' investment is substantially more sensitive to the shock.[11] Hence, while young firms are more likely to be strongly negatively affected by financial constraints after the shock, this channel is unlikely to fully explain the pronounced investment sensitivity observed among young firms.

Column (3) of Table 5 shows that, conditional on exposure, young firms are significantly more likely to report that they face high capital irreversibility following the shock. Moving

[11] Clearly, this regression suffers from conditioning on an outcome and should be interpreted with caution. However, together with the small number of firms reporting being heavily financially constrained and the muted effect on the average reported level of financial constraints, we take this as evidence that this channel alone cannot explain the results.

from the 25th to the 75th percentile in exposure increases the probability that a young firm reports facing higher capital irreversibility constraints by 11 percentage points. Compared to the pre-shock average—prior to the shock 71.6% of young firms reported facing high capital irreversibility (71.5% of established firms)—this corresponds to a 15% increase. This finding suggests that the unexpected shift in the competitive environment not only affects investment behavior directly but also alters firms' ability to adjust capital ex post. The magnitude of the effect is about 1.5 times larger than the estimates in Dibiasi (2025), who find that the Covid-19 shock increased reported irreversibility by 7 percentage points, on average. One possible explanation for the increase in capital irreversibility among young firms is that – owing to their limited networks, shorter track records, and lower market visibility – they face greater difficulties in reselling or repurposing capital assets when overall investment activity declines. This heightened capital irreversibility could, in turn, further dampen investment among young firms.

Columns (4) and (5) of Table 5 show that the heightened investment sensitivity of young firms is not driven by a specific type of investment. Both equipment and machinery investment as well as construction investment decline more sharply among exposed young firms relative to their older counterparts. Finally, we examine firm survival (Column 6). The likelihood of survival among young, shock-exposed firms is significantly lower. While the baseline survival rate through 2020 is approximately 93% for older firms, it averages only 88% for young firms. Column (6) indicates that moving from the 25th to the 75th percentile of exposure reduces the probability of survival by roughly 1 percentage point for older firms, but by more than 8 percentage points for young firms, underscoring their heightened vulnerability to the shock.

To summarize, young firms are not disproportionately affected by declines in sales relative to more established firms, nor do they display systematically different (immediate) employment elasticities. However, we document a pronounced and statistically significant difference in young firms' investments and their survival probability. While we do not find evidence that pre-shock financial constraints or capital irreversibility explain the

	(1) Δ Financial constraints (Level)	(2) Δ Heavily financially constrained (Dummy)	(3) Δ Capital irreversibility (Dummy)	(4) Δ Investment in equipment (in logs)	(5) Δ Investment in construction (in logs)	(6) Survive until 2020 (Dummy)
Exposure_i	-0.045	-0.002	-0.018	-0.129**	-0.261***	-0.013*
	(0.047)	(0.010)	(0.024)	(0.055)	(0.098)	(0.007)
Young_i	0.120*	0.001	0.012	-0.060	0.154	-0.040***
	(0.066)	(0.014)	(0.028)	(0.091)	(0.177)	(0.011)
$\text{Exposure}_i \times \text{Young}_i$	0.055	0.060**	0.132**	-0.345**	-0.660*	-0.089***
	(0.131)	(0.030)	(0.054)	(0.171)	(0.366)	(0.023)
Observations	1,993	1,993	1,855	2,655	1,506	4,444

Table 5: Further outcomes by exposure to the shock and young age.

Notes: This table reports the regression results of Equation (6) including the interaction term $Exposure_i \times Young_i$ for alternative outcome variables. Column (1) refers to the reported average level of financial constraints. Column (2) refers to a dummy variable indicating whether a firm reports being heavily financially constrained. Column (3) refers to the firm's reported capital irreversibility. Columns (4) and (5) refer to cumulative investment in machinery and equipment, and cumulative construction investment, respectively. Column (6) refers to firm survival until 2020. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

stronger investment response of young firms, we do find that, after the shock, young firms are more likely to become heavily financially constrained and to face stronger capital irreversibility. Hence, these factors contribute to the sharp post-shock decline in investment among young firms. However, since they do not differ ex ante between young and old firms, they cannot constitute the channel that explains the initial differential response. Instead, they act as reinforcing factors and are themselves likely to be influenced by the underlying channel.

As we find little evidence of ex ante differences in firm fundamentals that could explain the results, we next examine whether managerial characteristics help account for the heterogeneous investment responses observed across young and old firms following the exchange rate shock. Managerial traits are known to play an important role in corporate decision-making. For instance, Malmendier, Tate and Yan (2011) show that CEOs' Great Depression experiences and military service histories help explain corporate financing decisions. In our data, we observe several manager characteristics – such as age, gender,

and managerial experience both within the same firm and in other firms – that may shed light on the channel driving the differential behavior of young versus old firms.

The results are presented in Table 6. Column (1) explores the role of managerial age. We would not necessarily expect a monotonic effect of age, but rather a potentially differential response for rather young and rather old managers relative to managers around the mean age (which is around 53 in our data). We find that firms led by younger managers (at least one manager aged 40 or below) reduce investment more strongly in response to the shock. In contrast, the interaction term for older managers (managers above 60) is also negative but smaller in magnitude and not statistically significant. This suggests that it is managerial youth, rather than age per se, that plays a central role in shaping firms' responses. The significant effect of managerial youth may point to experience as a potential underlying mechanism. Column (2) therefore explicitly examines the role of managerial tenure. To isolate the effect of experience within the current firm, this specification controls for both firm age and overall managerial experience, the latter also capturing previous management roles in other firms. In addition, we control for management turnover to ensure that the estimated effect reflects tenure in the current firm rather than changes in the composition of the management team (which would mechanically lower the average experience of managers). The results confirm that firm-specific managerial experience matters: the interaction term $\text{Exposure}_i \times \text{Tenure in management}_i$ is not only positive and statistically significant but also economically meaningful. Each additional year of management tenure reduces the negative investment response to the shock by roughly 10%.

Column (3) shows that firms with exclusively female management respond substantially more strongly to the shock. The interaction term $\text{Exposure}_i \times \text{Female Management}_i$ is negative and statistically significant, indicating that the gender composition of the management team is associated with an almost tenfold higher response to the shock. This result is consistent with findings in the literature documenting that women tend to exhibit greater risk aversion (see, e.g., Croson and Gneezy (2009)). To further interpret

this result, we draw on an ad hoc survey question included in the Spring 2017 round of the KOF Investment Survey. In a one-off module, Dibiasi, Mikosch and Sarferaz (2025) asked a sub-sample of firms in our analysis to assess their corporate culture with respect to risk-taking: "Is your company generally prepared to take entrepreneurial risks, or does it try to avoid such risks where possible?" Responses were recorded on a scale from 1 to 10, where 1 indicates "not at all prepared to take risks" and 10 indicates "very willing to take risks". We observe responses from 569 firms and correlate these with managerial characteristics. The average reported willingness to take risks is 5.15. However, firms with female managers rate their risk-taking culture 16.3% lower on average (a difference of 0.84 points).[12] This is in line with Khan and Vieito (2013), who find that firm risk—measured as the standard deviation of logarithmic returns—is lower when the CEO is a woman. By contrast, we find no statistically significant differences in perceived risk culture based on the CEO's age or tenure in management. These findings suggest that differential risk attitudes among managers may help explain response heterogeneity. However, since we cannot observe risk attitudes directly, we cannot assess whether this difference varies substantially between young and old firms. However, because only very few boards are composed exclusively of women, gender composition alone cannot explain the strong investment response of young versus old firms. Using the share of female managers instead of an indicator for female boards does not change the results.

Column (4) includes all managerial characteristics simultaneously. The magnitudes and significance levels of the interaction terms remain broadly consistent with the earlier specifications. Thus, while we do not find ex ante differences in firm fundamentals to explain heterogeneous responses to the exchange rate shock, we do find that firm age and managerial characteristics are important determinants of how firms adjust to the shock. Can this combined evidence shed light on potential mechanisms underlying response heterogeneity? The stronger reactions of firms with relatively young managers and with managers who have limited tenure in the same firm may reflect characteristics typical of

[12]The full results are presented in Table 12 in Appendix B.

	(1)	(2)	(3)	(4)
	Δ Total investment (in logs)	Δ Total investment (in logs)	Δ Total investment (in logs)	Δ Total investment (in logs)
Exposure_i	-0.054	-0.308***	-0.099*	-0.199*
	(0.064)	(0.098)	(0.052)	(0.107)
$\text{Exposure}_i \times \text{Young manager}_i$	-0.451**			-0.408**
	(0.208)			(0.208)
$\text{Exposure}_i \times \text{Old manager}_i$	-0.188			-0.221
	(0.151)			(0.151)
$\text{Exposure}_i \times \text{Tenure in management}_i$		0.031**		0.027**
		(0.013)		(0.014)
$\text{Exposure}_i \times \text{Female management}_i$			-0.867**	-0.846**
			(0.384)	(0.399)
Young manager_i (≤ 40)	-0.074			-0.072
	(0.107)			(0.107)
Old manager_i (> 60)	-0.218**			-0.222**
	(0.086)			(0.090)
$\text{Tenure in management}_i$		0.011		0.016
		(0.010)		(0.011)
$\text{Female management}_i$			-0.018	-0.041
			(0.173)	(0.235)
Observations	2,503	2,956	2,956	2,503
Controls		Yes		Yes

Table 6: Response heterogeneity across various observable manager characteristics.

Notes: This table reports the regression results of Equation (6), including the interaction of $Exposure_i$ with alternative managerial characteristics. The dependent variable is cumulative total investment (in logs). "Young manager" equals one if at least one manager is aged 40 or below. "Old manager" equals one if managers are on average aged 60 or above. Tenure in management measures the number of years a manager has held a managerial position within the same firm. "Female management" equals one if the firm is managed by female managers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Control variables, where indicated, include firm age, overall managerial experience, and management turnover.

young firms more generally: compared with older, established firms, employees in young firms – both executives and non-executives – inevitably have less experience with the firm's market environment. If firms, or rather the people within them, only gradually learn about the true potential of their market, then negative demand shocks at an early stage may induce an excessively pessimistic assessment of the overall market environment. Consequently, such shocks trigger disproportionately strong negative responses, as the new information carries greater weight in shaping beliefs compared with older firms that have already observed a longer history of events. This mechanism is consistent with models of Bayesian learning such as Jovanovic (1982) and Berman, Rebeyrol and Vicard

(2019): if firms learn about their market environment over time, early-life shocks have greater informational content and thus elicit stronger reactions. The same framework also aligns with the observation that firms exposed to a comparatively positive shock (at the far left tail of the exposure distribution) exhibit a markedly more positive investment response (see Figure 5).

To assess whether these managerial characteristics are related to the mechanisms underlying the strong response of young firms, we examine their interaction with firm age in Table 7. While the strong responses of firms with young managers and with female managers remain present in this specification, we do not find these characteristics to have stronger effects among young firms (see Columns (1) and (3)). Column (2) focuses on managerial tenure within the firm, which we interpret as a measure of experience with the firm's market. Here, we do find evidence that higher tenure is associated with a mitigation of the strong negative investment response among young firms. The estimated coefficients suggest that roughly eight years of managerial experience within a firm are sufficient to offset the negative investment response typically observed in young firms. This finding points to experience – and thus a learning channel – as a plausible explanation for the heightened sensitivity of young firms.

In a final exercise, we include the two major firm-level determinants of investment emphasized in the literature—financial constraints and productivity—and interact them with firm age. While we find no discernible interaction with financial constraints, we do find that the most productive young firms are better able to mitigate the impact of the shock. However, only young firms above the 80th percentile of the productivity distribution exhibit a response comparable to that of the average established firm.

	Δ Total investment (in logs)				
	(1)	(2)	(3)	(4)	(5)
Exposure_i	0.006	-0.172*	-0.046	-0.091	-0.088
	(0.066)	(0.095)	(0.054)	(0.059)	(0.058)
$\text{Exposure}_i \times \text{Young firm}_i$	-0.490**	-0.897**	-0.434**	-0.427**	-0.428*
	(0.229)	(0.395)	(0.182)	(0.201)	(0.235)
$\text{Exposure}_i \times \text{Young manager}_i$	-0.437*				
	(0.223)				
$\text{Exposure}_i \times \text{Old manager}_i$	-0.239				
	(0.159)				
$\text{Exposure}_i \times \text{Tenure in management}_i$		0.018			
		(0.013)			
$\text{Exposure}_i \times \text{Female management}_i$			-0.637*		
			(0.346)		
$\text{Exposure}_i \times \text{Financial constraints (pre)}$				0.085	
				(0.059)	
$\text{Exposure}_i \times \text{Labor productivity (pre)}$					0.032
					(0.064)
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Young manager}_i$	-0.127				
	(0.587)				
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Old manager}_i$	0.335				
	(0.530)				
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Tenure in management}_i$		0.119*			
		(0.070)			
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Female management}_i$			-1.062		
			(1.009)		
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Financial constraints (pre)}$				-0.222	
				(0.222)	
$\text{Exposure}_i \times \text{Young firm}_i \times \text{Labor productivity (pre)}$					0.676***
					(0.245)
Young manager_i	-0.071				
	(0.117)				
Old manager_i	-0.230**				
	(0.090)				
$\text{Tenure in management}_i$		0.012			
		(0.010)			
$\text{Female management}_i$			-0.002		
			(0.195)		
Financial constraints (pre)				-0.002	
				(0.034)	
Labor productivity (pre)					0.098***
					(0.034)
$\text{Young firm}_i \times \text{Young manager}_i$	0.043				
	(0.284)				
$\text{Young firm}_i \times \text{Old manager}_i$	0.147				
	(0.332)				
$\text{Young firm}_i \times \text{Tenure in management}_i$		0.038			
		(0.036)			
$\text{Young firm}_i \times \text{Female management}_i$			-0.214		
			(0.418)		
$\text{Young firm}_i \times \text{Financial constraints (pre)}$				-0.030	
				(0.118)	
$\text{Young firm}_i \times \text{Labor productivity (pre)}$					-0.160
					(0.119)
Young firm_i	-0.070	-0.107	0.007	0.012	-0.141
	(0.131)	(0.189)	(0.099)	(0.103)	(0.117)
Observations	2,503	2,956	2,956	2,274	2,366
Controls		Yes			

Table 7: Response heterogeneity across important firm-level characteristics for old and young firms.

Notes: This table reports the regression results of Equation (6) augmented by an interaction of $Exposure_i$ with firm and managerial characteristics and $Youngfirm_i$. The dependent variable is cumulative total investment (in logs). "Young manager" equals one if at least one manager is aged 40 or below. "Old manager" equals one if managers are on average aged 60 or above. Tenure in management measures the number of years a manager has held a managerial position within the same firm. "Female management" equals one if the firm is managed by female managers. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Control variables, where indicated, include firm age, overall managerial experience, and management turnover.

5 Conclusion

This paper studies heterogeneous firm responses to the 2015 Swiss Franc appreciation. We show that the exchange rate shock had a significant and persistent impact on investment, particularly among firms more exposed to changes in their competitive environment. Young firms exhibited the strongest reactions, cutting investment much more sharply than older firms.

While differences in firm fundamentals do not explain the heightened responsiveness of young firms, we find that managerial characteristics play an important role. In particular, executives' experience within the same firm mitigates firms' responses to the shock, especially for young firms. We argue that these empirical patterns are consistent with a Bayesian learning framework in the spirit of Jovanovic (1982) and Berman, Rebeyrol and Vicard (2019), in which firms update their beliefs about profitability over time. Overall, the findings carry important aggregate implications and may help explain the decline in business dynamism observed over recent decades.

References

Abberger, Klaus, Matthias Bannert, and Andreas Dibiasi. 2014. "Metaumfrage im Dienstleistungssektor." *KOF Analysen*, 8(2): 51–62.

Adelino, Manuel, Song Ma, and David Robinson. 2017. "Firm Age, Investment Opportunities, and Job Creation." *The Journal of Finance*, 72(3): 999–1038.

Adhvaryu, Achyuta, Namrata Kala, and Anant Nyshadham. 2022. "Management and Shocks to Worker Productivity." *Journal of Political Economy*, 130(1): 1–47.

Arni, Patrick, Peter H. Egger, Katharina Erhardt, Matthias Gubler, and Philip Sauré. 2024. "Heterogeneous Impacts of Trade Shocks on Workers." CESifo Working Paper 11041.

Autor, David, David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review*, 103(6): 2121–2168.

Berman, Nicolas, Vincent Rebeyrol, and Vincent Vicard. 2019. "Demand Learning and Firm Dynamics: Evidence from Exporters." *The Review of Economics and Statistics*, 101(1): 91–106.

Bertrand, Marianne, and Antoinette Schoar. 2003. "Managing with Style: The Effect of Managers on Firm Policies." *The Quarterly Journal of Economics*, 118(4): 1169–1208.

Binding, Garret, and Andreas Dibiasi. 2017. "Exchange rate uncertainty and firm investment plans evidence from Swiss survey data." *Journal of Macroeconomics*, 51: 1–27.

Biondi, Filippo, Sergio Inferrera, Matthias Mertens, and Javier Miranda. 2025. "Declining Job Reallocation in Europe: The Role of Shocks, Market Power, and Technology." Jena Economics Research Papers 2025-004.

Bloom, Nicholas, and John Van Reenen. 2007. "Measuring and Explaining Management Practices Across Firms and Countries." *The Quarterly Journal of Economics*, 122(4): 1351–1408.

Bonadio, Barthélémy, Andreas M Fischer, and Philip Sauré. 2020. "The speed of exchange rate pass-through." *Journal of the European Economic Association*, 18(1): 506–538.

Brown, Charles, and James L Medoff. 2003. "Firm age and wages." *Journal of Labor Economics*, 21(3): 677–697.

Cloyne, James, Clodomiro Ferreira, Maren Froemel, and Paolo Surico. 2023. "Monetary Policy, Corporate Finance, and Investment." *Journal of the European Economic Association*, 21(6): 2586–2634.

Cochrane, William G. 1977. *Sampling Techniques.* Hoboken, NJ: John Wiley & Sons.

Croson, Rachel, and Uri Gneezy. 2009. "Gender differences in preferences." *Journal of Economic Literature*, 47(2): 448–474.

Decker, Ryan A., John Haltiwanger, Ron S. Jarmin, and Javier Miranda. 2016. "Declining Business Dynamism: What We Know and the Way Forward." *American Economic Review*, 106(5): 203–07.

Decker, Ryan A., John Haltiwanger, Ron S. Jarmin, and Javier Miranda. 2020. "Changing Business Dynamism and Productivity: Shocks versus Responsiveness." *American Economic Review*, 110(12): 3952–90.

Dibiasi, Andreas. 2025. "Business-cycle dependent effects of uncertainty shocks: The role of capital irreversibility." *Available at SSRN 3130157*.

Dibiasi, Andreas, Heiner Mikosch, and Samad Sarferaz. 2025. "Uncertainty Shocks, Adjustment Costs, and Firm Beliefs: Evidence from a Representative Survey." *American Economic Journal: Macroeconomics*, 17(3): 36–73.

Dibiasi, Andreas, Klaus Abberger, Michael Siegenthaler, and Jan-Egbert Sturm. 2018. "The effects of policy uncertainty on investment: Evidence from the unexpected acceptance of a far-reaching referendum in Switzerland." *European Economic Review*, 104: 38–67.

Dix-Carneiro, Rafael, and Brian K. Kovak. 2017. "Trade Liberalization and Regional Dynamics." *American Economic Review*, 107(10): 2908–46.

Durante, Elena, Annalisa Ferrando, and Philip Vermeulen. 2022. "Monetary policy, investment and firm heterogeneity." *European Economic Review*, 148: 104251.

Egger, Peter H, and Katharina Erhardt. 2016. "EU-Swiss trade integration via input-output linkages." *Aussenwirtschaft*, 67(3): 1–23.

Ewens, Michael, Ramana Nanda, and Matthew Rhodes-Kropf. 2018. "Cost of experimentation and the evolution of venture capital." *Journal of Financial Economics*, 128(3): 422–442.

Flückiger, Jan. 2015. "Die SNB überrumpelte auch den Bundesrat." *Neue Zürcher Zeitung*.

Foster, Lucia, John C. Haltiwanger, and C. J. Krizan. 2001. "Aggregate Productivity Growth: Lessons from Microeconomic Evidence." *New Developments in Productivity Analysis*, 303–372. University of Chicago Press.

Gosnell, Greer K., John A. List, and Robert D. Metcalfe. 2020. "The Impact of Management Practices on Employee Productivity: A Field Experiment with Airline Captains." *Journal of Political Economy*, 128(4): 1195–1233.

Guiso, Luigi, and Giuseppe Parigi. 1999. "Investment and Demand Uncertainty." *The Quarterly Journal of Economics*, 114(1): 185–227.

Haltiwanger, John, Ron S. Jarmin, and Javier Miranda. 2013. "Who Creates Jobs? Small versus Large versus Young." *The Review of Economics and Statistics*, 95(2): 347–361.

Hopenhayn, Hugo, and Richard Rogerson. 1993. "Job Turnover and Policy Evaluation: A General Equilibrium Analysis." *Journal of Political Economy*, 101(5): 915–938.

Jovanovic, Boyan. 1982. "Selection and the Evolution of Industry." *Econometrica*, 50(3): 649–670.

Khan, Walayet A, and João Paulo Vieito. 2013. "CEO gender and firm performance." *Journal of Economics and Business*, 67: 55–66.

Krusell, Per, Claire Thurwachter, and Joshua Weiss. 2024. "Upwardly Mobile: The Response of Young vs. Old Firms to Monetary Policy." *mimeo.*

Lanteri, Andrea, Pamela Medina, and Eugene Tan. 2023. "Capital-reallocation frictions and trade shocks." *American Economic Journal: Macroeconomics*, 15(2): 190–228.

Malmendier, Ulrike, and Geoffrey Tate. 2005. "CEO overconfidence and corporate investment." *The Journal of Finance*, 60(6): 2661–2700.

Malmendier, Ulrike, Geoffrey Tate, and Jon Yan. 2011. "Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies." *The Journal of Finance*, 66(5): 1687–1733.

Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica*, 71(6): 1695–1725.

Michelacci, Claudio, and Vincenzo Quadrini. 2009. "Financial markets and wages." *The Review of Economic Studies*, 76(2): 795–827.

Ouimet, Paige, and Rebecca Zarutskie. 2014. "Who works for startups? The relation between firm age, employee age, and growth." *Journal of Financial Economics*, 112(3): 386–407.

Petersen, Mitchell A, and Raghuram G Rajan. 1994. "The benefits of lending relationships: Evidence from small business data." *The Journal of Finance*, 49(1): 3–37.

Puri, Manju, and Rebecca Zarutskie. 2012. "On the life cycle dynamics of venture-capital-and non-venture-capital-financed firms." *The Journal of Finance*, 67(6): 2247–2293.

Robb, Alicia M, and David T Robinson. 2014. "The capital structure decisions of new firms." *The Review of Financial Studies*, 27(1): 153–179.

Sadun, Raffaella, Rachel J Schuh, Jonathan S Hartley, John Van Reenen, and Nicholas Bloom. 2025. "Management and Firm Dynamism." National Bureau of Economic Research Working Paper 33765.

Sedláček, Petr, and Vincent Sterk. 2017. "The Growth Potential of Startups over the Business Cycle." *American Economic Review*, 107(10): 3182–3210.

A Further information on KOF Investment Survey

The KOF Investment Survey is a business survey conducted in Switzerland by the KOF Swiss Economic Institute at ETH Zurich. Until 2011, the survey was administered annually in the autumn. Since 2012, it has been conducted biannually, once in the spring and once in the autumn. In the spring wave, KOF sends invitations to firms at the end of February and accepts responses until early May. In the autumn wave, firms are invited in mid-October and can respond until the end of the year. The survey targets a large panel of private and semi-private Swiss firms. The current panel comprises slightly more than 8,000 unique firms. It is a disproportionately stratified random sample with respect to firm size, drawn from the national census of enterprises. The sample covers all sectors except agriculture (NACE 10 to 96) and, within each sector, includes firms from three different size classes, with complete coverage of large firms. The thresholds for these size classes—based on full-time equivalent (FTE) employment—are determined by an "optimal stratification" procedure that accounts for the size distribution of firms within each industry (Cochrane, 1977). Overall, the sample accounts for 34% of total employment (measured in FTEs) in Switzerland across the covered sectors. In terms of industry composition, 34% of firms in the sample belong to the manufacturing sector (NACE 10–33), 2% to energy, water supply, and waste management (NACE 35–38), 9% to construction (NACE 41–43), and 55% to the service sector (NACE 45–96). Regarding firm size, 10% of the sample consists of large firms (more than 250 FTEs), 27% are medium-sized firms (50 to 249 FTEs), and 63% are small firms with fewer than 50 employees. The average response rate between 2009 and 2019 was 35%, with individual survey waves ranging between 33% and 39%.

B Further results and robustness tests

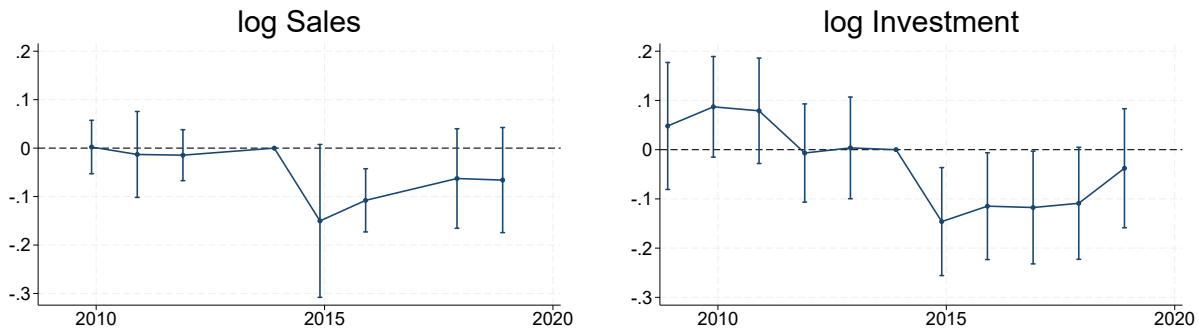

Figure 6: Event study: Exposed firms' (log) sales and (log) investment in the years around the exchange rate shock in 2015 relative to non-exposed firms.

Note: The figures show the differential effect of the exchange rate shock on log sales and log investment between exposed and non-exposed firms. Figure 3 in the main text depicts the event study for the years 2012 to 2017. For robustness, this figure shows the same event study graph for the years 2009 to 2019. In these graphs, the sample is not limited to the set of firms in the main difference-in-differences sample. The underlying regression is based on equation (7). The coeffcients in the plot correspond to $\beta_{2009}, ..., \beta_{2019}$.

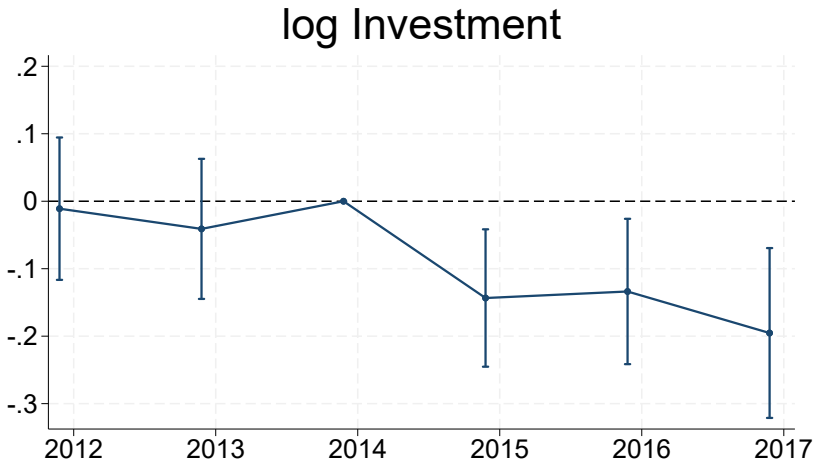

Figure 7: Event study with standardized import competition as exposure measure.

	(1)	(2)	(3)	(4)	(5)	(6)
	Δ Total investment (in logs)					
$Exposed_i$	-0.111*					
	(0.057)					
$Exposure_i$		-0.156***				
		(0.052)				
$Exporter_i$			-0.057			0.062
			(0.057)			(0.070)
$\widetilde{Import\ Share}_i$				0.018		0.021
				(0.030)		(0.030)
$\widetilde{Import\ Competition}_i$					-0.115***	-0.130***
					(0.030)	(0.037)
Observations	3,134	3,134	3,134	3,134	3,134	3,134

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Effects of various exposure measures on investment.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Δ Sales (in logs)				Δ Total investment (in logs)			
$Exposure_i$ (Exporter according to survey)	-0.115***				-0.190***			
	(0.043)				(0.055)			
$Exposure_i$ (Export threshold 0 CHF)		-0.159***				-0.182***		
		(0.047)				(0.059)		
$Exposure_i$ (Export threshold 10,000 CHF)			-0.144***				-0.153***	
			(0.044)				(0.054)	
Manufacturing				-0.081**				-0.228***
				(0.038)				(0.058)
Observations	1,524	1,557	1,557	1,557	3,028	3,134	3,134	3,134

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Alternative exposure definitions.

	(1)	(2)	(3)	(4)	(5)
	Total investment (in logs)	Total investment (in logs)	Total investment (in logs)	Invest (0/1)	Invest (0/1) alt.
Panel A					
$Post_t \times Exposure_i$	-0.142***			-0.001	-0.015
	(0.038)			(0.007)	(0.009)
$\mathbb{1}(\mathrm{T}_t = 2012) \times Exposure_i$		-0.053	-0.014		
		(0.058)	(0.063)		
$\mathbb{1}(\mathrm{T}_t = 2013) \times Exposure_i$		-0.026	0.000		
		(0.056)	(0.062)		
$\mathbb{1}(\mathrm{T}_t = 2015) \times Exposure_i$		-0.173***	-0.136**		
		(0.060)	(0.060)		
$\mathbb{1}(\mathrm{T}_t = 2016) \times Exposure_i$		-0.134**	-0.159**		
		(0.060)	(0.064)		
$\mathbb{1}(\mathrm{T}_t = 2017) \times Exposure_i$		-0.184***	-0.127*		
		(0.069)	(0.075)		
Panel B					
$Post_t \times Exposed_i$	-0.137***			0.006	-0.011
	(0.041)			(0.008)	(0.010)
$\mathbb{1}(\mathrm{T}_t = 2012) \times Exposed_i$		-0.051	-0.010		
		(0.055)	(0.059)		
$\mathbb{1}(\mathrm{T}_t = 2013) \times Exposed_i$		-0.048	-0.026		
		(0.051)	(0.056)		
$\mathbb{1}(\mathrm{T}_t = 2015) \times Exposed_i$		-0.189***	-0.153***		
		(0.054)	(0.054)		
$\mathbb{1}(\mathrm{T}_t = 2016) \times Exposed_i$		-0.160***	-0.167***		
		(0.058)	(0.061)		
$\mathbb{1}(\mathrm{T}_t = 2017) \times Exposed_i$		-0.174***	-0.140**		
		(0.063)	(0.068)		
Observations	19,780	19,780	15,294	26,508	30,918
Year fixed effects	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
Sample	All	All	Diff-in-Diff	All	All

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Robustness: Effects of the exchange rate shock on firm-level investment.

	(1)	(2)	(3)
	Δ Sales (in logs)	Δ Total investment (in logs)	Δ Employment (in logs)
Exposure_i	-0.129***	-0.070	-0.034**
	(0.047)	(0.053)	(0.017)
Young_i	0.076**	-0.002	0.044
	(0.036)	(0.092)	(0.034)
$\text{Exposure}_i \times \text{Young}_i$	-0.010	-0.535***	-0.061
	(0.084)	(0.185)	(0.068)
Observations	1,547	3,094	3,255

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Heterogeneous effects across various outcomes.

	(1)	(2)	(3)	(4)
	Corporate Risk Culture			
$\text{Female management}_i$	-0.838*			-1.187*
	(0.485)			(0.643)
Young manager_i		-0.013		0.000
		(0.338)		(0.339)
Old manager_i		0.307		0.238
		(0.335)		(0.338)
$\text{Tenure in management}_i$			0.013	0.020
			(0.024)	(0.027)
Constant	5.240***	5.154***	5.122***	5.114***
	(0.125)	(0.143)	(0.182)	(0.225)
Observations	569	491	569	491

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Corporate risk culture.