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# **THE TRANSMISSION OF MONETARY POLICY THROUGH CREDIT STANDARDS: EVIDENCE ON LOAN APPLICATION DISCOURAGEMENT IN THE EURO AREA**

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## **ABSTRACT**

This study examines the impact of monetary policy and its announcements on firms' loan application discouragement, operating through changes in credit standards. We merge firm-level data from the Survey on the Access to Finance of Enterprises (SAFE) with bank-level data from the Bank Lending Survey (BLS) for twenty-euro area countries, covering the period from the first half of 2009 to the second half of 2024. The findings indicate that, following a monetary policy-induced tightening of credit standards, firms with higher turnover, stronger credit records and more stable balance sheets exhibit a lower propensity to become discouraged from applying for loans. Conversely, firms with weaker characteristics are more adversely affected. Importantly, these effects persist even when the analysis is restricted to firms with a very low probability of loan rejection, indicating that monetary policy induces a self-restriction mechanism that operates in addition to the traditional credit supply channel.

**JEL:** D22, E44, E52, E58, G21, L25

**Keywords:** Monetary Policy, Euro Area, Firm Heterogeneity, Monetary Policy Transmission, Firms' Discouragement, Credit Standards

**Disclaimer:** The article expresses the views of the authors and not those of the Bank of Greece. We remain solely responsible for any errors and omissions.

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## 1. Introduction

The influence of central bank policies on firms has been extensively examined, with particular attention devoted to the mechanisms through which monetary policy is transmitted to the microeconomic environment. Existing literature typically investigates this transmission from both the borrowers' and lenders' perspectives, focusing on their behavioral responses to shifts in monetary conditions. On the supply side, studies emphasize how variations in interest rates and credit conditions shape the lending behavior of financial institutions. On the demand side, research explores firms' adjustments to monetary fluctuations, such as reductions in money demand in response to rising interest rates or balance sheet effects resulting from changes in financing costs. Notably, some firms may become self-rationed following monetary policy adjustments, indicating the existence of an additional "side effect" within the transmission process of monetary policy.

A substantial body of research investigates how monetary policy shapes firms' financing conditions and performance through a variety of transmission channels. Mishkin (1995) underscores the interest rate channel, illustrating that adjustments in policy rates directly affect the cost of capital and, consequently, the attractiveness of new investment opportunities. Bernanke et al. (1995) emphasize the credit channel, demonstrating that credit contractions tighten financing conditions for firms, thereby constraining investment, dampening growth, and reducing profitability. Through the asset price channel, Chirinko (1969) argues that monetary policy influences firms' investment behavior by altering equity valuations. Furthermore, Borio and Zhu (2012) identify the risk-taking channel, suggesting that contractionary monetary policy heightens banks' risk aversion, thereby restricting firms' access to external finance and weakening their overall performance.

In addition, the inflation channel - as highlighted by Taylor (1995), Nelson (2002), and Woodford (2003) - captures the way monetary policy influences firms through changes in inflation expectations and real balances. A contractionary policy that lowers inflation expectations can increase the real interest rate, thereby discourage investment and reducing firms' incentive to borrow. Finally, the exchange rate channel emphasizes that monetary policy affects firms via currency movements: a tightening of policy typically leads to currency appreciation, which undermines the competitiveness

of export-oriented firms while reducing the cost of imported inputs (Obstfeld and Rogoff, 1995; Taylor, 1995).

This paper contributes to the literature by demonstrating that, through the credit channel, monetary policy can indirectly influence firms' financing behavior via loan application discouragement. This self-rationing mechanism implies that even creditworthy firms may refrain from applying for external financing when they anticipate unfavorable lending conditions. Credit standards reflect the supply side of credit, whereas loan application discouragement captures part of the demand side of the credit market. Although a growing body of research investigates the determinants of loan discouragement, relatively few studies explicitly examine the role of monetary policy in shaping this phenomenon. Among the exceptions, Anastasiou et al. (2023) provide evidence that communications by the European Central Bank (ECB), such as policy speeches, can significantly affect the degree of loan discouragement among firms.

This study investigates the transmission of monetary policy shocks through bank credit conditions and their effects on firms' loan application discouragement. Following a contractionary monetary policy shock, banks tighten credit standards, making lending conditions more restrictive. As a result, firms become more likely to refrain from applying for bank loans due to an increased perceived probability of rejection. The analysis accounts for firm-level heterogeneity in discouragement responses by incorporating key characteristics such as firm size, age, turnover, and debt structure. Importantly, the results remain robust when the sample is restricted to firms with a very low ex ante probability of loan rejection. Overall, the findings indicate that monetary policy operates through credit standards to affect firms' discouragement rates, with the magnitude of the effect varying systematically across firm characteristics.

A further contribution of this research lies in the integration of three complementary datasets—the Survey on the Access to Finance of Enterprises (SAFE), the Bank Lending Survey (BLS), and a set of three alternative measures of monetary policy shocks developed by Romer and Romer (2004), Altavilla et al. (2019), and Anastasiou et al. (2023). The SAFE database, jointly conducted by the European Central Bank (ECB) and the European Commission, provides micro-level information on thousands of firms across the euro area, allowing for a detailed analysis of firm-level financing behavior.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on the transmission of monetary policy and its effects on firm-level borrowing discouragement. Section 3 describes the data and outlines their sources. Section 4 examines the relationship between monetary policy shocks and changes in credit standards. Section 5 presents the empirical strategy and results on how credit tightening driven by monetary policy affects firms' likelihood of becoming discouraged borrowers. Section 6 reports analogous results for credit tightening, focusing on firms that have lower probability of loan rejection alongside a comprehensive suite of robustness tests, which confirm the stability of our estimates across different model specifications. Section 7 concludes by summarizing the key findings and discussing implications for future research.

## **2. Literature**

The study of monetary policy and its transmission to firms constitutes a well-established yet continually evolving area of research, driven by the growing availability of granular data and advanced empirical methodologies. Understanding how firms respond to monetary shocks remains a central concern for both academic inquiry and policy formulation. Existing studies predominantly investigate how the impact of monetary policy varies according to firm-specific characteristics such as sector, age, turnover, and geographic location. The evidence consistently reveals substantial heterogeneity across these dimensions in terms of key firm-level outcomes, including profitability, investment behavior, and access to external finance.

### **2.1 Monetary policy and its impact on different types of firms**

Firm-specific characteristics play a critical role in shaping how monetary policy influences corporate behavior. Smaller firms, characterized by limited asset bases, restricted collateral, and lower cash flows, tend to exhibit greater sensitivity to monetary policy changes when making investment decisions. Using data on 35,000 Italian firms from 1989 to 1999, Gaiotti and Generale (2002) provide empirical evidence supporting this view. For the euro area as a whole, recent studies likewise suggest that younger firms are more responsive to monetary shocks in their investment behavior. Durante et al. (2022), employing firm-level data from 2000 to 2016 across major euro area economies—Germany, Italy, France, and Spain—and applying local projection methods with the three-month EONIA rate as the policy variable, find that

younger firms display stronger investment responses to monetary tightening. Similarly, Krussel et al. (2023) confirm the heightened sensitivity of younger firms to monetary policy shocks, arguing that older firms, being closer to their optimal scale, are consequently less affected. Drawing on data from euro area countries between 1999 and 2018, they employ local projection techniques using monetary shocks identified by Altavilla et al. (2019) to substantiate their findings.

With respect to sectoral heterogeneity, Peersman and Smets (2005) demonstrate that industries producing durable goods experience more pronounced effects of monetary policy on output growth. In a related analysis, Georgiadis (2015), using data from fourteen European economies between 1990 and 2009 and employing a Mixed Cross-Section VAR (MCS-VAR) approach, shows that countries with a higher concentration of interest-rate-sensitive sectors display stronger real activity responses following monetary tightening.

Finnegan and Kapoor (2023), using data from the Survey on the Access to Finance of Enterprises (SAFE) covering the period 2014–2019, examine the sensitivity of small and medium-sized enterprises (SMEs) to unconventional monetary policy (UMP) across euro area countries. Their findings indicate that SMEs are more responsive to UMP in economies characterized by higher levels of credit constraints. Moreover, firms with elevated debt-to-asset ratios in these countries are more likely to face financing difficulties. Interestingly, the authors observe that firms perceiving themselves as risky were not necessarily credit constrained during episodes of UMP. Despite the accommodative stance of unconventional measures, however, small and young firms remained persistently credit constrained, highlighting the limited effectiveness of UMP in alleviating financing frictions for these segments of the corporate sector.

Similar evidence is provided by Yalcin et al. (2004), who analyze a sample of 16,000 firms over the period 1990–2000. By distinguishing between sub-periods of monetary tightening and loosening, the authors demonstrate that younger firms, those with higher risk profiles, and those exhibiting greater leverage are particularly vulnerable to credit tightening. In a related context, Ottonello and Winberry (2020), using U.S. firm-level data spanning 1983–2014, show that monetary policy is less effective for high-risk firms—especially those characterized by higher debt ratios or weaker credit histories. Their results suggest that financial frictions and firm-specific

risk play a significant role in shaping the heterogeneity of monetary policy transmission across the corporate sector.

## **2.2 Firm Discouragement**

A growing body of research on the euro area has examined credit discouragement using firm-level data from the Survey on the Access to Finance of Enterprises (SAFE). Holton et al. (2014), using data from 2009 to 2011, find that financial conditions did not significantly affect credit demand but did influence credit supply—specifically, that heightened financial tensions reduced firms’ likelihood of obtaining credit. Similarly, Drakos and Giannakopoulos (2018), employing a trivariate probit framework for the 2009–2014 period, show that discouragement is primarily driven by banks’ past and expected future willingness to lend. Their model captures three stages of the credit process: whether a firm requires external finance, whether it applies for a loan, and whether the application is successful. Extending this line of inquiry, Kallandranis et al. (2023), using data from 2009 to 2018, identify substantial cross-country heterogeneity in both credit discouragement and rejection rates, reflecting persistent structural differences in financial markets across the euro area.

More recently, Anastasiou et al. (2024), analyzing survey data from 2009 to 2022, uncover a positive association between climate risk and borrower discouragement among SMEs. Their results indicate that firms with higher exposure to climate-related risks are more likely to refrain from applying for credit—despite being financially viable—owing to heightened uncertainty and perceived financing barriers. In a related context, Rostamkalaei (2016), drawing on UK data from the SAFE survey for 2011–2016, examines the long-term effects of credit tightening on SMEs and finds that a substantial share of investment-ready firms chose not to apply for loans due to discouragement, thereby delaying or suppressing investment activity.

In the U.S. context, Han et al. (2009), using data from the 1998 Survey of Small Business Finances (SSBF98), report that riskier firms are more likely to be discouraged from applying for credit, particularly in more concentrated banking systems. Interestingly, they find that longer financial relationships with lenders increase rather than mitigate discouragement among high-risk borrowers, suggesting that relationship banking may not always reduce perceived credit constraints. Similarly, Ferrando and

Mulier (2022), analyzing euro area data from 2010 to 2017, document that a considerable proportion of eligible firms opted not to apply for credit. Their results highlight a trade-off between expected returns and financing costs, whereby firms may forgo external funding when the perceived cost of borrowing exceeds anticipated profits.

Finally, evidence from emerging and developing economies provides complementary insights. A multi-country study covering Brazil, China, Eritrea, Ethiopia, Honduras, India, Kenya, Pakistan, Tanzania, and Uganda shows that older and larger firms are less likely to experience credit discouragement Chakravarty and Xiang (2013). In these contexts, firm-specific attributes—such as size, age, and access to information—play a more decisive role in shaping borrowing behavior than in advanced financial systems.

### **2.3 Monetary Policy and Discouragement**

The literature directly linking monetary policy to borrowers' loan application discouragement remains relatively scarce, though several recent studies provide valuable insights into this emerging area. Ladeira (2023) investigates how U.S. consumers become discouraged from borrowing following episodes of monetary tightening. The study argues that such discouragement attenuates the effectiveness of the credit channel, thereby reducing the overall transmission of contractionary policy. Specifically, even in the absence of binding financial constraints, many households choose not to apply for credit, a behavioral response that dampens the intended contraction in credit demand. In the euro area context, Anastasiou et al. (2023), using Survey on the Access to Finance of Enterprises (SAFE) data from 2009 to 2018, identify a negative relationship between the sentiment conveyed in European Central Bank (ECB) communications and borrower discouragement. In other words, more positive or reassuring ECB speeches are associated with lower levels of discouragement among firms, suggesting that central bank communication can mitigate perceived credit frictions and influence borrowing behavior. Complementary to this line of research, Ahrens et al. (2025) apply supervised machine learning and natural language processing to quantify the tone of U.S. Federal Reserve speeches, showing that speech-implied forecast revisions significantly affect financial market volatility and tail risks. Similarly, Czudaj and Nguyen (2025) employ a dictionary-based text analysis of ECB press

conferences to construct hawkish and dovish sentiment indicators, demonstrating that these communication tones predict short-term interest rates, inflation expectations, and policy transmission dynamics. Together, these studies highlight the growing relevance of text-based methods in identifying how central bank communication shapes both market behavior and credit-related outcomes.

### **3. Data**

To investigate the impact of monetary policy on firms' borrowing discouragement, this study employs micro-level data from the Survey on the Access to Finance of Enterprises (SAFE). This dataset provides firm-level information for countries within the European Union and is jointly conducted by the European Central Bank (ECB) and the European Commission. The survey has been administered biannually since 2009, capturing detailed information on firms' financing conditions and perceptions over time. For the purposes of this analysis, we use a subsample comprising firms from the 20 euro-area countries, covering 32 survey waves from 2009H1 to 2024H2. After excluding observations with missing values in the key variables of interest, the final analytical sample consists of approximately 280,000 firm-wave observations. Figures 1 and 2 illustrate the distribution of firms across countries and survey waves, respectively.<sup>1</sup>

**[Insert Figures 1 and 2 here]**

#### **3.1 Dependent variable**

To examine the impact of monetary policy shocks on borrowing discouragement, we focus on firms that report a need for external finance but refrain from applying due to a perceived likelihood of rejection, following the approach of Anastasiou *et al.* (2023, 2024). Accordingly, we restrict our analysis to the subsample of firms that respond affirmatively to Question Q20 of the SAFE survey: “*If you need external financing to realise your growth ambitions, what type of external financing would you prefer most?*” Specifically, we utilize item Q20\_1, which pertains to the need for bank loans. Based

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<sup>1</sup> For Descriptive Statistics see Section A in the Supplementary Appendix

on this information, we construct a dichotomous variable  $N_i$  that classifies each firm  $i$  according to whether it reports a need for a bank loan or not.

$$N_i = \begin{cases} 1, & \text{firms who need bank loan} \\ 0, & \text{Otherwise} \end{cases} \quad (1)$$

We also employ Question Q7A from the SAFE survey, which asks: “*Have you applied for the following types of financing during the current quarter?*” Specifically, we focus on sub-question Q7A\_a, which refers exclusively to bank loans. This question offers four possible responses: (1) *Applied*; (2) *Did not apply because of possible rejection*; (3) *Did not apply because of sufficient internal funds*; and (4) *Did not apply for other reasons*. Following standard practice in the literature, we distinguish between firms that report not applying for a bank loan due to possible rejection and those that select any other response category. Based on this classification, we construct the dependent variable  $D_i$ , which identifies each firm  $i$  as either *discouraged* (if it did not apply due to fear of rejection) or *non-discouraged* (otherwise).

$$D_i = \begin{cases} 1, & \text{firm needs loan, but did not apply because of fear of rejection} \\ 0, & \text{Otherwise} \end{cases} \quad (2)$$

### 3.2 Control variables

In addition to monetary policy variables, we incorporate several firm-specific characteristics that may influence the likelihood of borrowing discouragement. Previous studies (e.g., Chakravarty & Xiang, 2009) suggest that older and larger firms are less likely to be discouraged from applying for external finance. To capture firm size, we use the categorical variable  $DI$ , which classifies firms into four groups: micro (1–9 employees), small (10–49 employees), medium (50–249 employees), and large (more than 250 employees). Firm age is represented by the variable  $D5$ , which categorizes firms according to their registration period: 0–2 years, 2–5 years, 5–10 years, and more than 10 years since establishment.

A firm’s sector of activity, turnover, and ownership structure may also affect its propensity toward borrowing discouragement (Drakos & Giannakopoulos, 2011). The sectoral classification is captured by variable  $D3$ , which distinguishes between four main sectors: Construction, Industry, Trade, and Services. Annual turnover is

represented by variable *D4*, which divides firms into six categories: (i) up to €500,000; (ii) €500,000–€1 million; (iii) €1–2 million; (iv) €2–10 million; (v) €10–50 million; and (vi) above €50 million. Ownership status is captured by *D6*, a dichotomous variable distinguishing between sole proprietorships and all other ownership types.

Since financially riskier firms are more likely to exhibit borrowing discouragement (Han et al., 2009), we control for indicators of financial vulnerability. Specifically, we include *Q2\_j* and *Q11\_e*, which measure the firm’s debt-to-asset ratio and credit history, respectively, both referring to the last quarter. These variables are categorical, with three possible responses each: *increased*, *unchanged*, or *decreased* for the debt-to-asset ratio, and *improved*, *unchanged*, or *deteriorated* for credit history.

Finally, to capture the broader economic environment, we include as a categorical variable the survey question *Q11\_a*, which asks firms about their expectations regarding the overall economic outlook (Ferrando and Mulier, 2022). The possible answers are *improved*, *unchanged*, or *deteriorated*.

### 3.3 Credit Standards

In this analysis, the credit standards indicator serves as the principal independent variable. Prior to introducing the monetary policy variables, we first assess the broader macroeconomic implications of credit tightening. The indicator is developed by the European Central Bank (ECB) based on data from the Bank Lending Survey (BLS). It reflects the net percentage of banks reporting changes in credit standards, encompassing aspects such as collateral requirements, loan maturities, and leverage constraints. The index is calculated as the net percentage, defined as the difference between the frequency of banks reporting a tightening and those reporting an easing of credit conditions. Positive values therefore indicate a net tightening of credit standards. Importantly, this measure specifically pertains to lending conditions for small and medium-sized enterprises (SMEs).

Two variants of the indicator are employed in the analysis: one capturing the realized change in credit standards during the previous quarter, and another representing banks’ expectations for the subsequent quarter. Since the BLS data are reported

quarterly, we aggregate the values by averaging the two quarters within each half-year to obtain semi-annual observations.

As illustrated in Graph 3, credit standards increased sharply during the Global Financial Crisis of 2008, reaching their peak for the entire sample period. Subsequently, they declined and stabilized around zero, with a temporary tightening episode observed around 2012. From that point onward, credit standards generally remained below or close to zero. During the COVID-19 pandemic, a brief tightening was followed by a rapid easing. Beginning in 2021, credit standards rose once more reflecting the transmission of restrictive monetary policy, before gradually easing again toward zero after 2023.

**[Insert Figure 3 here]**

### **3.4 Definition of Monetary Policy Shock**

A key methodological concern in this analysis relates to the potential endogeneity between monetary policy and the macroeconomic environment. Since economic conditions can influence policy decisions, the monetary policy variable must be defined in an exogenous manner, independent of contemporaneous economic fluctuations. To address this issue, we follow the approach proposed by Romer and Romer (2004) and later applied by Murgia (2020), employing a Taylor-rule-based framework that decomposes interest rate movements into a *systematic* component—reflecting the predictable response of monetary policy to macroeconomic conditions—and an *exogenous shock* component, which captures unexpected policy actions unrelated to current economic developments.

$$S_m = f(\Omega_m) + \varepsilon_m \quad (3)$$

Formally, let  $\Omega_m$  denote the information available to the central bank at each ECB meeting, and let  $f(\bullet)$  represent the systematic component of monetary policy decisions. The monetary policy shock is then captured by the regression residual  $\varepsilon_t$ , which

corresponds to the *non-systematic* or *exogenous* component. By isolating this residual term in equation (3), we obtain the exogenous portion of monetary policy, which can subsequently be employed as an instrumental variable in the empirical analysis.

Following the approach of Murgia (2020), the systematic component incorporates the Euro Area's one- and two-year-ahead GDP and inflation projections, as well as their respective revisions. These revisions are defined as the first differences between the one- and two-year projections, thereby capturing how updates in forecasts reflect evolving expectations about macroeconomic conditions. In addition, the model includes the unemployment rate at meeting  $m$ , the level of total assets held by the ECB, and the interest rate observed fourteen days prior to each policy meeting.

As an alternative measure of monetary policy shocks, we also adopt the methodology of Altavilla et al. (2019), utilizing their database of median yield changes within a 30-minute window before and after each monetary policy announcement. Within this high-frequency event-study framework, we define monetary policy shocks (MPS) as changes in the three-month overnight index swap (OIS) rates that are negatively correlated with movements in the EURO STOXX 50 index across policy events, consistent with the identification strategy of Jarociński and Karadi (2020) and Holm-Hadulla *et al.* (2022).

Finally, to incorporate the informational content of central bank communication, we employ the European Central Bank's (ECB) speeches dataset, comprising 2,815 speeches delivered between January 2000 and December 2024. We extract sentiment information through textual analysis following Schmeling and Wagner (2025) and Anastasiou *et al.* (2023). The preprocessing stage involves removing common stop words (e.g., "is," "on," "the," "at"). For each relevant term, we analyze a five-word window surrounding it and count the number of positive and negative sentiment words, as classified by the Loughran and McDonald (2011) financial sentiment dictionary. This procedure allows for a systematic quantification of the tone embedded in ECB communications. Based on this, we construct a monthly sentiment index, defined as the net count of positive minus negative words divided by the total number of words per speech. To ensure stationarity, the sentiment series is transformed by first differencing.

$$MPsentiment = \frac{Positive - Negative}{Positive + Negative} \quad (4)$$

Figure 4 presents the three types of monetary policy shocks at a monthly frequency. The figure illustrates that, prior to the Global Financial Crisis, the tone of monetary policy communications generally fluctuated around zero, indicating a neutral sentiment. Following the crisis, the sentiment index declined markedly, entering negative territory. The subsequent two measures of monetary policy shocks also oscillate around zero over most of the sample period; however, a pronounced increase is observed after the COVID-19 pandemic, reflecting the tightening stance of monetary policy during that period.

**[Insert Figure 4 here]**

All variables originally recorded at higher frequencies (monthly or quarterly) were converted to a semiannual frequency to ensure consistency with the SAFE dataset. Specifically, the monetary policy shock (MPS) series, initially available at a monthly frequency, was aggregated to a semiannual level by summing the monthly observations within each six-month period. Similarly, the Bank Lending Survey (BLS) data were adjusted to match the semiannual frequency of the SAFE dataset. This aggregation procedure enables direct comparability across datasets and ensures that all variables are expressed on a consistent temporal scale. In practice, the transformation involved computing the mean value of credit standards and summing the monetary policy shocks for each semiannual interval.

## **4.The effects of monetary policy on credit standards**

### **4.1 Methodology**

First, we estimate the relationship between monetary policy and banking credit standards, using monetary policy shocks. The underlying assumption is that a tightening of monetary policy induces stricter credit standards (Ciccarelli et al.,2015). To empirically assess this relationship, we employ the local projection method proposed

by Jordà (2005), which allows for the estimation of the dynamic effects of monetary policy shocks on both backward- and forward-looking measures of credit standards.

$$CS_{c,t+h} = \alpha_0 + \sum_{j=0}^6 \beta_j MPS_{t-j} + \sum_{j=0}^6 \delta_j CS_{c,t-1} + \sum_{i=1}^3 \gamma_i Controls_{c,t} + u_t \quad (5)$$

In Equation (5), the monetary policy shock (MPS) is introduced using three alternative identification strategies. First, we follow the narrative approach of Romer and Romer (2004); second, we apply the high-frequency identification method developed by Altavilla *et al.* (2019); and third, we employ the monetary policy speech sentiment index as an alternative measure of policy stance. The set of control variables includes key banking sector indicators retrieved from the ECB Data Portal—specifically, the aggregate return on equity (ROE), the loans-to-deposits ratio (LDR), and total assets. In addition, we control for six lag of the credit standards (CS) variable. For the monetary policy shock, we include six lags<sup>2</sup>. The local projections are estimated separately for backward-looking and forward-looking measures of credit standards.

The monthly monetary policy shocks are aggregated to a quarterly frequency by summing their values within each quarter. This transformation allows the projection horizons to be expressed in quarters and ensures consistency with the frequency of the credit standards indices obtained from the Bank Lending Survey (BLS).

#### 4.1 Results

Using the local projection framework, the results indicate that monetary policy exerts a significant and persistent influence on the future evolution of credit standards. In response to a 100-basis-point increase in the Romer and Romer (R&R) monetary policy shock, backward-looking credit standards rise cumulatively by approximately 5%, while forward-looking credit standards increase by nearly 10% after two years (see Figures 5 and 6). When the OIS swap yield is used to identify monetary policy shocks, the estimated effects are substantially larger: credit standards increase cumulatively by

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<sup>2</sup> For Instrument significance see Section B in the Supplementary Appendix

around 40% and 30% for the backward- and forward-looking measures, respectively, over the same two-year horizon (see Figures 7 and 8).

Finally, when the Monetary Policy Sentiment (MPS) Index increases by 100 basis points—reflecting a more positive or dovish monetary stance—backward- and forward-looking credit standards decline cumulatively by approximately 20% and 50%, respectively, within fifth quarters (see Figures 9 and 10). After roughly two years, these effects gradually revert toward zero, indicating a mean-reverting adjustment in banks’ credit policies. Overall, these findings suggest that monetary policy shocks, regardless of their identification method, have economically meaningful and temporally persistent effects on banks’ lending behavior and overall credit supply conditions.

**[Insert Figures 5-10 here]**

## **5. The effects of credit standards through monetary policy on the probability of discouragement**

### **5.1 Methodology**

In the first stage of the analysis, we estimate the effect of monetary policy on credit tightening, followed by an assessment of its impact on firms’ borrowing discouragement. Given that credit standards are potentially endogenous and influenced by monetary policy, we use two lags of the extracted shocks as instruments and estimate equation (7), incorporating the predicted values obtained from equation (6). The choice of lag length is informed by the first-stage regression diagnostics and is consistent with the literature on the delayed transmission of monetary policy effects (Romer and Romer, 2004; Finnegan and Kapoor, 2023). The inclusion of additional lags beyond the second did not produce statistically significant coefficients and considerably reduced the number of available observations. Further details regarding the treatment of monetary policy lags, along with robustness checks based on alternative lag specifications, are provided in the Supplementary Material (Appendix Section D).

$$CS_{c,t} = \delta_0 + \sum_{j=0}^2 \delta_j MPS_{t-j} + \widehat{u}_{c,t} \quad (6)$$

$$\begin{aligned}
& \text{Prob}(D_{i,j,t} = 1 \mid N = 1) \\
& = a_0 + \beta_1 \widehat{CS}_{c,t-1} + \sum_1^M \beta_n \text{Controls}_{i,j,t} \cdot \widehat{CS}_{c,t-1} + \sum_1^M \gamma_n \text{Controls}_{i,j,t} \\
& + \text{TIME} + c_j + \varepsilon_{i,j,t} \quad (7)
\end{aligned}$$

In the proposed model,  $i$ ,  $j$ , and  $t$  denote firm, country, and time indices, respectively. The dependent variable  $D_{i,j,t}$  represents the probability that firm  $i$  in country  $j$  at time  $t$  is discouraged from applying for external financing. The main explanatory variable of interest is the lagged predicted credit standards index ( $\widehat{CS}_{t-1}$ ), capturing the extent of credit tightening induced by time lags of monetary policy tightening.

The model also controls for a range of firm-specific characteristics, including firm size, age, sector of activity, ownership type, annual turnover, credit history, and debt-to-asset ratio, as well as firms' perceptions of the broader economic environment. Country-specific fixed effects ( $c_j$ ) are incorporated to account for unobserved heterogeneity across countries, while a time trend ( $\text{TIME}_t$ ) captures common temporal dynamics. Finally, to explore potential heterogeneity in the impact of credit standards, we include interaction terms between ( $\widehat{CS}_{t-1}$ ) and selected firm-level characteristics.

## 5.2 Results by Romer & Romer shocks

When forward-looking credit standards tighten due to monetary policy, an increase in loan application discouragement is observed. More specifically, a 1% increase in forward-looking credit standards driven by monetary policy tightening raises the probability that firms become discouraged borrowers by 0.26 percentage points, on average. Conversely, when firms' outlook on the economic environment improves, their discouragement about applying for loans tends to decline. The results also reveal that, once monetary policy shocks are used as instruments, sectoral affiliation, firm age, and ownership structure do not exert a statistically significant influence on firms' loan application discouragement. Instead, firm-specific

characteristics—particularly size, turnover, and creditworthiness—emerge as the dominant determinants.

Firm heterogeneity plays a central role in shaping credit access dynamics. Larger firms exhibit substantially lower levels of discouragement relative to smaller enterprises. Firms with annual turnover between €10–50 million are significantly less likely to be discouraged compared to those with turnover below €500,000. Likewise, medium- and large-sized firms demonstrate greater resilience against discouragement than micro-enterprises, especially when expectations of future credit tightening are considered.

Financial structure also contributes notably to variations in discouragement behavior. Firms with higher debt-to-asset ratios are more likely to experience discouragement, suggesting that greater leverage heightens perceived financing constraints. Conversely, firms with stronger credit histories are less discouraged, underscoring the mitigating role of established creditworthiness in overcoming informational frictions and maintaining access to bank financing.

**[Insert Table 1 here]**

When credit standards tighten due to monetary policy, there is notable heterogeneity in the resulting impact on firms' probability of becoming discouraged borrowers. Firms with higher turnover consistently exhibit lower levels of borrowing discouragement after credit tightening induced by monetary policy, relative to firms with lower turnover. Firms with annual turnover between €2 million and €10 million are 2 percentage points less discouraged than those with turnover below €500,000 following a 1% increase in credit standards induced by monetary policy, and 1 percentage point less discouraged after a rise in forward-looking credit standards. Firms with turnover between €10 million and €50 million are 1.1 percentage points less discouraged after a backward-looking credit standards tightening driven by monetary policy. This finding contrasts with conventional evidence suggesting that larger firms are typically less financially constrained and less sensitive to monetary policy transmission, as documented by Gertler and Gilchrist (1994). More specifically, this relationship does not appear to be linear. Very large firms do not exhibit a further decline

in discouragement. Instead, the pattern is hump-shaped, with medium- to large-turnover firms showing the lowest levels of discouragement, particularly following the tightening episode. This may reflect a combination of factors: compared with very large firms, these firms tend to have greater external financing needs (Robb, 2002), while at the same time they may feel more confident in accessing credit than small and micro firms. In contrast, when firm size is proxied by the number of employees, the pattern is no longer significant. And the firms' age also seem to not create heterogeneity in the credit tightening impact followed by monetary policy tightening.

Finally, credit history quality remains a key determinant of discouragement, even in the presence of monetary policy shocks. Firms with stronger credit histories generally exhibit greater confidence and are less discouraged in response to contractionary monetary shocks transmitted through forward-looking credit standards than those with weaker credit profiles. Under backward-looking credit standards, firms with improved or unchanged credit histories are 1 and 1.23 percentage points less discouraged, respectively. When forward-looking credit standards are considered, the corresponding reductions are 0.43 and 0.67 percentage points. These findings align with Berger and Udell (1995), who emphasize that firms with established credit relationships face fewer financing frictions and are less likely to self-ration their demand for credit.

Following a monetary policy tightening, firms whose debt-to-asset ratios remained stable exhibit lower discouragement compared to those that reduced their leverage. This suggests that firms with stronger balance sheets and stable financial positions are less affected by tightening credit conditions, consistent with the balance-sheet channel of monetary policy (Bernanke & Gertler, 1989; Bernanke, Gertler & Gilchrist, 1996). By contrast, firms in a deleveraging phase may reduce their debt exposure as a precautionary response to anticipated credit constraints, a behavior consistent with the signaling effects of credit rationing and self-selection (Stiglitz & Weiss, 1981). This sensitivity is likely amplified by a diminished appetite for new investment projects; as these firms prioritize balance sheet repair over expansion, they are more prone to discouragement since the opportunity cost of withdrawing from the credit market is relatively low. Our findings suggest that while stable leverage ratios bolster resilience, the combination of active deleveraging and low investment demand intensifies a firm's response to monetary signals, leading to higher rates of self-induced discouragement.

**[Insert Tables 2-6 here]**

### **5.3 MP Sentiment Index as robustness check**

When the monetary policy speech sentiment measure from Anastasiou et al. (2023) is employed as a robustness check, the results remain largely consistent with the baseline estimations. Larger firms, measured by their turnover, tend to be less discouraged when adverse sentiment in monetary policy communication is transmitted through stricter credit conditions. Similarly, firms with stronger credit histories appear more resilient, displaying lower levels of discouragement under the same conditions.

Significant heterogeneity in discouragement is observed with respect to firms' debt-to-asset ratios following credit tightening induced by negative monetary policy communication. Firms that maintained a stable debt-to-asset ratio appear to be less discouraged by such credit tightening compared to those whose ratios fluctuated. Overall, these findings suggest that the sentiment embedded in central bank communications shapes firms' perceptions of credit availability primarily through channels related to firm size and creditworthiness, while firm age plays a comparatively minor role. The results are replicated using a dummy variable for positive and negative speeches as an instrument, as reported in the Supplementary Material Appendix (Section F).

**[Insert Tables 7-12 here]**

### **5.4 3 Month OIS Swap Yield Shocks as Robustness check**

The baseline results are consistent with previous findings, while the new evidence obtained using the monetary policy shock measure of Altavilla et al. (2019) underscores the pivotal role of monetary policy in shaping firm-level borrowing discouragement. Specifically, when firm size is measured by their annual turnover, larger firms appear less discouraged following a tightening of monetary policy that is transmitted through credit standards. When monetary policy is captured through three-month OIS swap yields and transmitted via credit standards, older firms appear to be less affected by discouragement compared to younger firms.

Regarding financial characteristics, the analysis indicates that when a restrictive monetary policy results in tighter credit standards both forward-looking and backward-looking, firms with improved credit histories are less adversely affected by such tightening and exhibit lower levels of discouragement. Furthermore, firms undergoing active deleveraging during periods of monetary tightening exhibit a significantly higher propensity for discouragement.<sup>3</sup>

**[Insert Table 13 here]**

## **6. Robustness checks: evidence from non-risky firms**

A primary challenge in identifying the behavioral impact of monetary policy lies in disentangling the distinct channels through which it affects firm discouragement. There are three primary mechanisms: **(i)** a direct discouragement effect, whereby monetary tightening dampens business sentiment and macroeconomic expectations, prompting a behavioral withdrawal independent of specific bank actions. **(ii)** the classic credit supply channel, representing the objective side of transmission where tighter policy leads to a contraction in credit supply and the actual exclusion of firms through outright loan rejections; and **(iii)** a signal-induced discouragement channel, where monetary policy tightening is transmitted through credit standards. In this mechanism, the tightening of current or anticipated standards acts as a critical signal regarding banks' shifting risk appetite and the broader credit environment. This informational content prompts even creditworthy firms to proactively self-restrict their demand and engage in precautionary withdrawal, fearing future rejection despite their objective eligibility.

To isolate our proposed mechanism, the signal-induced discouragement from the traditional credit channel, it is essential to determine whether firms that are unlikely to be rejected by banks still exhibit a behavioral withdrawal following a policy shock. If monetary policy causes discouragement even among creditworthy firms that would otherwise be financed, it indicates a significant side effect that exists independently of actual credit supply constraints.

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<sup>3</sup> The tables of results are reported in Section C of the Supplementary Appendix.

## 6.1 Methodology

Subsequently, we restrict the analysis to a subsample of firms for which loan rejection is ex ante unlikely. To this end, we estimate an additional equation (8) using question Q7B\_a as the dependent variable: “*If you applied for or tried to negotiate for this type of financing during the current quarter, what was the outcome?*”. Firms are classified according to whether the reported outcome was a loan rejection or not. Using firm-level characteristics, country controls, and indicators of the economic outlook, we estimate each firm’s probability of rejection. This predicted probability is then used as a threshold to distinguish firms that would be able to obtain bank credit (even if they did not apply) from those that could plausibly be rejected by banks.

$$\text{Prob}(\text{Q7B}_{i,j,t} = 1 \mid N = 1) = \alpha_0 + \sum_1^M \gamma_n \text{Controls}_{i,j,t} + \text{TIME} + c_j + \varepsilon_{i,j,t} \quad (8)$$

After estimating the rejection probability for each firm, we compute its median and retain the lower half of the distribution. This procedure allows us to identify firms with the characteristics discussed above that could become discouraged following a monetary tightening, despite being likely to obtain bank financing if they applied. The median estimated rejection probability is 5.99%, indicating that even prior to sample restriction firms face a low likelihood of rejection (see Figure 11). We then re-estimate the probit model specified in equation (7) using this restricted sample.

**[Insert Figure 11 here]**

## 6.2 Results

Alternative estimations that account for monetary policy–driven changes in credit standards indicate that credit tightening has a statistically significant effect on firms’ likelihood of becoming discouraged from applying for bank loans, operating through forward-looking credit standards. Importantly, focusing on firms with a low ex ante probability of rejection, the results show that anticipated monetary tightening discourages even those firms that are likely to obtain bank credit from seeking loans. Moreover, firm-specific characteristics play a decisive role in shaping this probability.

Within this group of firms, age emerges as a significant determinant of discouragement: firms aged 5–10 years and those older than 10 years are less likely to be discouraged than younger firms. Firms operating in the industrial sector also exhibit lower levels of discouragement. In addition, firm size matters: larger firms, measured by the number of employees, are less likely to be discouraged. Small (10–49 employees), medium-sized (50–249 employees) and large (over 250 employees) enterprises display lower levels of discouragement compared with micro firms (1–9 employees).

In contrast, financial characteristics do not play a significant role in this subsample. Firms experiencing an increase in their debt-to-asset ratio or an improvement in their credit history do not exhibit significantly higher or lower levels of discouragement.

**[Insert Table 14 here]**

When the credit standards predicted by monetary policy are interacted with firm characteristics, we observe almost the same transmission on discouragement. First for size according to labor force and credit history trend do not indicate any heterogeneity in the transmission.

For backward-looking credit standards, we observe that very old firms exhibit a larger increase in discouragement following a monetary tightening, whereas very young firms do not. One possible interpretation is that younger firms inherently face stronger financing needs and constraints, making them less responsive in terms of discouragement when credit standards tighten. Empirical research has shown that younger and smaller firms typically rely more on external finance because their internal resources are insufficient to support growth and investment, especially at early stages of development (Robb, 2002). These younger firms also tend to be more opaque to lenders and have less established credit histories and collateral, which exacerbates their financing constraints relative to older, more established firms.

In contrast, older firms often have accumulated tangible assets, more stable cash flows, and longer credit histories, making them more sensitive to changes in credit

standards: when banks tighten criteria, these firms may adjust behavior (e.g., delaying projects or refraining from loan applications) because they are otherwise capable of obtaining finance but respond to tightened conditions by self-restriction. This interpretation is consistent with life-cycle models of firm finance, which posit that as firms mature they become less financially constrained and more responsive to variations in external funding conditions.

Firm size measured by turnover also exhibits heterogeneous effects within the subsample of non-rejectable firms. Following a credit tightening, firms with annual turnover between €1–2 million and €2–10 million are less likely to become discouraged compared with firms with turnover below €500,000. Consistent with the previous analysis, we observe a hump-shaped relationship, whereby firms in the middle of the size distribution display the lowest levels of discouragement. By contrast, very small and very large firms appear less resilient to increases in credit standards driven by monetary policy.

Finally, changes in the debt-to-asset ratio are significant in explaining firms' self-restriction following a monetary policy shock transmitted through the banking sector. Firms undergoing deleveraging, i.e., those that experience a decline in their debt-to-asset ratio exhibit higher levels of discouragement after a credit tightening, whereas firms with stable or increasing leverage are less likely to become discouraged. This pattern is consistent with a balance-sheet channel interpretation: firms that do not face pressing financing needs or that are actively improving their balance-sheet position may be more inclined to self-restrict in response to tighter credit conditions. By contrast, an increase in leverage likely reflects stronger investment demand and greater financing needs, which may enhance firms' resilience to discouragement following monetary tightening.

**[Insert Tables 15 - 19 here]**

### 6.3 Additional robustness checks

To further ensure the robustness of our findings, we employ an alternative identification strategy to isolate non-risky firms.<sup>4</sup> Specifically, we restrict our sample to firms that successfully obtained credit in the preceding period, thereby filtering out those with a recent history of rejection. Simultaneously, we implement a Heckman selection model, incorporating the Inverse Mills Ratio (IMR) as a control variable. This approach allows us to formally account for selection bias and control for the latent probability of rejection as determined by firm-specific characteristics, ensuring that our estimates are not driven by unobserved credit risk.

The results remain qualitatively unchanged, confirming that monetary tightening, channeled through forward-looking credit standards acts as a significant driver of firm discouragement. Our findings further reveal key heterogeneities: mid-sized firms (turnover between €2-10 million) and those with stable credit histories exhibit greater resilience, being significantly less prone to self-restriction following a policy shock. Notably, firms maintaining a stable debt-to-asset ratio are less discouraged than those actively deleveraging during tightening phases. This suggests that firms in a defensive financial posture are more sensitive to the signaling effect of credit standards, even when their objective risk remains low.

Furthermore, for the baseline results in section 5, is conducted alternative analysis using Heckman test for selection bias. The main idea is that in general we use only firms that need financing, this can cause bias of selection. For that reason, we select all the sample, and we estimate the probability of a firm to need bank loan according to its characteristics. We normalize this probability (Inverse Mills Ratio), and we include it in our estimations to control for this factor of needing financing.

Our robustness tests yield results consistent with the baseline analysis. Specifically, mid-sized firms (turnover between €2–10 million) exhibit greater resilience, showing a significantly lower propensity for discouragement following a monetary policy-induced tightening of backward-looking credit standards. Furthermore, we find that a firm’s credit trajectory is a crucial determinant of its response: firms with **improving** credit histories are substantially less likely to become

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<sup>4</sup> The robustness checks discussed in this section are presented in the Supplementary Appendix, see Sections E and F.

discouraged after a tightening shock compared to those with deteriorating credit profiles.

## **7. Conclusion**

This study investigates the transmission of European Central Bank (ECB) monetary policy to firm-level borrowing behavior through the channel of banking credit standards, with a particular focus on the phenomenon of loan application discouragement. By combining micro data from the Survey on the Access to Finance of Enterprises (SAFE) and the Bank Lending Survey (BLS) with several measures of monetary policy shocks, the analysis provides novel evidence on how monetary tightening indirectly shapes firms' perceptions of credit availability and their willingness to seek external financing.

The results demonstrate that monetary policy exerts a statistically and economically significant influence on bank lending conditions across the 20 euro area countries. This finding aligns with earlier evidence by de Haan and Sterken (2006) and Ciccarelli, Maddaloni, and Peydró (2015), who show that monetary policy shocks transmit strongly through bank credit standards and influence firms' financing behavior. In turn, these changing credit conditions play a critical role in determining whether firms self-restrict from applying for bank loans. The component of credit standards directly affected by monetary policy emerges as a key determinant of borrowing discouragement. When the Romer and Romer (2004) monetary policy shock is used as an instrument, notable heterogeneity arises in firms' resilience to contractionary policy: higher-revenue, more creditworthy, and actively leveraging firms exhibit substantially lower levels of discouragement compared to smaller and riskier counterparts. Various robustness checks were performed, and our core findings remain qualitatively and quantitatively consistent across all specifications.

The robustness analysis, employing the alternative monetary policy shock measure developed by Altavilla et al. (2019) and the Monetary Policy Sentiment Index, yields broadly consistent results. Moreover, when the sample is restricted to firms that can obtain bank loans, the effects remain statistically significant. This finding indicates that monetary policy can induce discouragement through changes in credit standards even among firms that would likely receive financing if they applied. Such an effect

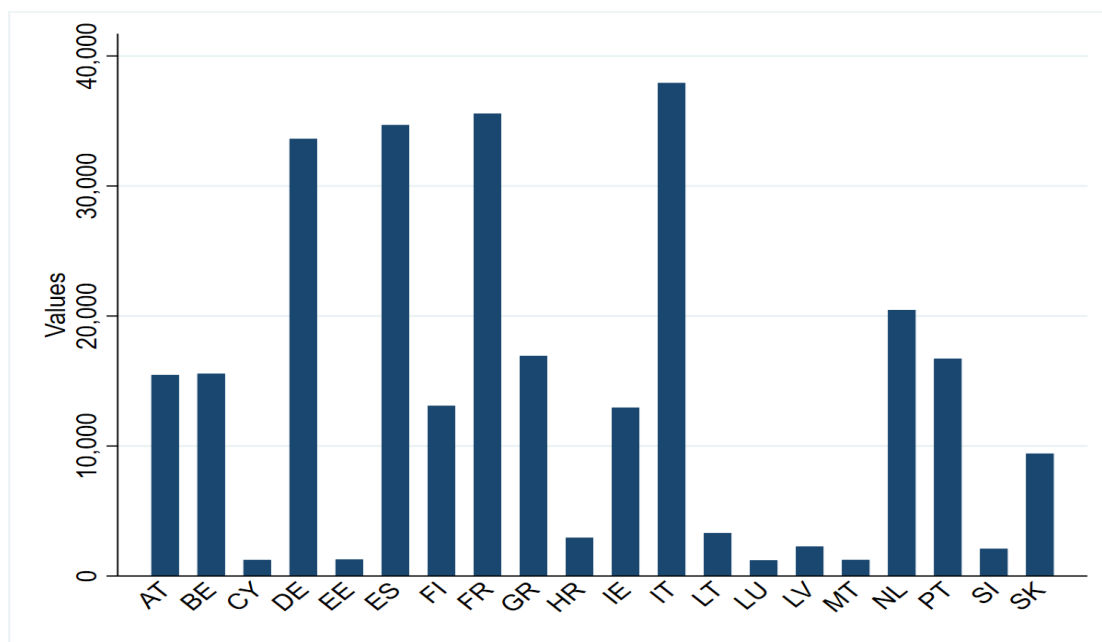
appears distinct from the traditional credit supply channel and points instead to a self-restriction mechanism driven by discouragement.

Taken together, these results extend the existing literature by highlighting an underexplored mechanism through which monetary policy affects firms, not only by constraining credit supply, but also by shaping firms' perceptions and expectations regarding loan approval. This behavioral channel introduces a psychological and informational dimension to the traditional credit channel, emphasizing that monetary tightening can discourage firms from applying for external financing, particularly those with weaker fundamentals or lower levels of financial inclusion.

From a policy perspective, the findings underscore the heightened vulnerability of financially constrained firms during periods of restrictive monetary policy. To mitigate the disproportionate discouragement experienced by such firms, policymakers should monitor both the aggregate monetary stance and the financial health of the banking sector, as constraints in capital and liquidity can amplify localized credit withdrawal even in the absence of policy rate changes. Strengthening targeted credit programs and expanding guarantee schemes could help preserve credit access for younger, smaller, and riskier firms, enhancing financial inclusion and ensuring that monetary policy adjustments do not inadvertently deepen financing inequalities across the corporate sector.

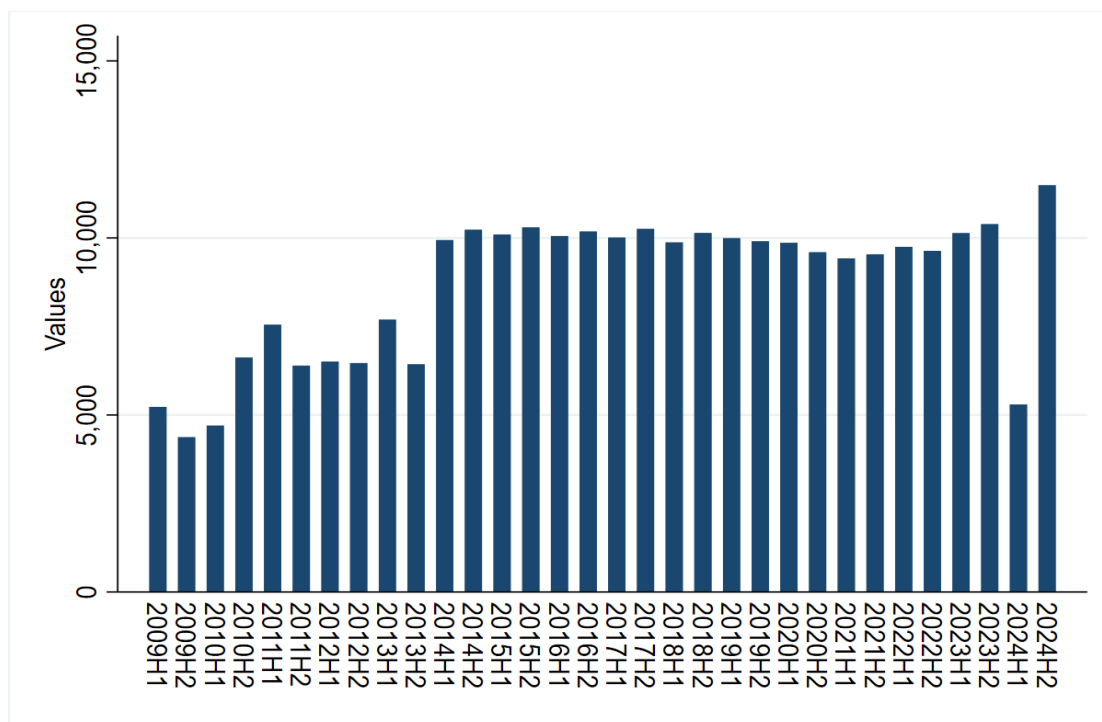
## Figures

Figure 1: Number of Firms per Country



Source: Survey of Access to Finance of Enterprises (SAFE)

Figure 2: Number of Firms per Wave



Source: Survey of Access to Finance of Enterprises (SAFE)

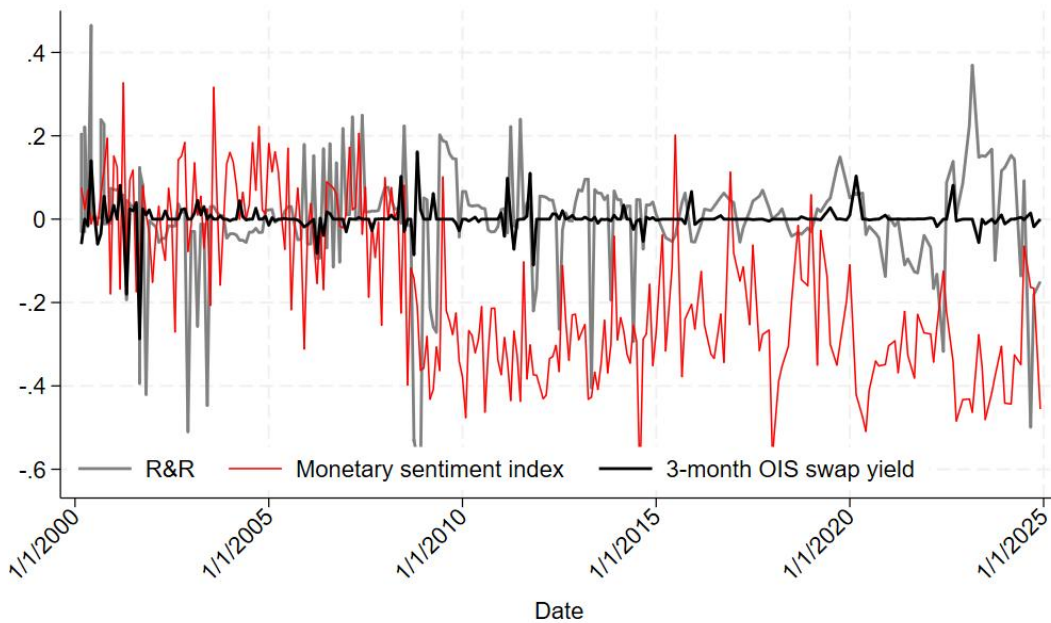
Figure 3: Credit Standards in Eurozone



These series illustrate the evolution of credit standards in the euro area from 2003 to 2025 on a quarterly basis. The left graph shows backward-looking credit standards, while the right graph displays forward-looking credit standards.

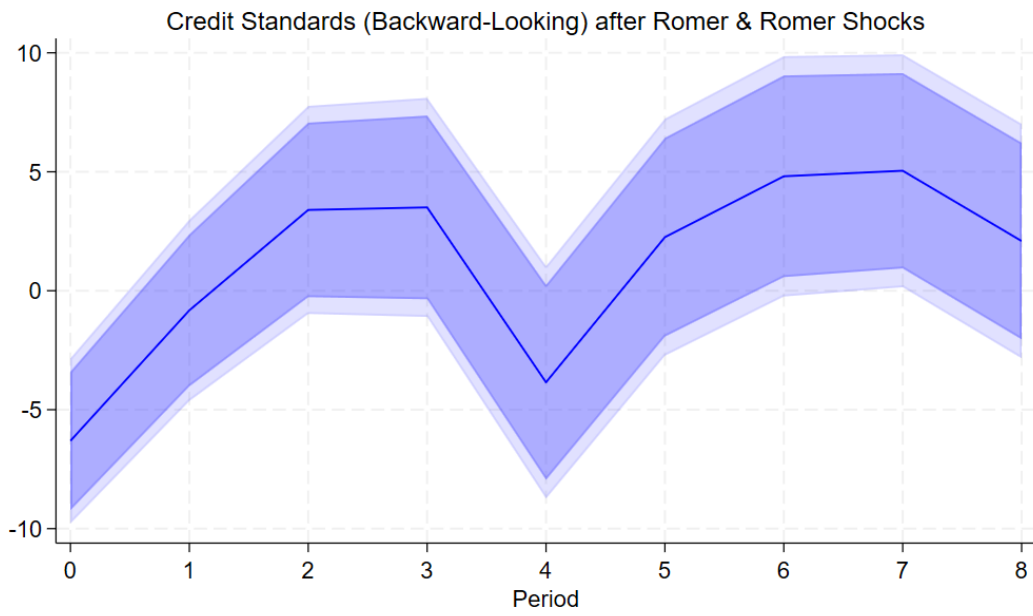
Source: Bank Lending Survey (BLS)

Figure 4: Monetary Policy Shocks | Romer & Romer - 3 Month OIS Yields – MP Sentiment



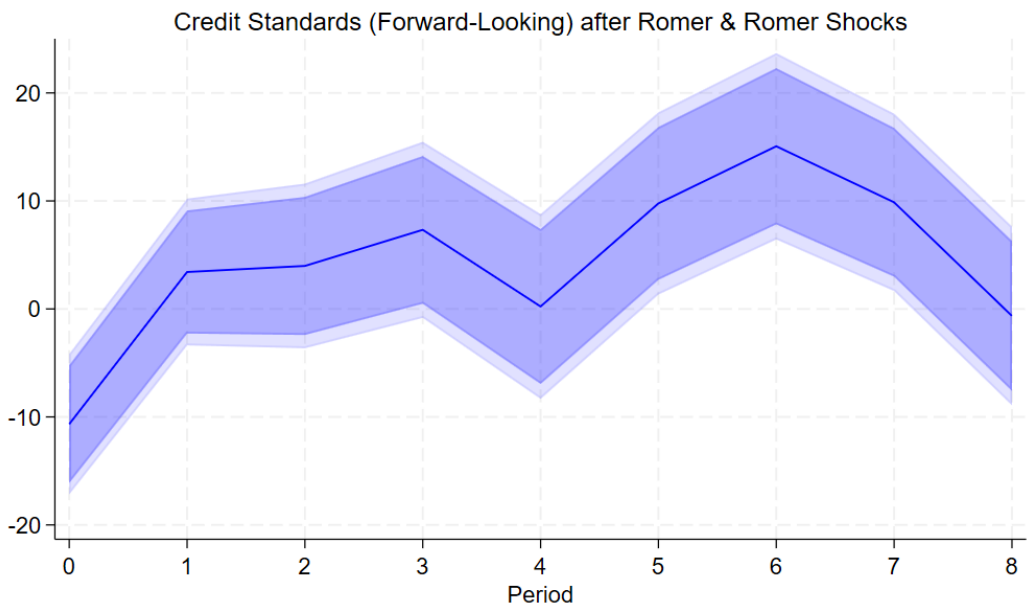
Source: ECB Portal, EA-MPD

Figure 5: Local Projections of Credit Standards (Backward-looking) after a 100 bps R&R Shock



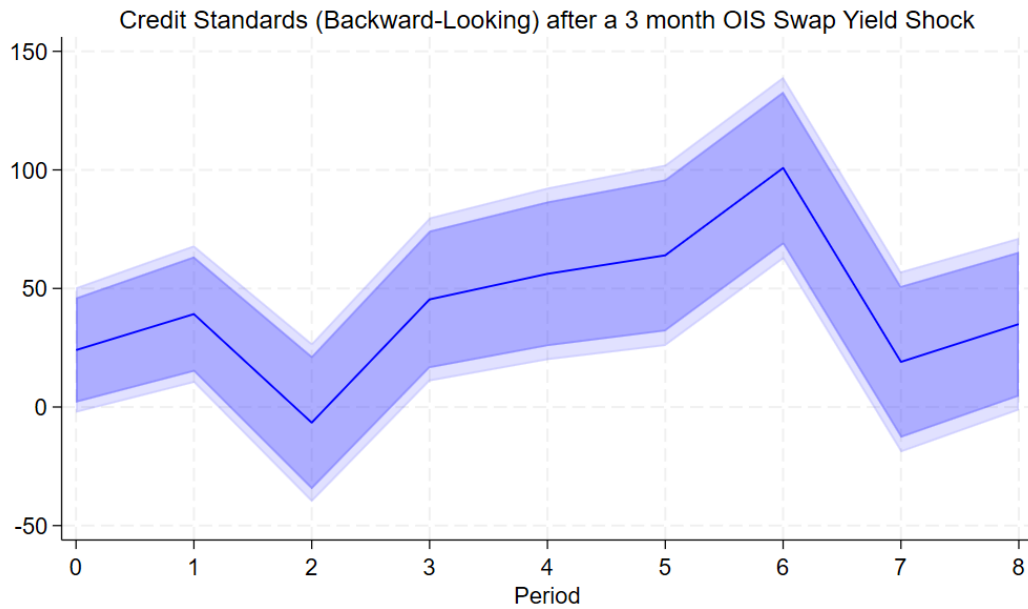
Note: Figure 5 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points.

Figure 6: Local Projections of Credit Standards (Forward-looking) after a 100 bps R&R Shock



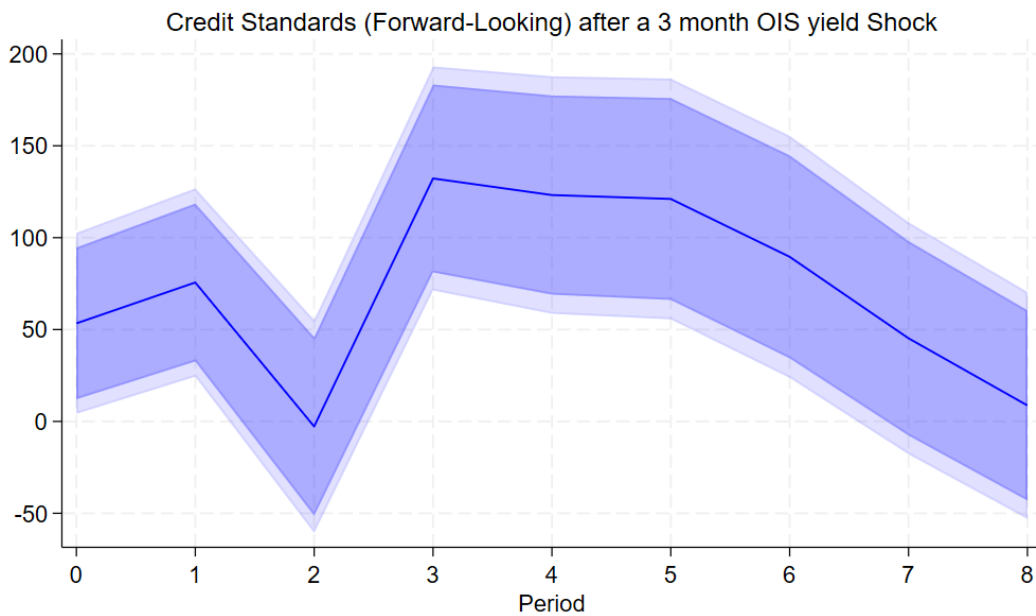
Note: Figure 6 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points

Figure 7: Local Projections of Credit Standards (Backward-looking) after a 100 bps 3 month OIS Swap Yield Shock.



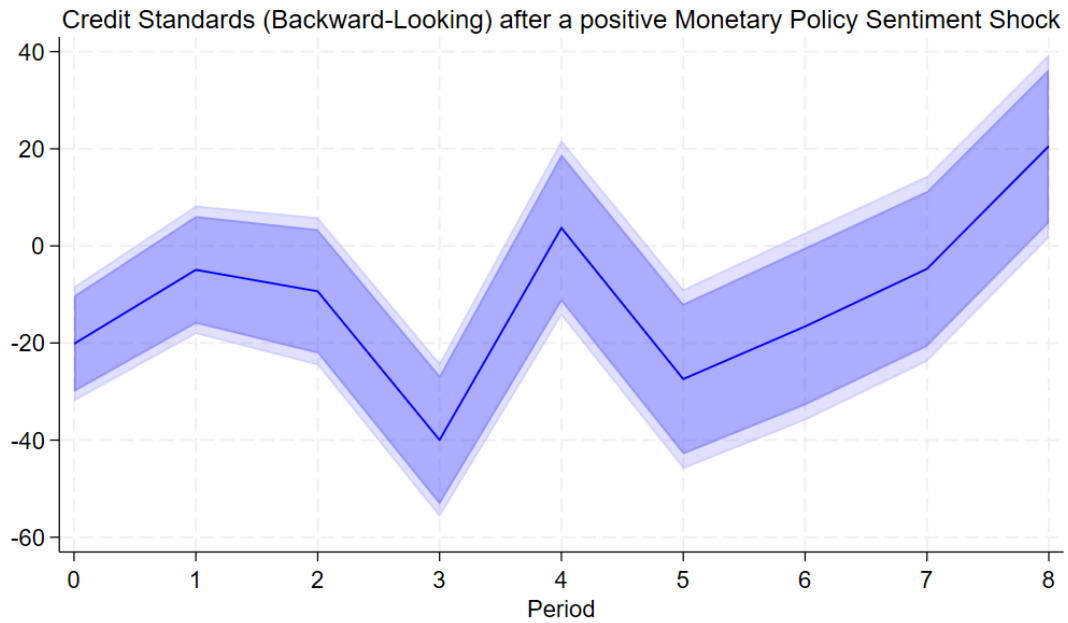
Note: Figure 7 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points.

Figure 8: Local Projections of Credit Standards (Forward-looking) after a 100 bps 3 month OIS Swap Yield Shock.



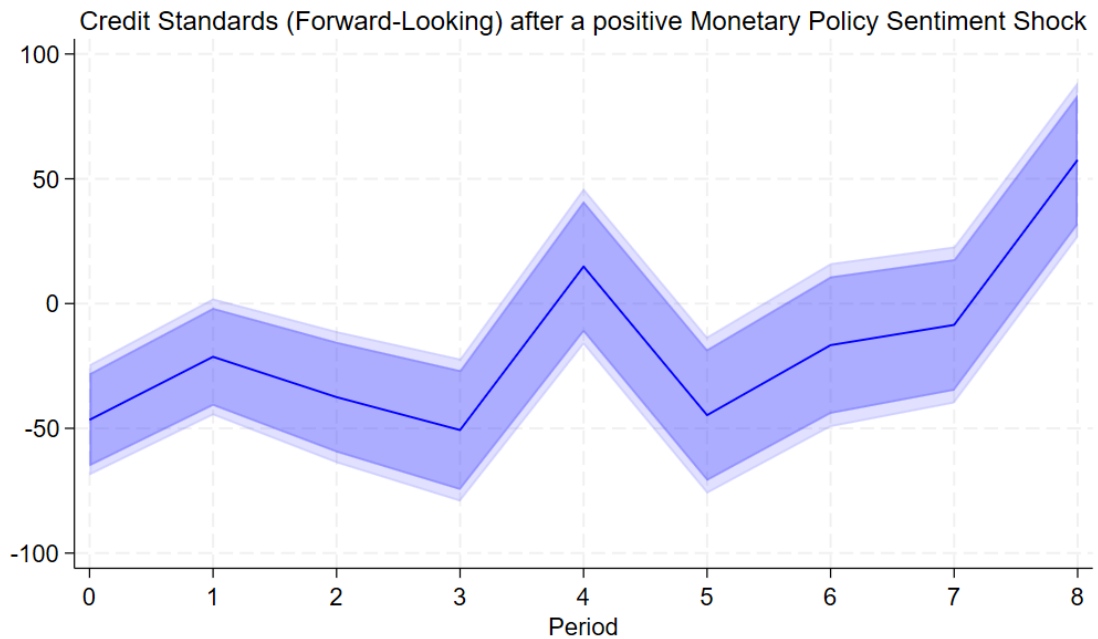
Note: Figure 8 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points.

Figure 9: Local Projections of Credit Standards (Backward-looking) after a 100 bps MP Sentiment increase.



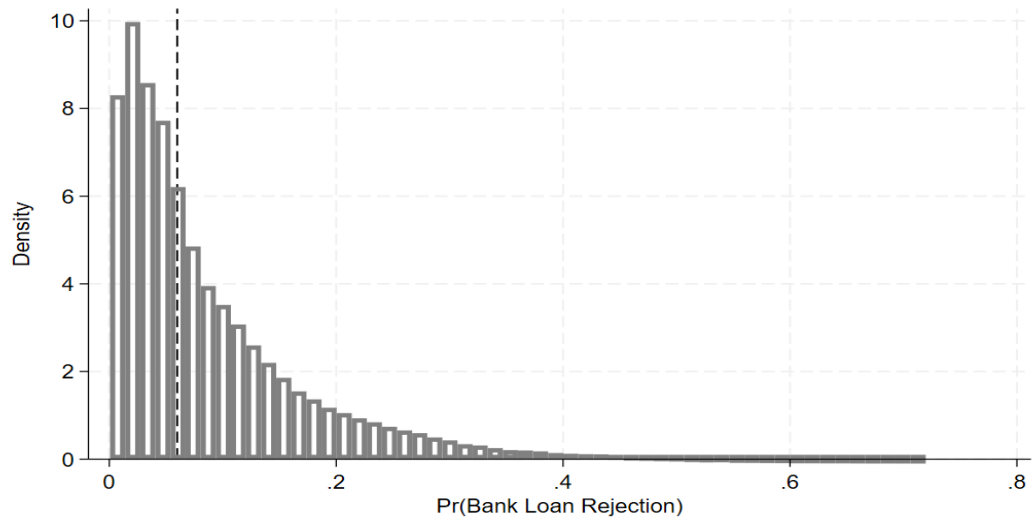
Note: Figure 9 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points.

Figure 10: Local Projections of Credit Standards (Forward-looking) after a 100 bps MP Sentiment increase.



Note: Figure 10 presents Credit Standards cumulative responses after a monetary policy shock of 100bps. The confidence intervals are 90% and 95%. The values are represented in Percentage Points.

Figure 11: Density of firms' probability of bank loan rejection



Note: Figure 11 shows the density of firms' probability of bank loan rejection. The dotted line indicates the median probability.

## Tables

### Baseline

Table 1: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00108 (0.00298)	0.00257* (0.00146)
Construction	0.00365 (0.0129)	0.00368 (0.0128)
Retail Trade	-0.00354 (0.00957)	-0.00377 (0.00958)
Industrial Sector	-0.0160 (0.00982)	-0.0161 (0.00983)
Age between 2-5 yrs	-0.0307 (0.0341)	-0.0318 (0.0341)
Age between 5-10 yrs	-0.0258 (0.0305)	-0.0263 (0.0306)
Age above 10 yrs	-0.0299 (0.0285)	-0.0307 (0.0286)
1-2 mill. Turnover	-0.00814 (0.0141)	-0.00903 (0.0140)
2-10 mill. Turnover	-0.00925 (0.00943)	-0.00956 (0.00940)
10-50 mill. Turnover	-0.0257** (0.0112)	-0.0261** (0.0112)
> 50 mill Turnover	-0.0143 (0.0103)	-0.0137 (0.00923)
Sole Ownership	0.00610 (0.00823)	0.00630 (0.00823)
Small Firms	-0.00697 (0.0110)	-0.00681 (0.0110)
Medium Firms	-0.0240* (0.0132)	-0.0241* (0.0132)
Large Firms	-0.0461*** (0.0172)	-0.0466*** (0.0172)
Dept/Assets (Increased)	0.0201** (0.00967)	0.0201** (0.00966)
Dept/Assets (No Change)	0.00627 (0.00831)	0.00612 (0.00831)
Credit History(Improved)	-0.0435*** (0.0114)	-0.0440*** (0.0114)
Credit History(No Change)	-0.0414*** (0.0106)	-0.0417*** (0.0106)
Economic Environment (Improved)	-0.0188* (0.00976)	-0.0197** (0.00976)
Economic Environment (No Change)	-0.0223*** (0.00850)	-0.0228*** (0.00854)
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Size

Table 2: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)-Across Firms' Size

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00378 (0.00487)	0.00252 (0.00232)
L.Small Firms X CS	-0.00270 (0.00598)	-0.000456 (0.00303)
L.Medium Firms X CS	-0.00695 (0.00678)	1.06e-05 (0.00355)
L.Large Firms X CS	0.00122 (0.00747)	0.00220 (0.00422)
Small Firms	-0.000865 (0.0150)	-0.00425 (0.0129)
Medium Firms	-0.00348 (0.0183)	-0.0157 (0.0167)
Large Firms	-0.0283 (0.0254)	-0.0301 (0.0242)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Age

Table 3: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)-Across Firms' age

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.00182 (0.0168)	-0.0170 (0.0190)
L.Age between 2-5 yrs X CS	-0.00113 (0.0193)	0.0135 (0.0213)
L.Age between 5-10 yrs X CS	-0.00706 (0.0178)	0.0163 (0.0194)
L.Age above 10 yrs X CS	0.00420	0.0202

	(0.0168)	(0.0190)
Age between 2-5 yrs	-0.0268	-0.0339
	(0.0305)	(0.0294)
Age between 5-10 yrs	0.000932	-0.0176
	(0.0347)	(0.0329)
Age above 10 yrs	-0.0174	-0.0180
	(0.0391)	(0.0370)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

---

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Turnover

Table 4: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)-Across Firms' Turnover

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00914** (0.00410)	0.00481** (0.00196)
L.(1-2) mill. Turnover X CS	-0.00437 (0.00687)	-5.33e-05 (0.00346)
L.(2-10) mill. Turnover X CS	-0.0199*** (0.00561)	-0.00953*** (0.00311)
L.(10-50) mill. Turnover X CS	-0.0115* (0.00692)	-0.000800 (0.00373)
L.(> 50) mill Turnover X CS	0.00344 (0.00843)	0.00186 (0.00382)
1-2 mill. Turnover	-0.00786 (0.0164)	-0.0149 (0.0152)
2-10 mill. Turnover	0.0164 (0.0143)	0.00419 (0.0127)
10-50 mill. Turnover	-0.0173 (0.0200)	-0.0387** (0.0195)
> 50 mill Turnover	-0.0449* (0.0247)	-0.0442* (0.0226)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Dept to Assets Ratio

Table 5: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)-Across Dept to Asset Ratio

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00361 (0.00371)	0.00446** (0.00189)
L.Dept/Assets (Increased) X CS	-0.00138 (0.00378)	-0.00149 (0.00230)
L.Dept/Assets (No Change) X CS	-0.00504 (0.00330)	-0.00393** (0.00195)
Dept/Assets (Increased)	0.0206** (0.00988)	0.0222** (0.00997)
Dept/Assets (No Change)	0.0106 (0.00866)	0.0114 (0.00862)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Credit History

Table 6: The impact of Credit Standards instrumented with Monetary Policy Shock (Romer & Romer)-Across Credit History

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.0108** (0.00436)	0.00753*** (0.00233)
L.Credit History(Improved) X CS	-0.00964** (0.00435)	-0.00433* (0.00260)
L.Credit History(No Change) X CS	-0.0123*** (0.00402)	-0.00677*** (0.00234)
Credit History(Improved)	-0.0335*** (0.0117)	-0.0361*** (0.0116)
Credit History(No Change)	-0.0317*** (0.0106)	-0.0333*** (0.0106)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Baseline

Table 7: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.000833 (0.00100)	0.000533 (0.00200)
Construction	0.00162 (0.0130)	0.00165 (0.0130)
Retail Trade	-0.00216 (0.00973)	-0.00214 (0.00973)
Industrial Sector	-0.0177* (0.00984)	-0.0176* (0.00985)
Age between 2-5 yrs	-0.0223 (0.0284)	-0.0227 (0.0285)
Age between 5-10 yrs	-0.0183 (0.0303)	-0.0186 (0.0303)
Age above 10 yrs	-0.0253 (0.0337)	-0.0259 (0.0339)
1-2 mill. Turnover	-0.0166 (0.0102)	-0.0166 (0.0103)
2-10 mill. Turnover	-0.0113 (0.0130)	-0.0112 (0.0130)
10-50 mill. Turnover	-0.0388*** (0.0146)	-0.0387*** (0.0146)
> 50 mill Turnover	-0.0313* (0.0177)	-0.0313* (0.0177)
Sole Ownership	0.00637 (0.00833)	0.00626 (0.00827)
Small Firms	-0.00591 (0.00978)	-0.00607 (0.00976)
Medium Firms	-0.0148 (0.0140)	-0.0150 (0.0140)
Large Firms	-0.0226 (0.0196)	-0.0226 (0.0197)
Dept/Assets (Increased)	0.0213** (0.00967)	0.0210** (0.00960)
Dept/Assets (No Change)	0.00719 (0.00829)	0.00694 (0.00826)
Credit History(Improved)	-0.0444*** (0.0113)	-0.0445*** (0.0113)
Credit History(No Change)	-0.0430*** (0.0106)	-0.0430*** (0.0106)
Economic Environment (Improved)	-0.0167* (0.00998)	-0.0163 (0.0101)
Economic Environment (No Change)	-0.0209** (0.00855)	-0.0205** (0.00864)
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Size

Table 8: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)-Across Firms' size

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.00489 (0.00614)	-0.00204 (0.00308)
L.Small Firms X CS	0.00218 (0.00703)	-0.000765 (0.00373)
L.Medium Firms X CS	0.000142 (0.00814)	0.00128 (0.00411)
L.Large Firms X CS	-0.00447 (0.00899)	-0.00355 (0.00518)
Small Firms	-0.00998 (0.0153)	-0.00521 (0.0128)
Medium Firms	-0.0171 (0.0187)	-0.0201 (0.0164)
Large Firms	-0.0164 (0.0228)	-0.0173 (0.0212)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Age

Table 9: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)-Across Firms' age

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.0168 (0.0168)	0.0101 (0.0130)
L.Age between 2-5 yrs X CS	-0.0268 (0.0207)	-0.0171 (0.0157)
L.Age between 5-10 yrs X CS	-0.0159 (0.0184)	-0.00808 (0.0135)
L.Age above 10 yrs X CS	-0.0216 (0.0165)	-0.0128 (0.0129)
Age between 2-5 yrs	-0.00371 (0.0312)	-0.00683 (0.0323)
Age between 5-10 yrs	-0.0100 (0.0354)	-0.0142 (0.0350)
Age above 10 yrs	0.00195 (0.0361)	-0.00414 (0.0370)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Turnover

Table 10: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)-Across Firms' Turnover

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.000337 (0.00469)	-0.00123 (0.00261)
L.(1-2) mill. Turnover X CS	-0.00573 (0.00681)	-0.00392 (0.00427)
L.(2-10) mill. Turnover X CS	-0.0144* (0.00777)	-0.00474 (0.00387)
L.(10-50) mill. Turnover X CS	-0.00269 (0.00899)	0.00283 (0.00422)
L.(> 50) mill Turnover X CS	-0.00132 (0.0101)	-0.00198 (0.00588)
1-2 mill. Turnover	-0.00601 (0.0147)	-0.00511 (0.0139)
2-10 mill. Turnover	0.00244 (0.0150)	-0.00972 (0.0127)
10-50 mill. Turnover	-0.0354* (0.0214)	-0.0455** (0.0184)
> 50 mill Turnover	-0.0330 (0.0258)	-0.0289 (0.0239)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Dept to Assets Ratio

Table 11: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)-Across Firms' Dept to Assets Ratio

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.000556 (0.00427)	0.000502 (0.00233)
L.Dept/Assets (Increased) X CS	-0.00352 (0.00436)	-0.00377 (0.00282)
L.Dept/Assets (No Change) X CS	-0.00709* (0.00400)	-0.00473* (0.00255)
Dept/Assets (Increased)	0.0209** (0.0100)	0.0214** (0.00996)
Dept/Assets (No Change)	0.0107 (0.00867)	0.0103 (0.00854)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Credit History

Table 12: The impact of Credit Standards instrumented with Monetary Policy (MP Sentiment)-Across Credit History

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00568 (0.00459)	0.00302 (0.00272)
L.Credit History(Improved) X CS	-0.00933* (0.00483)	-0.00448 (0.00301)
L.Credit History(No Change) X CS	-0.0145*** (0.00454)	-0.00785*** (0.00285)
Credit History(Improved)	-0.0353*** (0.0115)	-0.0364*** (0.0115)
Credit History(No Change)	-0.0328*** (0.0106)	-0.0342*** (0.0106)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	3,134	3,134

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Baseline

Table 13: The impact of Credit Standards instrumented with Monetary Policy Shock (3 month OIS Swap Yield)

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.00220 (0.00242)	-0.00301 (0.00412)
Construction	0.00728 (0.00649)	0.00728 (0.00649)
Retail Trade	-0.00807 (0.00529)	-0.00807 (0.00529)
Industrial Sector	-0.0111** (0.00497)	-0.0111** (0.00497)
Age between 2-5 yrs	-0.00805 (0.0125)	-0.00805 (0.0125)
Age between 5-10 yrs	0.00188 (0.0134)	0.00188 (0.0134)
Age above 10 yrs	-0.00304 (0.0149)	-0.00304 (0.0149)
1-2 mill. Turnover	-0.0182*** (0.00534)	-0.0182*** (0.00534)
2-10 mill. Turnover	-0.00690 (0.00595)	-0.00690 (0.00595)
10-50 mill. Turnover	-0.0368*** (0.00807)	-0.0368*** (0.00807)
> 50 mill Turnover	-0.0406*** (0.0108)	-0.0406*** (0.0108)
Sole Ownership	0.00120 (0.00419)	0.00120 (0.00419)
Small Firms	-0.0102** (0.00476)	-0.0102** (0.00476)
Medium Firms	-0.0219*** (0.00735)	-0.0219*** (0.00735)
Large Firms	-0.0193* (0.0112)	-0.0193* (0.0112)
Dept/Assets (Increased)	0.0209*** (0.00495)	0.0209*** (0.00495)
Dept/Assets (No Change)	0.00333 (0.00421)	0.00333 (0.00421)
Credit History(Improved)	-0.0438*** (0.00581)	-0.0438*** (0.00581)
Credit History(No Change)	-0.0339*** (0.00520)	-0.0339*** (0.00520)
Country FE	✓	✓
Time Trend	✓	✓
Observations	2,986	2,986

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Baseline

Table 14: Baseline Results | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00468 (0.00306)	0.00254* (0.00133)
Construction	0.00181 (0.0130)	0.00146 (0.0129)
Retail Trade	-0.0115 (0.0107)	-0.0121 (0.0106)
Industrial Sector	-0.0220** (0.0106)	-0.0220** (0.0107)
Age between 2-5 yrs	-	-
Age between 5-10 yrs	-0.0481* (0.0264)	-0.0475* (0.0261)
Age above 10 yrs	-0.0620*** (0.0238)	-0.0609*** (0.0235)
1-2 mill. Turnover	0.00445 (0.0193)	0.00444 (0.0193)
2-10 mill. Turnover	0.0139 (0.0123)	0.0135 (0.0122)
10-50 mill. Turnover	0.0105 (0.0151)	0.0100 (0.0150)
> 50 mill Turnover	0.0120 (0.0173)	0.0117 (0.0172)
Sole Ownership	-0.00281 (0.00918)	-0.00223 (0.00923)
Small Firms	-0.0306** (0.0119)	-0.0295** (0.0118)
Medium Firms	-0.0293* (0.0151)	-0.0281* (0.0150)
Large Firms	-0.0440** (0.0188)	-0.0421** (0.0186)
Dept/Assets (Increased)	-0.000442 (0.0105)	-0.000186 (0.0105)
Dept/Assets (No Change)	0.00600 (0.00780)	0.00634 (0.00787)
Credit History(Improved)	0.00876 (0.0226)	0.00861 (0.0225)
Credit History(No Change)	-0.000914 (0.0224)	-0.00157 (0.0222)
Economic Environment (Improved)	-0.00476 (0.0103)	-0.00346 (0.0104)
Economic Environment (No Change)	-0.0121 (0.00935)	-0.0108 (0.00939)
Country FE	✓	✓
Time Trend	✓	✓
Observations	1,811	1,811

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firm Size

Table 15: The impact of Credit Standards across firm size | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00801 (0.00613)	0.00187 (0.00282)
L.Small Firms X CS	-0.00347 (0.00573)	-0.000567 (0.00274)
L.Medium Firms X CS	-0.00482 (0.00691)	0.00115 (0.00327)
L.Large Firms X CS	-0.00173 (0.00711)	0.00143 (0.00332)
Small Firms	-0.0227 (0.0153)	-0.0285** (0.0144)
Medium Firms	-0.0185 (0.0198)	-0.0332* (0.0185)
Large Firms	-0.0399* (0.0233)	-0.0479** (0.0217)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time Trend	✓	✓
Observations	1,811	1,811

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Age

Table 16: The impact of Credit Standards across Firms' Age | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.0231** (0.0104)	-0.0500 (0.0499)
L.Age between 2-5 yrs X CS	- -	- -
L.Age between 5-10 yrs X CS	0.00641 (0.0136)	0.0409 (0.0505)
L.Age above 10 yrs X CS	0.0306*** (0.0111)	0.0534 (0.0501)
Age between 2-5 yrs	- -	- -
Age between 5-10 yrs	-0.0213 (0.0287)	-0.0112 (0.0313)
Age above 10 yrs	-0.0798*** (0.0252)	-0.0604** (0.0279)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time FE	✓	✓
Observations	1,808	1,808

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Firms' Turnover

Table 17: The impact of Credit Standards across Firms' Turnover | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.0107** (0.00536)	0.00309 (0.00249)
L.(1-2) mill. Turnover X CS	-0.0435*** (0.00942)	-0.0293*** (0.00751)
L.(2-10) mill. Turnover X CS	-0.0140** (0.00567)	-0.00551* (0.00308)
L.(10-50) mill. Turnover X CS	-0.00510 (0.00625)	0.00119 (0.00301)
L.(> 50) mill Turnover X CS	0.00145 (0.00729)	0.00139 (0.00303)
1-2 mill. Turnover	0.0342 (0.0214)	0.0307 (0.0219)
2-10 mill. Turnover	0.0393** (0.0164)	0.0280* (0.0153)
10-50 mill. Turnover	0.0179 (0.0202)	0.00347 (0.0184)
> 50 mill Turnover	0.00427 (0.0230)	0.00442 (0.0199)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time FE	✓	✓
Observations	1,808	1,808

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Dept to Assets Ratio

Table 18: The impact of Credit Standards across Dept to Asset Ratio | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	0.00845** (0.00360)	0.00488*** (0.00159)
L.Dept/Assets (Increased) X CS	-0.00465 (0.00356)	-0.00337* (0.00185)
L.Dept/Assets (No Change) X CS	-0.00670** (0.00307)	-0.00443*** (0.00164)
Dept/Assets (Increased)	0.00435 (0.0102)	0.00501 (0.0103)
Dept/Assets (No Change)	0.0115 (0.00822)	0.0121 (0.00822)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time FE	✓	✓
Observations	1,811	1,811

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Credit History

Table 19: The impact of Credit Standards across Credit History | After excluding firms with higher rejection probability

VARIABLES	(1) Credit Standards (Backward Looking)	(2) Credit Standards (Forward Looking)
L.CS	-0.00117 (0.00928)	-0.00265 (0.00448)
L.Credit History(Improved) X CS	0.00660 (0.00957)	0.00596 (0.00482)
L.Credit History(No Change) X CS	0.00563 (0.00937)	0.00488 (0.00467)
Credit History(Improved)	0.00468 (0.0231)	0.00206 (0.0225)
Credit History(No Change)	-0.00400 (0.0229)	-0.00631 (0.0223)
Rest Firm Characteristics	✓	✓
Country FE	✓	✓
Time FE	✓	✓
Observations	1,811	1,811

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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