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Borrower discouragement prevalence for Eurozone SMEs: Investigating the impact of economic sentiment

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ABSTRACT

We investigate whether economic sentiment exerts an impact on firms' decision to apply for a bank loan or not and hence its impact on discouragement prevalence. Using survey data for Eurozone firms and employing a Probit Heckman selection model, we document that a positive shock in economic sentiment lowers the percentage of discouraged bank borrowers in the economy. In contrast, higher economic sentiment shock volatility leads to an increase in discouragement.

1. Introduction

Discouragement of potential borrowers is a highly prevalent banking market outcome (e.g., Levenson and Willard, 2000; Cavalluzzo et al., 2002; Kon and Storey, 2003; Chakravarty and Yilmazer, 2009; Cowling et al., 2012; Freel et al., 2012; Chakravarty and Xiang, 2013; Xiang et al., 2015; Rostamkalaei et al., 2020; Kallandranis and Drakos, 2020). However, a structural theoretical explanation for discouragement is still elusive, with the literature putting forward intuitive, albeit general arguments such as the assessment of the perceived probability of loan application rejection relative to the cost of applying (e.g., Stiglitz and Weiss, 1981; Greenwald et al., 1984; Besanko and Thakor, 1987; Audretsch and Elston 2002; Drakos and Kallandranis, 2005; Berger and Udell, 2006; Guisoand Minetti, 2010 Drakos and Giannakopoulos, 2011; Freel et al., 2012; Farinha and Felix, 2015; Liberti and Petersen, 2018; Kallandranis, 2020; Rostamkalaei et al., 2020). There is no doubt that potential borrowers take into account their financial situation and thereby projecting the probability of their application be-

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ing successful. The natural question that arises is, given that they are forming a perceived probability, what are other factors that might be factored in this calculation?

Our conjecture is that potential borrowers, apart from their own financial situation, also take into account the overall perception regarding the current and the expected state of the economy. The intuition behind our conjecture is that potential borrowers attempt to proxy how banks will assess their application, given their profile as loan applicants, depending on the general current, and expected economic conditions. In other words, in an optimistic (pessimistic) regime about economic conditions, the marginal potential borrower might be less (more) discouraged to apply for a bank loan. Hence, the state of expectations, whether optimistic or pessimistic can affect the credit availability and the overall economic activity. In a context of less favorable economic conditions, the immediate effect on the economy is that discouraged borrowers would prevent themselves from undertaking profitable projects (e.g. Vermoesen et al., 2013), the funds in the economy to be misallocated and consequently to detriment long-term economic growth.

Similar behaviors have been suggested in other fields of economic decision making such as bank deposit flows (Anastasiou and Drakos, 2020; Anastasiou and Katsafados, 2020, 2021), agents' economic choices (Puri and Robinson, 2007; Kostopoulos and Meyer, 2018), predictability of stock returns (Kim and Kim, 2014; Siganos et al., 2014) and momentum strategies' profitability (Antoniou et al., 2013). Furthermore, prospects about the future credit market are influenced by the current state of the economy (e.g., Jin, 2015). However, following Salido et al. (2017), the inclusion of sentiment proxies may be predicting something, not about future credit supply but future credit demand.

An ideal candidate for operationalizing the overall perception for economic conditions is the Economic Sentiment Indicator (ESI), which in numerous studies has been shown to have predictive power over the future path of several economic variables such as GDP growth, interest rates, stock price changes, and the rates of inflation and unemployment among others (e.g., Stock and Watson, 1993; Estrella and Mishkin, 1998; Lovell and Tien, 2000; Mourougane and Roma, 2002; Utaka, 2003). Additionally, expectations are likely to play a role in shaping the debt behavior of businesses and thus affect the way capital structure decisions are made (e.g., Bhamra et al., 2010; Arnold et al., 2013 ; Pindado *et. al.,* 2017). The relevant literature suggests that a positive interaction between leverage and economic expectations is expected (see for example, Kiyotaki and Moore, 1997; Levy and Hennessy, 2007; Frank and Goyal, 2009 ; Pindado *et. al.,* 2017).

We develop an empirical strategy that is as solid as it is straightforward. First, we will filter out the impact of the current macroeconomic fundamentals to isolate the forward-looking component of the sentiment indicator. Second, we will build an econometric model for discouragement that controls for firm-specific characteristics to capture the objective part of the perceived probability of loan application success by the firm. Third, we will augment the econometric model by the forward-looking component of economic sentiment and test whether it contains any explanatory power for discouragement. The sentiment will be exogenous in this analysis.

Following the consumer confidence literature (e.g., Carroll et al., 1994; Acemoglu and Scott, 1994; Malgarini and Margani, 2007; Nofsinger, 2012; Lahiri et al., 2015; Kłopocka, 2017 etc.), we introduce market sentiment into the model through the agents' beliefs to capture the path of future economic conditions (Drakos and Kallandranis 2005; Taylor and McNabb 2007; Christiansen et al., 2014). Our aim is to investigate whether a shock in the Economic Sentiment Indicator (ESI) and its volatility affect SMEs' probability of a successful loan application, over and above any firm-specific objective characteristics. In a similar vein Canton et al. (2013) examine the application outcome and how this interacts dynamically with economic sentiment. We utilize data from the Survey of Access to Finance of Enterprises, covering SMEs from Eurozone countries for the post-2009 period until 2018, essentially giving us 19 semi-annual waves. The SAFE database provides the most extensive available dataset in terms of country and time coverage.

The rest of the paper is organized as follows. Section 2 summarizes the data and variables. Section 3 discusses the empirical strategy along with the empirical evidence. Finally, Section 4 concludes.

2. Data, variables and methodology

2.1. Data and variables

We employ survey data from the Survey of Access to Finance of Enterprises (SAFE). SAFE is a firm-level survey database, conducted twice a year (starting from the 2009H2) and launched by the European Central Bank and the European Commission. The SAFE contains important qualitative micro-level information regarding Eurozone firms' short-term developments such as their financing needs, their access to finance as well as their firm-specific characteristics (i.e., age, size, turnover, sector, and ownership type). Our sample covers firms from 19 Eurozone countries and 19 waves that correspond to the period 2009H2–2018H2. The initial pooled dataset consists of a sample with a total of 174,160 firm-wave observations. Below we present the relevant survey question from which we construct the main dependent variable in our analysis:

From Q7A we classify firm (i) as applying or not applying for a loan, and if not, for which reason. Firms who answered DK/NA were excluded. A salient feature of discouragement for a firm's hesitance to apply for a bank loan, relies on its fear of possible rejection. We are able to capture this hesitance by retrieving data from firms that gave the second answer "*Did not apply because of possible rejection*". Discouraged firms[1] are inevitably a subset of firms that need credit. In other words,

[1] Such discouraged firms form a substantial part of all SMEs (Han *et. al.,* 2009).

Table 1
Proportion of firms that need a loan and being discouraged by country.

Countries	Percentage of firms that need a loan	Percentage of firms being discouraged
Austria	0.442	0.072
Belgium	0.540	0.086
Cyprus	0.623	0.194
Finland	0.463	0.040
France	0.628	0.079
Germany	0.483	0.088
Greece	0.755	0.267
Ireland	0.515	0.228
Italy	0.686	0.080
Latvia	0.613	0.104
Lithuania	0.809	0.074
Luxemburg	0.442	0.053
Malta	0.554	0.045
Netherlands	0.478	0.188
Portugal	0.606	0.106
Slovakia	0.630	0.069
Slovenia	0.595	0.107
Spain	0.642	0.093
Total	0.589	0.107

discouragement is only observed only when a firm needs a bank loan. Thus, we define our dependent variable as follows: *Discouraged bank borrower (D_i)* (based on Q7A of the questionnaire) is a firm that needs a bank loan but did not apply due to fear of possible rejection.

We begin by defining N_i a binary variable showing whether the *i th* firm needs or not bank credit:

$$N_i = \begin{cases} 1 \ if \ \ firm \ needs \ credit \\ 0 \ otherwise \end{cases} \tag{1}$$

Then we proceed to the definition of our dependent variable (D_i), which is a dichotomous variable classifying the *i th* firm as discouraged or not:

$$D_i = \begin{cases} 1 \ if \ \ firm \ needs \ credit, \ \ but \ did \ not \ apply \ because \ of \ \ fear \ of \ \ rejection \\ 0 \ otherwise \end{cases} \tag{2}$$

In Table 1, we report the proportion of firms that need bank credit and the proportion of those that have been discouraged by country. We observe that Italy, Lithuania, and Slovakia report the highest percentages of firms that need a bank loan, while Greece, Cyprus, Ireland, and the Netherlands are the countries with the highest percentages of discouraged firms. On the contrary, the countries with the lowest percentages of discouraged firms are Finland, Luxemburg and Malta.

Our first main explanatory variable is ESI shock. The ESI is compiled within the Joint Harmonized EU Program of Business and Consumer Surveys and is a composite indicator made up of five sectoral confidence indicators (industrial, services, consumption, construction, retail trade) with different weights. Given that sentiment shock is driven by expectations about future economic outcomes, a positive economic sentiment shock reflects more optimism, making potential bank borrowers less discouraged.

H1. ***:*** *A positive ESI shock decreases firms' probability of being discouraged.*

To construct the ESI shock, we follow the methodology of Lemmon and Portniaguina (2006). In particular, we regress the economic sentiment indicator on contemporaneous and lagged values of a number of macroeconomic factors (as shown below) and then we obtain the residuals. These residuals[2] represent the shock of the economic sentiment indicator (*esi_shock*).

$$\begin{aligned} ESI_{i,t} = \ & a + \delta_1 CONS_{i,t} + \delta_2 CONS_{i,t-1} + \delta_3 UNEM_{i,t} + \delta_4 UNEM_{i,t-1} + \delta_5 YIELD_{i,t} + \delta_6 YIELD_{i,t-1} \\ & + \delta_7 RGDP_{i,t} + \delta_8 RGDP_{i,t-1} + \delta_9 HCPI_{i,t} + \delta_{10} HCPI_{i,t-1} + e_{i,t} \end{aligned} \tag{3}$$

where ESI, CONS, UNEM, YIELD, RGDP, HCPI, i and t denote economic sentiment indicator, private consumption expenditure, unemployment rate (seasonally adjusted), 10-year government bond yields, real GDP growth (chain linked volumes, 2010, million euro), inflation rate, country and time (semi-annual), respectively. All the variables are measured in percentage changes.

Then we proceed to the construction of the second main explanatory variable, the volatility of the *esi_shock*, that captures variations in economic agents' expectations about future economic outcomes (Caglayan and Xu, 2016). Specifically, in periods

[2] As an alternative, we also extract the *esi_shock* by regressing the economic sentiment indicator only on the lagged values of the abovementioned set of macro variables. The results are not reported for space conservation reasons. However, they remain robust and are available upon request.

of heightened economic uncertainty, banks are anticipated to behave more conservatively in granting new credit since they will not be in the position of rigorously estimating the expected returns from new lending. Therefore, levels of borrower discouragement may be aggravated during periods of higher uncertainty,

H2. *: A higher volatility of the ESI shock increases firms' probability of being discouraged.*

To measure the volatility of sentiment shock (*esi_shock_volat*), we estimate several Pooled Panel Generalized Autoregressive Conditional Heteroscedasticity (PP-GARCH hereafter) models (Cermeno and Grier, 2006). Specifically, we estimate the following alternative versions of the PP-GARCH model:

(a) A PP-GARCH(0,1)
(b) A PP-GARCH(1,1)
(c) A PP-GARCH(1,2)
(d) A PP-GARCH(2,1)
(e) A PP-GARCH(2,2)

Looking at the AIC (Akaike Information Criterion (Akaike, 1974) and the BIC (Bayesian Information Criterion (Schwarz, 1978) criteria, we conclude that the model with the lowest AIC and BIC values is the PP-GARCH(1,2) model, and thus from this specification, we extract the volatility of *esi_shock*.

To reduce the possible unobserved heterogeneity in the discouragement mechanism, we control for several firm-specific characteristics that may well affect discouragement. Variables correlated with discouragement include those which have been shown to predict informational asymmetries in the traditional credit rationing theory (e.g., Oliner and Rudebusch 1992; Audretsch and Elston 2002; Xiang et al., 2015). These firm-specific controls are determined by data availability obtained from the SAFE survey and are size, age, ownership type, legal form, interest expenses, and sector. In Tables A1 and A2, we report each variable's definition and the main descriptive statistics, respectively.

2.2. Econometric methodology

The appropriate econometric method for modeling the phenomenon at hand is given by the Heckman (1979) selection model consisting of two equations. The first equation is the so-called selection model, where the dichotomous decision to whether a firm needs or not a bank loan, modeled as a Probit. The second equation is the so-called outcome model, where the dichotomous decision is whether a firm -who needs a bank loan- is discouraged or not. This modeling tactic becomes even more important to the extent that selection equation errors are correlated with the errors from the extent of the outcome equation. In such occurrences, the Heckman estimator provides unbiased and consistent estimates of the parameters. In particular, the Heckman method augments the set of covariates in the outcome equation with the inverse Mill's ratio obtained from the first stage Probit equation.

The general setup we employ consists of the **selection equation** that models the probability of a firm needing a loan reads as follows:

$$\text{Prob}(N_{i,t}=1)=\beta_0+\sum_{i=1}^{N}\varphi_i\cdot Controls_{i,t}+\varepsilon_{i,t} \tag{4}$$

Then, we model the so-called **outcome equations** as follows:

$$\text{Prob}(D_{i,t}=1|N=1)=\beta_0+\beta_1\cdot esi\_shock_t+\sum_{i=1}^{N}\varphi_i\cdot Controls_{i,t}+\lambda\cdot(\rho\cdot\sigma_\varepsilon)+u_{i,t} \tag{5a}$$

$$\text{Prob}(D_{i,t}=1|N=1)=\beta_0+\beta_1\cdot esi\_shock_t+\beta_2\cdot esi\_shock\_volat_t+\sum_{i=1}^{N}\varphi_i\cdot Controls_{i,t}+\lambda\cdot(\rho\cdot\sigma_\varepsilon)+u_{i,t} \tag{5b}$$

Concerning the signs of the involved parameters, we have two prior beliefs:

I. A positive shock of the ESI tends to decrease the probability of discouragement, i.e., we expect that $\beta_1<0$, and
II. Higher volatility of the ESI shock increases the probability of a firm being discouraged, and therefore we anticipate that $\beta_2>0$.

We assume that $(\varepsilon_{i,t},u_{i,t})$ follows a bivariate normal distribution with:

$$\begin{pmatrix}\varepsilon_{i,t}\\u_{i,t}\end{pmatrix}\sim N\left[\begin{pmatrix}0\\0\end{pmatrix},\begin{pmatrix}\sigma_\varepsilon^2 & \rho\sigma_\varepsilon\\ \rho\sigma_\varepsilon & \sigma_u^2\end{pmatrix}\right] \tag{6}$$

where (ρ) is the correlation between $(\varepsilon_{i,t},u_{i,t})$ while $\lambda_{i,t}$ is the inverse Mill's ratio denoting the non-selection hazard. The significance of the estimated $(\hat{\lambda}_{i,t})$ would imply the rejection of the null hypothesis that ρ is zero and that thus selectivity bias is present.

Table 2
Heckman Selection model for Discouragement (selection: Need, outcome: Discouraged), with esi_shock as main explanatory variable.

	Discouraged	Need
esi_shock	**−0.315*** **	**–**
	[0.051]	
ownership1	−0.010	−0.010
	[0.015]	[0.056]
ownership2	−0.009	0.014
	[0.014]	[0.045]
ownership3	−0.022*	−0.048
	[0.013]	[0.047]
ownership4	0.030	−0.131
	[0.030]	[0.084]
ownership5	−0.010	−0.005
	[0.014]	[0.046]
ownership6	−0.025*	0.031
	[0.013]	[0.052]
legal1	–	–
legal2	−0.059*	0.247***
	[0.031]	[0.084]
legal3	−0.031*	0.104
	[0.017]	[0.085]
legal4	–	–
age1	−0.015	0.260
	[0.042]	[0.186]
age2	0.009	0.285
	[0.052]	[0.181]
age3	−0.001	0.271
	[0.047]	[0.179]
age4	−0.008	0.194
	[0.051]	[0.179]
size1	0.112***	−0.136***
	[0.014]	[0.025]
size2	0.068***	−0.150***
	[0.012]	[0.024]
size3	0.021**	−0.133***
	[0.009]	[0.024]
size4	–	–
turnover1	0.020	−0.130
	[0.026]	[0.087]
turnover2	0.035	−0.059
	[0.028]	[0.087]
turnover3	0.086**	0.110
	[0.037]	[0.087]
	0.026*	0.358***
interest_expense1	[0.016]	[0.055]
	0.004	−0.086
interest_expense2	[0.014]	[0.054]
	−0.023*	−0.072
interest_expense3	[0.012]	[0.055]
	0.030	−0.288***
interest_expense4	[0.019]	[0.057]
leverage1	0.033***	0.247***
	[0.012]	[0.041]
leverage2	0.005	−0.178***
	[0.010]	[0.039]
leverage3	0.016	−0.298***
	[0.012]	[0.040]
leverage4	−0.006	−0.386***
	[0.012]	[0.047]
sector1	0.011**	0.124***
	[0.004]	[0.015]
sector2	0.014***	0.057***
	[0.005]	[0.020]
sector3	0.003	0.020
	[0.004]	[0.015]
sector4	–	–

(*continued on next page*)

Table 2 (*continued*)

	Discouraged	Need
Constant	−1.720***	−0.038
	[0.419]	[0.222]
Diagnostics		
Observations	65,001	
Inverse Mills ratio	0.070	
Wald overal significance test (Probability value)	0.000	
Wald test of independent equations (Probability value)	0.069	

Notes: (a) This table presents the results of the estimated two-stage probit regressions described in the methodology section of the paper for model 5a, (b) *, **, *** denote statistical significance at the 10, 5 and 1 percent level respectively, (c) numbers in brackets denote cluster robust standard errors.

3. Empirical findings

The results from Eqs. (5a) and (5b) are presented in Tables 2 and 3, respectively. Before we embark on a detailed discussion of the main findings obtained from the Heckman selection, we start with the diagnostics. In both specifications, we find that the significance of the independence test and the Inverse Mills Ratio verify the choice of the Heckman selection model, indicating that firms' decision to become discouraged and their need for bank credit are interrelated.

The selection equation in Table 2 suggests that the probability a firm needs a bank loan increases as its leverage increases. Specifically, firms with increased leverage have 24.7 pp. higher probability of needing a bank loan. Also, firm size, defined by the number of employees, is found to exert a significant and sizeable negative impact on the probability of needing a bank loan. Our results imply that the smaller the firm is, the lower the probability of needing a bank loan. These findings are also consistent with (Drakos and Giannakopoulos, 2018).

Turning to the outcome equation, we find that the likelihood of a firm being discouraged is negatively affected by a shock of ESI[3] (see Table 2). In particular, we find that Eurozone firms face a 31.5 pp. lower probability of being discouraged in the presence of a higher *esi_shock*. Furthermore, given that sentiment shock is driven by expectations about the future economic outcomes, an increased economic sentiment reflects optimism and more favorable prospects for the future path of the economy (e.g., Pindado et al., 2017). As Hancock and Wilcox (1998) supported, banks use sentiment indicators as information variables, thus making increased sentiment to be likely translated into increased bank credit supply. As a result, the estimated marginal effect on sentiment shock reflects both of these positive influences on discouragement ratios.

Regarding the results from Table 3, we see that when we include both *esi_shock* and *esi_shock_volat,* the former retains its negative and statistically significant impact on discouragement, where the probability of discouragement decreases by 22.8 pp. under a higher *esi_shock*. Turning now our attention to *esi_shock_volat,* we find that it exerts a positive impact on discouragement. In particular, we find that a higher volatility of ESI shock increases firms' likelihood of not applying for a bank loan due to fear of possible rejection by 34.6 pp. Delis et al. (2014) also showed that during anxious periods economic agents' sentiment decreases hence contracting bank credit growth. In a similar vein, Cortés et al. (2016) supported that banks reduce their loan supply when economic sentiment declines. Consequently, a higher sentiment volatility negatively influences potential borrowers' perception to apply for a bank loan through the credit supply channel.

Concerning the control variables, most firm level characteristics prominent in the literature show either no or marginal effect on discouragement ratios. However, a worth-mentioned variable is size, which is found to exert a significant and sizeable positive impact on the probability of being discouraged. We document that micro-firms face the highest probability of being discouraged (almost 11 pp.). We also find that the likelihood of discouragement diminishes with firm size, which is consistent with the past relevant literature (e.g., Levenson and Willard, 2000; Xiang et al., 2015; Kallandranis and Drakos, 2020; Rostamkalaei et al., 2020), arguing that small businesses despite their greater desire for credit are more discouraged from applying for a bank loan. As Drakos and Giannakopoulos (2011) also stated, size, based on the employment level could be a signal for firms' ability to repay the loan, therefore making larger firms less discouraged to request a bank loan.

[3] As also supported by Chen *et al.,* (2021) during an expansion, market sentiment is high, while at the same time firms increase investment as they become optimistic about the demand for their product.

Table 3
Heckman Selection model for Discouragement (selection: Need, outcome: Discouraged), including both esi_shock and esi_shock_volat as main explanatory variables.

	Discouraged	Need
esi_shock	**−0.228*** **	**–**
	[0.047]	
	0.346* **	**–**
esi_shock_volat	[0.045]	
ownership1	−0.011	−0.010
	[0.015]	[0.056]
ownership2	−0.010	0.014
	[0.013]	[0.045]
ownership3	−0.021*	−0.048
	[0.012]	[0.047]
ownership4	0.028	−0.131
	[0.029]	[0.084]
ownership5	−0.010	−0.005
	[0.014]	[0.046]
ownership6	−0.025**	0.031
	[0.012]	[0.052]
legal1	–	–
legal2	−0.053*	0.247***
	[0.029]	[0.084]
legal3	−0.028	0.104
	[0.018]	[0.085]
legal4	–	–
age1	−0.013	0.260
	[0.042]	[0.186]
age2	0.008	0.285
	[0.051]	[0.181]
age3	−0.001	0.271
	[0.046]	[0.180]
age4	−0.006	0.194
	[0.049]	[0.179]
size1	0.111***	−0.136***
	[0.014]	[0.025]
size2	0.068***	−0.150***
	[0.012]	[0.024]
size3	0.021**	−0.133***
	[0.009]	[0.024]
size4	–	–
turnover1	0.019	−0.130
	[0.026]	[0.087]
turnover2	0.034	−0.059
	[0.028]	[0.087]
turnover3	0.080**	0.110
	[0.035]	[0.087]
	0.028*	0.358***
interest_expense1	[0.016]	[0.055]
	0.007	−0.086
interest_expense2	[0.013]	[0.054]
	−0.022*	−0.072
interest_expense3	[0.012]	[0.055]
	0.036*	−0.288***
interest_expense4	[0.020]	[0.057]
leverage1	0.031***	0.247***
	[0.012]	[0.041]
leverage2	0.004	−0.178***
	[0.010]	[0.039]
leverage3	0.014	−0.298***
	[0.011]	[0.040]
leverage4	−0.008	−0.386***
	[0.011]	[0.047]
sector1	0.008**	0.124***
	[0.004]	[0.015]
sector2	0.013**	0.057***
	[0.005]	[0.020]
sector3	0.002	0.020
	[0.003]	[0.015]
sector4	–	–

(*continued on next page*)

Table 3 (*continued*)

	Discouraged	Need
Constant	–	−0.038 [0.222]
Diagnostics		
Observations	65,001	
Inverse Mills ratio	0.060	
Wald test overal significance (Probability value)	0.000	
Wald test of indepen-dence (Probability value)	0.064	

Notes: (a) This table presents the results of the estimated two-stage probit regressions described in the methodology section of the paper for model 5b, (b) *, **, *** denote statistical significance at the 10, 5 and 1 percent level respectively, (c) numbers in brackets denote cluster robust standard errors.

4. Concluding remarks

The importance of discouraged borrowers has been recognized in both the theoretical and empirical literature. This study contributes to the literature by modeling for the first time the behavior of the potential discouraged bank borrowers, by augmenting the potential determinants of borrower discouragement by the shock in the economic sentiment and the volatility of economic sentiment. Our results support that higher economic uncertainty, as denoted by a higher volatility in the economic sentiment shock, increases the probability of a firm being discouraged to apply for a loan. In addition, we provide evidence that a positive shock at the ESI decreases the likelihood of discouragement.

Taken together, the results of this paper are indeed novel, and they have important implications for both policymakers and macroprudential regulators, given their responsibility for forming proper macroeconomic conditions that facilitate the access of firms to bank loans. The implications of the findings are even more interesting as they clearly highlight that the informational based theories of credit rationing appear to become more valid within a negatively shaped economic climate. Indeed, the self-rationed approach establishes an actual market imperfection that can lead to implications that might undermine SMEs viability and thus, to a market failure. This hesitancy to borrow and accordingly to invest leads SMEs to a falling off and puts the economy at risk of hysteresis. This is of great importance for policy makers and bankers in order to cement the financial system making sure that probable misjudgment of finance seekers will not influence their likelihood of obtaining a loan and thus pausing the overall credit market. The only way out of this puzzle for policymakers is to enhance even more the information sharing among participants in the credit market in order to improve the availability of finance even when economic conditions are not than favorable.

In terms of the direction of future avenue of research, a possible extension of this empirical work would be to explore the examination of the nature and effects of SMEs rationing per country and the actual composition of bad and good borrowers amongst those currently are self-characterized as discouraged. Besides, given people's sentiment, it would be interesting to consider the lasting effect of a negative sentiment among SMEs, even when banks are starting to relax their lending criteria. Finally, our study could be extended by examining not only additional control variables, but also what factors lead businesses to become excessively pessimistic about the likely outcome of loan applications. Is it just the general feeling of the dominant economic climate or there should be other explanations too? To answer this question, we need to explore whether there are any gaps between perceived and actual success probabilities.

Declaration of competing interest

No conflict of interest exits in the submission of this manuscript, and this manuscript is approved by all authors for publication.

Appendix

Table A1 and A2

Table A1
Definition of factors affecting discouraged borrowers.

Factor	Depending on	Proxy Definition
esi_shock	**Sentiment**	Shock of ESI as derived following the methodology of Lemmon and Portniaguina (2006)
esi_shock_volat		Volatility of ESI shock as derived by the estimation of a Pooled Panel GARCH (1,2)
ownership1	**Ownership type**	1, if one owner only; 0, otherwise
ownership2		1, if family; 0, otherwise
ownership3		1, if business associates; 0, otherwise
ownership4		1, if public shareholders; 0, otherwise
ownership5		1, if venture capital enterprises or business angels; 0, otherwise
ownership6		1, if other ownership type; 0, otherwise
legal1	**Legal form**	1, if a subsidiary of another enterprise; 0, otherwise
legal2		1, if a branch of another enterprise; 0, otherwise
legal3		1, if an autonomous profit-oriented enterprise; 0, otherwise
legal4		1, if a non-profit enterprise; 0, otherwise
age1	**Age**	1, if age≥10 years or more; 0, otherwise
age2		1, if age ≥5 & <10; 0, otherwise
age3		1, if age ≥2 & <5; 0, otherwise
age4		1, if age <2; 0, otherwise
size1	**Size**	1, if # of employees ≥1 & ≤9; 0, otherwise
size2		1, if # of employees ≥10 & ≤49; 0, otherwise
size3		1, if # of employees ≥50 & ≤249; 0, otherwise
size4		1, if # of employees ≥250; 0, otherwise
turnover1	**Financial**	1, if turnover increased over the past six months; 0, otherwise
turnover2		1, if turnover remained unchanged over the past six months; 0, otherwise
turnover3		1, if turnover decreased over the past six months; 0, otherwise
interest_expense1		1, if interest expenses increased over the past six months; 0, otherwise
interest_expense2		1, if interest expenses remained unchanged over the past six months; 0, otherwise
interest_expense3		1, if interest expenses decreased over the past six months; 0, otherwise
interest_expense4		1, if not applicable over the past six months; 0, otherwise
leverage1		1, if financial leverage increased over the past six months; 0, otherwise
leverage2		1, if financial leverage remained unchanged over the past six months; 0, otherwise
leverage3		1, if financial leverage decreased over the past six months; 0, otherwise
leverage4		1, if not applicable over the past six months; 0, otherwise
sector1	**Sector type**	1, if construction; 0, otherwise
sector2		1, if industry; 0, otherwise
sector3		1, if wholesale or retail trade; 0, otherwise
sector4		1, if transport; 0, otherwise

Table A2
Descriptive statistics of main and control variables.

Variable	Number of Observations	Mean	Standard Deviation	Skewness	Kurtosis
discouraged	71,765	0.108	0.310	2.530	7.405
need	121,682	0.589	0.492	−0.365	1.133
esi_shock	126,944	−0.002	0.041	−0.240	3.386
esi_shock_volat	174,160	0.113	0.050	−0.915	2.899
ownership1	167,774	0.037	0.188	4.931	25.318
ownership2	167,774	0.477	0.499	0.091	1.008
ownership3	167,774	0.128	0.334	2.228	5.965
ownership4	167,774	0.008	0.092	10.723	115.993
ownership5	167,774	0.305	0.460	0.846	1.716
ownership6	167,774	0.029	0.169	5.586	32.206
legal1	174,087	0.054	0.226	3.954	16.642
legal2	174,087	0.850	0.357	−1.957	4.833
legal3	174,087	0.093	0.290	2.805	8.869
legal4	174,087	0.003	0.057	17.530	308.318
age1	174,087	0.015	0.122	7.982	64.715
age2	174,087	0.052	0.222	4.043	17.346
age3	174,087	0.119	0.324	2.350	6.522
age4	174,087	0.797	0.402	−1.479	3.187
size1	174,087	0.364	0.481	0.565	1.320
size2	174,087	0.304	0.460	0.851	1.725
size3	174,087	0.249	0.432	1.162	2.352
size4	174,087	0.083	0.276	3.015	10.093

(*continued on next page*)

Table A2 (*continued*)

Variable	Number of Observations	Mean	Standard Deviation	Skewness	Kurtosis
turnover1	174,087	0.393	0.488	0.438	1.191
turnover2	174,087	0.326	0.469	0.741	1.550
turnover3	174,087	0.275	0.447	1.007	2.014
interest_expense1	174,087	0.221	0.415	1.346	2.812
interest_expense2	174,087	0.480	0.500	0.080	1.006
interest_expense3	174,087	0.170	0.376	1.752	4.071
interest_expense4	174,087	0.080	0.272	3.084	10.516
leverage1	102,133	0.149	0.356	1.971	4.888
leverage2	102,133	0.494	0.500	0.025	1.000
leverage3	102,133	0.233	0.423	1.260	2.589
leverage4	102,133	0.098	0.298	2.694	8.261
sector1	174,087	0.217	0.413	1.369	2.876
sector2	174,087	0.102	0.303	2.626	7.898
sector3	174,087	0.245	0.430	1.185	2.406
sector4	174,087	0.352	0.478	0.619	0.619

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