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Dynamic Discouraged Borrowers

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This paper investigates the intertemporal dynamics of borrower discouragement. Using a cross-country panel of firms that were resurveyed across the waves of the Survey on Access to Finance of Enterprises, we find that the probability of transitioning into discouragement changes over the business cycle and across bank financing products: term loans and credit lines. Past credit experiences and firm-level risk indicators are important factors in explaining the probability of being discouraged over time. We also analyse the transitioning out of discouragement, and show that firm-level improvements in credit history and profit outlook drive the transitioning out of the discouragement state.

Introduction

Discouragement has been recognized as a widely spread phenomenon in debt markets and this is particularly important as access to bank term loans and credit lines is strongly positively associated with firm value if employed intensively (Berger *et al.*, 2021). Previous research has shown that discouraged borrowers are twice as prevalent as rejected borrowers. However, until recently it was difficult to investigate the subject as, unlike rejections, discouragement is largely unobservable. The empirical literature usually takes a static approach by comparing discouraged borrowers with applicant and non-applicant firms, implicitly assuming that once a discouraged borrower always a discouraged borrower, without taking into consideration the fact that the phenomenon might be a transitory status during a firm's lifetime. In this paper, we overcome this limitation by trying to answer the following research question: how do firms change their status into and out of discouragement over time? To convincingly answer this question, one needs to observe a sample of firms that are resurveyed over time and trace back the internal and external factors that shape the decision to not apply because of fears of being rejected. Given the fact that firms interact multiple times with their financiers, our idea is that discouragement arises as a result of a learning process. Current discouraged borrowers, for example, might be firms that recently applied and got their application rejected, or can be firms that are guided by experienced entrepreneurs rationally formalizing their expectations about the outcome of a loan application and declaring discouragement.

The seminal theoretical work of Kon and Storey (2003) explained the reasons why discouraged borrowers exist. The theoretical model is a one-time model in which discouraged borrowers arise because of screening errors, application costs and the extent to which the bank interest rate differs from that charged by the money lender. However, in practice, the phenomenon of discouragement is complex and might be the result of a dynamic learning process driven by a multitude of factors. In this paper we seek to analyse how these learning processes adapt and occur in credit markets and give rise to the phenomenon of discouragement. In conducting our analysis, we also dedicate particular attention to two main factors that shape the phenomenon: the economic cycle and the type of bank financing product.

To do so, we focus on firms that were resurveyed multiple times in the ECB 'Survey on Access to Finance of Enterprises' (SAFE) to unveil the intertemporal dynamics of borrower discouragement. Using a panel regression that links past

credit constraints to the probability of moving into discouragement, we show that firms that had bad credit experiences (those that were partially or fully rationed in the past) are more likely to be discouraged for both term loans and credit lines. The probability of moving into discouragement is also linked to firm and country-level factors. Among firm-level covariates, we noticed that age and capital are important determinants in the transitioning into discouragement for term loans, while for credit lines, financing size and credit history are the key firm-level factors. Importantly, we also show that the dynamics change depending on the type of financing product – credit lines or term loans – and during two different phases of the economic cycle – crisis and post-crisis.

In a second step, we also unveil the transition out of discouragement. To this end, we find that improvements in credit history and profit outlook are important determinants, while previous negative experiences have no long-lasting effects on firms' discouragement. Importantly, we also show that the likelihood of moving out of discouragement is mostly driven by improvements in the business climate, which are captured by time fixed effects.

Our study contributes to the literature on borrower discouragement in different ways. First, we apply a dynamic approach which is particularly important as firms transition from one state of engaging with the market for debt into a state of discouragement and vice versa. The typical way to think about discouraged borrowers – as shown in Kon and Storey (2003) – describes the phenomenon as a one-stage process, without taking in consideration the fact that discouragement might be a result of an evolving process. Since firms interact multiple times with financial institutions when seeking external financing it could be that past experiences, the recent evolution of their credit risk profile and the economic cycle are important in determining their willingness to put forward new funding applications. Bad previous experiences (credit denials), increased credit risk and the evolution of the external environment might increase the likelihood of transitioning from a state where firms that need funding are willing to apply, into a state of discouragement. Studying the phenomenon by using a dynamic approach is important for businesses and their owners and managers, as remaining in a state of discouragement for long periods of time will constrain their ability to invest in new opportunities and generate future growth. The approach is different from the recent empirical evidence on the determinants of borrower discouragement (Cole and Sokolyk, 2016; Han, Fraser and Storey, 2009; Mac an Bhaird, Vidal and Lucey, 2016) and on the effect of loan application costs on the level of discouragement (Ferrando and Mulier, 2022), but it is complementary and adds some important new insights to this body of knowledge.

Second, we apply this approach over a long period that allows us to distinguish how the dynamic process evolves during the crisis and in normal times. In this regard, the literature usually focuses on short periods characterized by particular events, such as the Global Financial Crisis (GFC) (Cowling *et al.*, 2016). In our work, we rely on a longer time period, which allows us to differentiate the phases of the economic cycle.

Third, we distinguish between different banking products: term loans and credit lines. Different banking products entail different exchanges of bank–firm information, which can shape the propensity of moving into and out of discouragement. The empirical literature is less rich on this point as it usually concentrates on the context of term loans, which entail a lower exchange of information during the lending relationship. On the contrary, credit lines might be more strategic for the lending partner as they might be used as a vehicle for exchanging information and learning about how firms behave. In this regard, Berger *et al.* (2021) finds a special role of credit lines in supporting long-term firm performance and improving bank–firm relationships.

From a broader perspective, our study also fits into the debate around the availability of credit to small and medium-sized enterprises (SMEs). Cosh, Cumming and Hughes (2009) established that capital is not always available to SMEs in the form they would prefer, which may increase discouragement, and Block *et al.* (2018) identifies significant new players in the market for entrepreneurial finance which may reduce discouragement. Barbalau, Huson and Roth (2022) also highlight the critical role that cash holdings play in the bank lending process. This also relates to wider debates around the democratization of entrepreneurial finance, defined as 'the creation of more equality regarding the access to financial resources by categories known to be underrepresented among potential entrepreneurs' (Fisch, Meoli and Vismara, 2020: 70) and the potential for

new forms of finance to improve the outcomes of under-capitalized groups of entrepreneurs such as discouraged borrowers.

The remainder of the paper is organized as follows. The next section discusses the previous relevant literature and formulates the main hypotheses. The third section presents the dataset, the variables and the empirical strategy. The fourth section presents and discusses the results. The fifth section concludes the paper.

Previous relevant literature and hypothesis development

Information in bank–firm relationships is at the heart of the literature on small business financing. In their seminal work, Stiglitz and Weiss (1981) argue that borrower quality is ex-ante difficult to evaluate by the lending bank. Through their credit screening technologies, lenders have an imperfect picture of borrowers' quality when they submit an application for funds. A second problem, arising ex-post (once the loan is granted), would be whether the borrower responds to an increase in interest rates by switching to riskier projects. Adverse selection and moral hazard resulting from information asymmetries between firms and banks lead to a supply of capital below the social optimum (De Meza and Southey, 1996; Stiglitz and Weiss, 1981). In such a context, many good borrowers might not apply for a loan because they feel they will be rejected (discouraged borrowers). Kon and Storey (2003) formalize a theory on why discouraged borrowers exist. The paper shows that the scale of discouragement in an economy depends on three factors: screening errors of the banks, the scale of application costs and the extent to which the bank interest rate differs from that charged by money lenders.

In the following subsections, we analyse in detail three main groups of factors that allow us to set the grounds for the hypothesis section on the intertemporal dynamics of discouragement.

Firm characteristics

The empirical literature on borrower discouragement identifies firm determinants that lead to discouragement. The common thread of the literature is barriers to lending markets stemming from information asymmetries. A firm's capacity to meet lenders' requirements in terms of information is dependent on firms' characteristics and resources available. Large firms with established lending relationships are more likely to have their credit needs satisfied (Berger and Udell, 2006; Canton *et al.*, 2013; Cowling, Liu and Ledger, 2012; Fraser, 2019). Firms with poor lending relationships and those that have missed loan repayments in the past are more likely to have credit needs but more likely to be constrained in obtaining finance (Baas and Schrooten, 2006; D'Aurizio, Oliviero and Romano, 2015; Fraser, 2019; Rajan, 1992). Conditional on credit needs, the literature shows that discouragement is more likely to be concentrated in smaller, younger and less profitable firms (Cole and Sokolyk, 2016; Cowling *et al.*, 2016; Mac an Bhaird, Vidal and Lucey, 2016). Clearly, newborn firms will have less experience in credit markets and self-rationing (Calabrese, Girardone and Sclip, 2021). The smallest and most informationally opaque SMEs are more likely to be discouraged (Berger and Udell, 1998; Cowling *et al.*, 2016), because such firms have less well-established banking relationships (Rostamkalaei, Nitani and Riding, 2020). This suggests that banking relationships facilitate bilateral information flow between borrowers and lenders, thereby reducing information asymmetries (Cole and Sokolyk, 2016; Han, Fraser and Storey, 2009; Petersen and Rajan, 2002). In this regard, recent work of Rostamkalaei, Nitani and Riding (2020) shows that firms with more established banking relationships are more prone to suspend their formal loan applications following informal talks with their banks rather than being discouraged by their own judgement. Recent work of Brown, Liñares-Zegarra and Wilson (2022) shows that self-rationing is also prevalent among innovators (product and process). Firm-level determinants of discouragement for Eurozone borrowers are identified by Mac an Bhaird, Vidal and Lucey (2016). The authors show that discouraged borrowers are smaller, younger firms with declining turnover and increasing debt-to-asset ratios.

Macroeconomic factors

According to the financial accelerator theory (Bernanke, Gertler and Gilchrist, 1996), in the presence of an adverse macroeconomic shock, banks reduce credit more to risky firms. The key underlying reason for this portfolio mechanism

– termed 'flight to quality' – can be explained through information asymmetries and agency costs related to the credit markets, which vary along the economic cycle. Imperfections in credit markets are reflected in the external finance premium charged to borrowers. When a crisis breaks out, the premium increases due to the higher uncertainty in financial markets. In such a context, banks are more rigorous in their screening process and even good-quality firms are more afraid of being rejected (Calabrese, Girardone and Sclip, 2021; Rodano, Serrano-Velarde and Tarantino, 2018). Informationally opaque small businesses, which rely on bank credit, were among the most affected by rising credit intermediation costs. The empirical evidence on discouraged borrowers documents that following the GFC shock (Cowling *et al.*, 2016) and the Eurozone debt crisis (Calabrese, Girardone and Sclip, 2021), the share of discouraged borrowers in an economy increases. Such an increase is explained by both supply (tightening of lending standards and increased application costs) and demand factors (misperceptions of a possible rejection).

Firm balance sheet strength is important to overcome a tightening of lending standards. The literature shows that during the crisis, the credit crunch is concentrated in small and young opaque borrowers. Moreover, during the crisis period relationship variables usually outweigh other firm-risk indicators (Cowling, Liu and Ledger, 2012). For example, it is common wisdom that relationship lending allows firms to mitigate the negative effects of a credit crunch (Beck *et al.*, 2018).

Mol-Gómez-Vázquez, Hernández-Cánovas and Koëter-Kant (2019) shows that financial instability raises application costs, since banks will seek to reduce the risk of their portfolios by asking borrowers for additional information. Such an increase deters borrowers from putting forward loan applications (Mol-Gómez-Vázquez, Hernández-Cánovas and Koëter-Kant, 2019), thereby increasing discouragement. The importance of application costs is well investigated in a recent paper of Ferrando and Mulier (2022), in which the authors find that a reduction of application costs following a legal change in Belgium reduced the number of discouraged borrowers in an economy.

Finally, the empirical literature also shows that the structure of the banking sector and the competition within it is an important determinant of borrower discouragement. Dominant banks are less incentivized to invest in stable and long lending relationships (Mol-Gómez-Vázquez, Hernández-Cánovas and Koëter-Kant, 2019), leading to higher shares of discouragement in an economy.

Type of bank financing

The exchange of information and thus the level of information asymmetries between borrowers and lenders varies depending on the type of financing product. Different bank financing products entail different levels of bilateral information flows and agency costs. Term loans and credit lines are the most common type of debt, both in terms of number and volume of loans (Ivashina, Laeven and Moral-Benito, 2022). Credit lines are different from loans in several dimensions: contract and function, and the type of collateral usually pledged. In terms of contract dimensions, the main difference between a credit line and a standard-term loan contract is that a credit line allows firms to draw a pre-committed amount of funds when firms need it (Holmstrom and Tirole, 1998). With credit lines, the lender determines ex-ante an amount of cash that the borrower can draw down in the future (ex-post); once the amount of credit is drawn down, the lender only has discretion in denying further request for funds by the borrower. Such a difference increases agency conflicts between lender and borrowers, as credit lines will be drawn down in low-state cash flows when liquidity is needed most. This agency conflict is exacerbated during the crisis and/or following firm profitability shocks, and results in restricted access to credit lines when the borrower needs them most (Sufi, 2009). On the contrary, term loans are characterized by an ex-ante fixed schedule of payments and a lower bilateral flow of information.

The importance of firm-level indicators and the strength of the relationship varies across lending products. For credit lines, past credit records (credit history) in terms of loans paid and the responses of past credit inquiries is the most important piece of information, since it conveys information on how a firm behaves in the short term and how reliant on debt an entrepreneur is (Berger *et al.*, 2021). Meanwhile for term loans, bank monitoring is less intense. By analysing the specialness of bank debt, Berger *et al.* (2021) show that credit lines appear to work as channels to build relationships that enhance firm performance, which is less often the case for term loans.

Hypothesis development

The literature analysed so far identifies firm-level and macroeconomic determinants of discouragement by comparing firms in a state of discouragement with non-applicants, applicants and credit-rationed firms. Empirical investigations were performed in the cross-section for term loans, without considering the evolution of a firm's status over time and how the characteristics might differ for credit-line financing. This is because discouragement is observable only through questionnaire data, which is usually distributed one time to a firm and usually refers to the most used type of bank financing: term loans. In this paper we overcome these three limitations and analyse the dynamic evolution of a discouraged borrower over different phases of the economic cycle (crisis and post-crisis) for both term loans and credit lines.

The underlying idea is the following. Entrepreneurs require several infusions of bank credit at different stages in the firm's lifecycle, leading to multiple interactions with their financiers. By implication, learning by both entrepreneurs (Jovanovic, 1992) and banks (Petersen and Rajan, 1994) will take place and experience increases over the interactions. In this respect, discouragement might arise because of multiple contingent factors that are embedded in the entrepreneurial experience. Every time a firm interacts with its bank, it receives feedback, which is injected into the entrepreneurial experience. The stock of the feedback is dependent on the level of information asymmetry entrenched in the lending relationship, which varies depending on the three main factors highlighted above: firm-level characteristics, the economic cycle and the type of lending product. Each factor shapes the level of information asymmetry and thus the propensity of moving into discouragement. It is reasonable to hypothesize that apart from these three factors, recent experiences in the credit market take an important role. It could be, for example, that entrepreneurs who experienced a credit refusal do not feel confident about future loan applications and become discouraged. In this regard, recent developments identified an important subset of discouraged borrowers called 'scarred borrowers', who are defined as those who have experienced a previous credit refusal and withdrawn from the market completely (Calabrese, Cowling and Liu, 2021).

The discussion above leads to our first hypothesis:

H1: Firms react to tangible internal and external signals from the credit market and move into a discouraged state.

A fraction of firms that were discouraged in the past might move out of their discouraged status. Entrepreneurs' expectations about a positive result of a loan application might improve across time. Cowling *et al.* (2016) and Fraser (2019) estimate that more than half of discouraged borrowers would make successful loan applications if they applied. Fraser (2019) also argues that entrepreneurs tend to overestimate their perceived likelihood of a rejection. The gap between perceived and actual rejection probabilities might vary depending on the level of information asymmetry, which is dependent on the three factors highlighted above: firm-level characteristics, economic cycle and the type of lending product. With regard to the first, it could be that improvements in profits and bank–firm relationships increase the confidence of the entrepreneur about a positive outcome of a possible loan application, moving a firm out of discouragement. With regard to the economic cycle, during a crisis period firms might become less confident about a positive outcome of a loan application and self-select out of the credit market. On the contrary, during normal times, firms might be overconfident about their application outcomes and apply for external financing. With regard to lending products, as said before, firms that use credit lines usually have a higher exchange of information with their banks, leading to higher information transparency in their bank–firm relationships (Berger and Udell, 1998; Petersen and Rajan, 2002). Given informal talks, entrepreneurs might be more conscious about their credit risk and make a loan application only when their risk profile really improves. In the case of credit lines, given the higher exchange of information and experience to set up the application, it could be that previous negative experiences had a lower long-lasting effect on discouragement.

This leads to our second hypothesis:

H2: Firms react to soft signals of prevailing market conditions to move out of discouragement.

Data and empirical methodology

SAFE data description

Firm data is from the ECB/EC SAFE survey. The survey has three characteristics that make it particularly suitable for our empirical analysis: (1) it contains information on both the availability and the needs of external finance in the 6 months preceding the interview for a cross-country sample of enterprises domiciled in the Eurozone; (2) when possible, firms are resurveyed along the waves of the survey, giving us the possibility to extract a panel of firms resurveyed; and (3) it collects a large set of information on firm characteristics such as country, sector, size, age, performance, legal status and ownership structure. The survey starts in 2009H1 and is conducted every 6 months. Firms surveyed are randomly selected from the Dun & Bradstreet business register and stratified by country, economic activity and size. In terms of sectoral activity, survey respondents are divided into four large industries based on the one-digit NACE classification: manufacturing, construction, services and retail and trade. Firms in agriculture, public administration and financial services are excluded.

In this study, we use 20 waves of the survey (from wave 1 to wave 20) that correspond to the period from January 2009–June 2009 to October 2018–March 2019,[1] for the 11 major Eurozone economies. After eliminating missing data, we retain only firms that were resurveyed along the survey waves. The final sample contains 26,225 unique firms and 86,388 firm-level observations. Given the evolution of the macroeconomic context, we conduct our analysis in two separate subsamples. The first subsample covers the financial crisis period till the end of 2013, while the second subsample period starts with the massive liquidity injections described: from 2014H1 to 2018H2 (from wave 11 to wave 20).[2]

We initially classified firms based on their need for external finance into two groups: those that need external finance and those that do not. Those that need external finance are further classified into two groups: discouraged borrowers and firms that apply for credit. Those that apply for credit are further classified into three subsets: firms that got everything,[3] loan scaled (received less than 75% of requested) and credit denied. The classification is made across lending products (term loans and credit lines) using specific questions of the questionnaire that ask firms if they have applied for a banking product as well as the reasons why not. More precisely, for term loans the SAFE questionnaire asks [bank loan demand]: 'With regards to bank loans, could you please indicate whether you: (1) applied for them over the past 6 months [Applied]; (2) did not apply because you thought you would be rejected [Discouraged]; (3) did not apply because you had sufficient internal funds [Sufficient internal funds]; (4) did not apply for other reasons [Did not apply for other reasons].' For those that applied for a bank loan, the survey asks for information on the result of their application [bank loan result]: 'If you applied for a bank loan over the past 6 months, did you: (1) receive almost all the financing you requested [Got almost everything]; (2) receive only part of the financing you requested [Loan scaled]; (3) refuse to proceed because of unacceptable costs of terms and conditions [Refused]; (4) or have you not received anything at all [Denied]; (5) Application is still pending.' In a similar way the two questions are repeated for credit-line products.

We categorize firms that need a term loan as those that apply for a term loan or do not apply because of fear of being rejected; zero otherwise. We made the same categorization for firms that need a credit line. More precisely, those that apply for a credit line or do not apply because of fear of being rejected are categorized as firms that desire a credit line; zero otherwise.

Firm-specific and macro control variables

Table 1 reports the definitions and summary statistics of all dependent and independent

[1]See Appendix Table A.1 for details of the reference period. See Appendix Table A.2 for details of the sample composition across country and industry. We retain the 11 major Eurozone economies because firms domiciled in these countries are surveyed in all the waves used; small countries are usually surveyed on an annual basis (e.g. firms domiciled in Hungary are surveyed every two waves).

[2]See Appendix Table A.1 for details of the reference period and the main context. The crisis panel contains 12,778 distinct firms and 34,664 observations. The post-crisis panel contains 16,151 unique firms and 51,724 observations.

[3]Firms that refused a loan due to higher costs are a very small subsample (roughly 1% of the applicants) and are

Table 1. Descriptive statistics

Variable	Description	Obs.	Mean	SD	Min	Max
Panel A: Firm-level variables						
Need loan	Dummy variable equal to one for firms that desire a term loan; zero otherwise. [Survey question: Q7A_a]	78,742	0.36	0.48	0	1
Discouraged loan	Dummy variable equal to one for firms that did not apply for a term loan because of fear of being rejected; zero otherwise. [Survey question: Q7A_a]	78,742	0.07	0.25	0	1
Got everything loan	Dummy variable equal to one if a firm applied for term loan and received everything requested; zero otherwise. Conditional on applicant. [Survey question: Q7B_a]	21,484	0.82	0.38	0	1
Loan scaled	Dummy variable equal to one if a firm applied for a term loan and received part of the amount requested; zero otherwise. Conditional on applicant. [Survey question: Q7B_a]	21,484	0.09	0.28	0	1
Loan denied	Dummy variable equal to one if a firm applied for a term loan and is credit denied; zero otherwise. Conditional on applicant. [Survey question: Q7B_a]	21,484	0.09	0.29	0	1
Need credit line	Dummy variable equal to one for firms that desire a credit line; zero otherwise. [Survey question: Q7A_b]	69,582	0.34	0.47	0	1
Discouraged credit line	Dummy variable equal to one for firms that did not apply for a credit line because of fear of being rejected; zero otherwise. [Survey question: Q7A_b]	69,582	0.06	0.23	0	1
Got everything credit line	Dummy variable equal to one if a firm applied for a credit line and received everything requested; zero otherwise. Conditional on applicant. [Survey question: Q7B_b]	18,480	0.80	0.39	0	1
Credit line scaled	Dummy variable equal to one if a firm applied for a credit line and received part of the amount requested; zero otherwise. Conditional on applicant. [Survey question: Q7B_a]	18,480	0.11	0.31	0	1
Credit line denied	Dummy variable equal to one if a firm applied for a credit line and is credit denied; zero otherwise. Conditional on applicant. [Survey question: Q7B_a]	18,480	009	0.28	0	1
Size	Variable equal to one for micro firms (1–9 employees); two for small firms (10–49 employees); three for medium-sized firms (50–249 employees). [Survey question: D1]	86,388	1.916	0.802	1	3

Table 1. (Continued)

Variable	Description	Obs.	Mean	SD	Min	Max
Panel A: Firm-level variables						
Age	Variable equal to one if the firm is less than 2 years old; two if the firm is between 2 and 5 years old; three if the firm is between 5 and 10 years old; four if the firm is 10 years or more. [Survey question: D5]	86,388	3.706	0.727	0	4
Turnover increase	Dummy variable equal to one if the firm's outlook with respect to sales and profitability improved in the past 6 months; zero otherwise. [Survey question: Q11c]	86,153	0.406	0.491	0	1
Capital improved	Dummy variable equal to one if the firm's capital position improved in the past 6 months; zero otherwise. [Survey question: Q11d]	85,642	0.279	0.449	0	1
Credit history improved	Dummy variable equal to one if the firm's credit history improved in the past 6 months; zero otherwise. [Survey question: Q11e]	83,776	0.275	0.447	0	1
Family owner	Dummy variable equal to one if the firm's owner is an individual or a family; zero otherwise. [Survey question: D6]	85,424	0.530	0.499	0	1
Exp. bank financing	Dummy variable equal to one if the firm expects an improvement in bank willingness to provide funds. [Survey question: Q11f]	77,859	0.190	0.392	0	1
Subsidiary	Dummy variable equal to one if the firm's owner is another enterprise; zero otherwise. [Survey question: D6]	85,424	0.107043	0.309169	0	1
Panel B: Country-level controls						
Unemployment	National unemployment rates from Eurostat.	86,388	0.111	0.059	0.033	0.277
CR-5	A measure of banking concentration, calculated as a fraction of assets held by the five largest banks to total commercial banking assets in a country. Collected from ECB data-warehouse.	86,388	0.542	0.189	0.250	0.973
Branch density	Number of commercial bank branches per square kilometre. From Financial Access Survey, IMF Data.	86,393	0.486	0.320	0.007	1.422

This table shows firm-level control variables used together with their description, the number of the observations, mean, standard deviation, minimum and maximum. For an easier replication of our study, the survey question used is provided in square brackets.

variables[4]. The independent variables capture firm-level risk indicators and common firm characteristics. Firm-level risk indicators include size, age, performance, capital and credit history. Firm size is a categorical variable by employee numbers: equal to one for micro (1–9 employees), two for small (10–49 employees) and three for medium (50–249 employees). Age is given by bands: equal to one for firms with 2 years or less, two for firms with 2–5 years of track records, three for firms with a range from 5 to 10 years and four for firms with 10 years or more. Table 1 shows that the average size corresponds to small-sized firms. In terms of age, most of the firms are more than 10 years old (roughly 80% of the respondents). Performance, capital and credit history are measured in banded changes over the past 6 months (increased, same or decreased). With these pieces of information, we create three dummy variables that switch to one when a firm reports an increase in sales (turnover improved), capital (capital improved) and credit history (credit history improved). On average, 39% and 27% of firms report an improvement in their performance and leverage, while 26% declare an improvement in their credit history. Information on ownership structure is captured by a dummy variable that takes value one for firms that are family owned. Family firms represent half of the firms surveyed (51%).

We also include controls at the country level. More precisely, we include the level of unemployment, a measure of banking sector concentration and a measure of bank–firm proximity. In Appendix Table A.4 we plot the correlation matrix among the main variables.

Empirical methodology

Discouraged borrowers self-select out of the credit market and loan outcomes are only observed for loan applicants. If we are to examine the effect of the previous loan application outcomes on the propensity of being discouraged, the selection mechanism should be taken into consideration as the sample of firms that apply for credit is not a random sample of the population of firms. Moreover, there are two other factors to consider. First, bank loans and credit lines are two different banking products that serve different financing needs. A firm might have sufficient funds to not request a credit line but might not have sufficient funds to compensate for their need to obtain a loan for financing their investments. Second, the economic cycle has an influence on firm demand and likelihood of applying for bank financing that we need to consider. We address this sample selection problem by incorporating information on non-applicant firms in our regression specifications. We extract the inverse Mills' ratio (Heckman, 1979) in first-stage probit regressions to update the second-stage regressions,[5] in which we investigate the likelihood of transitioning into discouragement. To do so, we estimate a panel probit regression with random effects of the following form:

$$y_{i,t} = \gamma X_{i,t} + \theta M_{c,t} + \delta_i + \rho_t + imr + \varepsilon_{i,t} \quad (1)$$

where $y_{i,t}$ is (1) the probability of moving into discouragement conditional on not being discouraged in the previous wave of the survey or (2) the probability of moving out of discouragement conditional on being discouraged in the previous wave of the survey; $X_{i,t}$ and $M_{c,t}$ are vectors of firm and country-level controls described in the text; imr is the inverse Mills' ratio; δ_i and ρ_t are industry and wave fixed effects to control for unobserved industry heterogeneity and time-varying unobserved factors.

Results

In this section, we first unveil the characteristics of discouraged borrowers over the business cycle and the transition probabilities from previous states. Then we uncover the underlying reasons behind the transition into and out of discouragement over time. The analyses are performed in the context

included in the category of firms that applied and got almost everything.

[4]See Appendix Table A.3, for details on the share of discouraged borrowers across countries.

[5]In terms of the exclusion restriction, two additional variables – subsidiary and willingness of banks to lend – are included in the selection model but excluded from the outcome models. The rationale for using these two variables as instruments for demand is the following. Firms that are part of a group will likely have a lower demand for external credit, given the possibility to draw from internal funds. Analogously, firms that have expectations of an improvement in future bank financing are more likely to apply.

Table 2. Descriptive characteristics for discouraged borrowers and for firms that apply and do not apply for a loan

Panel A: Crisis period	(1) Discouraged (Obs. 2282)		(2) Applied (Obs. 9094)		(3) Not applied (Obs. 23,181)			
	Mean	SD	Mean	SD	Mean	SD	(1) over (2)	(1) over (3)
Size	1.69	0.74	2.10	0.77	1.89	0.78	***	***
Age	3.49	0.90	3.60	0.87	3.56	0.92	***	***
Turnover increase	0.29	0.46	0.38	0.29	0.35	0.48	***	***
Capital better	0.15	0.35	0.25	0.43	0.26	0.44	***	***
Credit history	0.16	0.36	0.24	0.43	0.23	0.42	***	***
Family owner	0.56	0.48	0.62	0.49	0.55	0.49	***	
Panel B: Post-crisis	(1) Discouraged (Obs. 2924)		(2) Applied (Obs.14,246)		(3) Not applied (Obs. 27,015)			
	Mean	SD	Mean	SD	Mean	SD	(1) over (2)	(1) over (3)
Size	1.58	0.72	2.07	0.80	1.86	0.81	***	***
Age	3.74	0.62	3.81	0.56	3.78	0.56	***	***
Turnover increase	0.31	0.46	0.48	0.50	0.44	0.50	***	***
Capital better	0.16	0.37	0.30	0.46	0.30	0.46	***	***
Credit history	0.19	0.39	0.34	0.47	0.31	0.46	***	***
Family owner	0.53	0.50	0.53	0.50	0.49	0.50		***

This table shows the descriptive statistics among firm groups. In panel A, we show descriptive statistics and a univariate comparison of difference in means of discouraged borrowers, firms that apply for a loan and those that do not apply for a loan during the crisis. In panel B, we report descriptive statistics and a univariate comparison of difference in means of discouraged borrowers, firms that apply for a loan and those that do not apply for a loan after the crisis. ***, **, * denote significance at the 1%, 5% and 10% level.

of crisis and non-crisis for term loans and credit lines.

Preliminary exploration

Tables 2 and 3 present the descriptive statistics for discouraged borrowers and the other categories of SMEs, as well as univariate mean comparison tests. More precisely, in Table 2 we compare discouraged borrowers with firms that apply and firms that do not apply for a loan. While in Table 3 we compare discouraged borrowers with firms that apply for a loan, distinguishing by the outcome of the application process: got everything, loan scaled and denied. Both tables are divided into panels A and B, where we analyse the evolution of discouraged borrowers and the other firm categories during the crisis (before wave 11) and post-crisis (after wave 11). Discouraged borrowers represent 6.5% of the total firm observations. As shown in Table 1, the majority of firms surveyed do not desire credit because of sufficient internal funds, corresponding to 63.5% of the observations. The level of discouragement both during the crisis (6.3% on average) and post-crisis (6.7% on average) is lower than that observed in the US context by Cole and Sokolyk (2016) and Han, Fraser and Storey (2009), and in line with that observed for studies using UK (Cowling *et al.*, 2016; Freel *et al.*, 2012) and EU data (Calabrese, Girardone and Sclip, 2021; Mac an Bhaird, Vidal and Lucey, 2016). Univariate differences in means allow a preliminary comparison of different types of borrowers. In terms of firm-level characteristics, on average discouraged borrowers are smaller, younger and poorer performing in comparison to the whole sample of firms. Differences are evident for all firm risk indicators and are larger both in terms of magnitude and significance when we compare discouraged borrowers to non-applicants (panels A and B of Table 2). By comparing discouraged borrowers over the credit cycle (panel A vs. panel B), we find that in the post-crisis period discouraged borrowers are smaller in size, older and worse performing in comparison to firms that were discouraged during the crisis.

Table 3 compares discouraged borrowers with firms that applied for a loan, distinguishing between those that got everything requested, received less than 75% of requested (loan scaled) and denied. In panel A, discouraged borrowers are similar to firms that had their application partially approved or denied. More precisely, discouraged

Table 3. Descriptive characteristics for discouraged borrowers and for firms that apply for a loan and got everything, loan scaled and denied

Panel A: Crisis period	(1) Discouraged (Obs. 2282)		(2) Got everything (Obs. 6579)		(3) Scaled (Obs. 933)		(4) Denied (Obs. 1009)				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	(1) over (2)	(1) over (3)	(1) over (4)
Size	1.69	0.74	2.15	0.77	2.15	0.78	1.83	0.79	***	***	***
Age	3.49	0.90	3.63	0.92	3.61	0.94	3.48	0.95	***	***	
Turnover increase	0.29	0.46	0.40	0.49	0.31	0.45	0.27	0.43	***		*
Capital better	0.15	0.35	0.28	0.44	0.17	0.37	0.15	0.35	***		
Credit history	0.16	0.36	0.26	0.44	0.18	0.38	0.15	0.34	***	*	
Family owner	0.56	0.48	0.62	0.49	0.67	0.48	0.59	0.49	***	***	*
Panel B: Post-crisis	(1) Discouraged (Obs. 2924)		(2) Got everything (Obs. 11,026)		(3) Scaled (Obs. 905)		(4) Denied (Obs. 951)				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	(1) over (2)	(1) over (3)	(1) over (4)
Size	1.58	0.72	2.13	0.78	1.93	0.78	1.71	0.75	***	***	***
Age	3.74	0.60	3.83	0.50	3.81	0.53	3.71	0.68	***	**	
Turnover increase	0.31	0.46	0.49	0.50	0.42	0.50	0.37	0.48	***	***	***
Capital better	0.16	0.36	0.32	0.46	0.22	0.42	0.21	0.41	***	***	**
Credit history	0.19	0.39	0.35	0.48	0.27	0.44	0.22	0.42	***	***	*
Family owner	0.52	0.50	0.54	0.50	0.56	0.50	0.49	0.50		*	*

This table shows the descriptive statistics among firm groups. In panel A, we show descriptive statistics and a univariate comparison of difference in means of discouraged borrowers and firms that apply for a loan distinguishing by the outcome of the application process in got everything, loan scaled and credit denied during the crisis. In panel B, we report descriptive statistics and a univariate comparison of difference in means of discouraged borrowers and firms that apply for a loan distinguishing by the outcome of the application process in got everything, loan scaled and credit denied after the crisis. ***, **, * denote significance at the 1%, 5% and 10% level.

Table 4. Transition probabilities from previous states

	Crisis		Post-crisis	
	Discouraged	Not discouraged	Discouraged	Not discouraged
Panel A: Term loans				
Not applied $loan_{t-1}$	4.68%	95.32%	3.77%	96.23%
Discouraged $loan_{t-1}$	52.83%	47.17%	71.72%	28.28%
Applied $loan_{t-1}$	6.82%	93.18%	4.94%	95.06%
Got $everything_{t-1}$	3.52%	96.48%	2.36%	97.64%
Loan $scaled_{t-1}$	12.30%	87.70%	13.42%	86.58%
Loan $denied_{t-1}$	28.31%	71.69%	33.11%	66.89%
Panel B: Credit lines				
Not applied credit $line_{t-1}$	4.20%	95.80%	3.08%	96.92%
Discouraged credit $line_{t-1}$	48.48%	51.52%	60.99%	39.01%
Applied credit $line_{t-1}$	7.60%	92.40%	4.43%	95.57%
Got $everything_{t-1}$	3.94%	96.06%	2.03%	97.97%
Loan $scaled_{t-1}$	12.76%	87.24%	8.48%	91.52%
Loan $denied_{t-1}$	29.63%	70.37%	31.69%	68.31%

This table shows the transition probabilities from non-discouragement into discouragement and vice versa, conditional on previous states.

borrowers are similar in terms of performance indicators (turnover and capital) to loan-scaled firms, and similar in terms of age and performance (turnover, capital and credit history) to firms that had their application rejected. The similarity between discouraged borrowers and loan-scaled firms suggests that discouragement was not an efficient self-rationing mechanism to screen riskier borrowers from the loan market during the crisis period. In panel B, we repeat the comparison in the post-crisis period. An interesting feature emerges from this comparison – as one can see in the post-crisis period, discouraged firms are different from partially rationed and loan-denied firms. In the aftermath of the crisis, discouraged borrowers are smaller and worse performing than denied borrowers. This result suggests that in this period the self-rationing mechanism was more efficient as it leaves out of the credit market non-creditworthy firms.[6]

Our key finding in this section is that riskier borrowers are most likely to be discouraged, implying that self-rationing overall is an efficient mechanism. Over the business cycle, the mechanism is more efficient during normal times, because during crisis periods banks raise their lending standards and serve privileged borrowers with more established lending relationships. In Table 4, we uncover the average probability of transitioning to discouragement conditional on previous status. We find that the probability of remaining discouraged is roughly 53% and 48% for term loans and credit lines, respectively during the crisis period. This probability rises in the post-crisis period, moving from 53% and 48% to 71% and 61% for term loans and credit lines, respectively. A second interesting observation is that firms that were loan scaled or credit denied exhibit a higher probability of declaring discouragement in the following wave. More precisely, the transition probability is roughly 13% and 29% for both term loans and credit lines during the crisis. Both percentages show a sizable increase in the post-crisis period. These transition probabilities suggest that previous loan experiences are relevant for transitioning into discouragement: a bad credit experience reshapes the view on future application outcomes, making entrepreneurs reluctant to apply for bank financing in the future. Another interesting feature that emerges is that discouragement is transitionary, as half of the firms that declared discouragement in the previous period move out of this state.

Probability of moving into discouragement

Table 5 reports the results of the regression model of Equation (1). In columns 1 and 2 we analyse the

[6]We repeat the exercise in the context of credit line financing and the results remain qualitatively the same.

Table 5. Probability of moving into discouragement

	Term loans (1) Crisis	Credit lines (2) Post-crisis	(3) Crisis	(4) Post-crisis
$Scaled_{t-1}$	0.594***	0.881***	0.605***	0.852***
	(0.111)	(0.124)	(0.104)	(0.114)
$Denied_{t-1}$	0.968***	1.340***	0.958***	1.376***
	(0.120)	(0.137)	(0.109)	(0.128)
Size	−0.258	−0.110	−0.712***	−0.417***
	(0.229)	(0.217)	(0.202)	(0.123)
Age	−0.098***	−0.089	−0.163*	0.019
	(0.037)	(0.066)	(0.090)	(0.084)
Turnover increase	0.005	−0.184*	−0.398***	−0.274***
	(0.108)	(0.100)	(0.149)	(0.098)
Capital improved	−0.267***	−0.334***	−1.074**	−0.104
	(0.102)	(0.104)	(0.464)	(0.166)
Credit history improved	−0.110	−0.020	−0.480***	−0.381***
	(0.097)	(0.101)	(0.137)	(0.109)
Family owner	−0.219*	−0.028	−0.567***	−0.002
	(0.115)	(0.081)	(0.149)	(0.091)
Unemployment rate	1.560	0.605	7.933**	−3.173
	(1.571)	(1.984)	(3.783)	(2.306)
CR-5	0.082	0.227	1.294***	1.008
	(0.630)	(0.524)	(0.396)	(0.912)
Branch density	−0.071	0.034	−3.201***	−0.487
	(0.332)	(0.494)	(1.093)	(0.383)
Inverse Mills' ratio	0.077	0.570	−8.139***	−0.834
	(1.259)	(1.036)	(3.017)	(1.014)
Industry FE	Y	Y	Y	Y
Wave FE	Y	Y	Y	Y
Wald χ^2	80.61***	135.61***	130.28***	194.00***
Log pseudolikelihood	−809.458	−797.962	−708.515	−854.252
Observations	3954	5246	2680	4364

This table shows the estimation results of the probit model of Equation (1) using discouraged borrower as dependent variable. In columns 1 and 2 the sample period spans from wave 1 to wave 10 (crisis period), while in columns 3 and 4 the sample period considered is from wave 11 to wave 20 (post-crisis). See Table 2 for firm-level control variable description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denote significance at the 1%, 5%, 10% level.

phenomenon in the context of term loans, while in columns 3 and 4 the focus is on credit lines. The results suggest that previous negative credit experiences are likely to increase the probability of transitioning into discouragement for both term loans and credit lines. In particular, the coefficients are higher in the post-crisis period, suggesting that partial loans (scaled) or credit denials (denied) had a negative influence on perceptions about future loan and credit-line outcomes. This suggests that previous negative experiences have a 'scarring effect' on borrowers, who then refrain from applying for external bank financing.

The results suggest that the probability of transition from not being discouraged to being discouraged is driven by both firm and macro-specific factors. Among firm-level covariates, turnover and capital are important determinants as a negative evolution of these two variables increases the likelihood of shifting from not being discouraged to being discouraged. The evolution of credit history is important only for credit-line products. Firm past credit record (credit history) in terms of loans paid and the responses of past credit inquiries is an important piece of information to assess and monitor the evolution of the borrower credit score. This is particularly true in the context of credit lines, in which banks continuously monitor borrowers to overcome agency conflicts related to this type of financing.

Country-level controls are also important. The severity of the crisis increases the probability of being discouraged, suggesting that expectations about the evolution of the macroeconomy play an important role. Unemployment and banking-sector concentration enter, with a positive and

Table 6. Probability of moving out of discouragement

	Term loans (1) Crisis	Credit lines (2) Post-crisis	(3) Crisis	(4) Post-crisis
Scarred	−0.044	0.053	0.447***	0.622***
	(0.081)	(0.077)	(0.093)	(0.091)
Size	−0.207	0.430***	0.093	0.098
	(0.214)	(0.142)	(0.157)	(0.090)
Age	−0.010	0.111***	−0.026	−0.003
	(0.026)	(0.042)	(0.072)	(0.053)
Turnover increase	0.055	0.265***	0.062*	0.137*
	(0.095)	(0.067)	(0.085)	(0.073)
Capital improved	0.146*	0.098	0.053	0.069
	(0.083)	(0.070)	(0.073)	(0.127)
Credit history improved	0.038	0.196***	0.214**	0.078*
	(0.080)	(0.076)	(0.098)	(0.071)
Family owner	−0.154*	0.136***	0.054	0.076
	(0.092)	(0.048)	(0.117)	(0.059)
Unemployment rate	−1.643	3.628***	0.345	−0.563
	(1.363)	(1.276)	(1.973)	(1.737)
CR-5	0.286	−1.339***	−0.775	−0.737
	(0.553)	(0.314)	(0.651)	(0.685)
Branch density	−0.214	0.994***	0.245	0.266
	(0.291)	(0.309)	(0.867)	(0.267)
Inverse Mill's ratio	−1.511	2.073***	0.450	0.505
	(1.149)	(0.663)	(2.406)	(0.777)
Industry FE	Y	Y	Y	Y
Wave FE	Y	Y	Y	Y
Wald χ^2	72.58***	122.19***	93.06***	146.20***
Log pseudolikelihood	−1316.41	−1521.06	−1033.91	−1096.52
Observations	2519	3347	2013	2417

This table shows the estimation results of the probit model of Equation (1) using the probability of moving out of discouragement as dependent variable. In columns 1 and 2 the sample period spans from wave 1 to wave 10 (crisis period), while in columns 3 and 4 the sample period considered is from wave 11 to wave 20 (post-crisis). See Table 2 for firm-level control variable description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denote significance at the 1%, 5%, 10% level.

significant coefficient only for credit-line products during the crisis, suggesting that uncertainty and more concentrated banking markets lead to a higher propensity of shifting into discouragement. Branch density, on the contrary, has a negative sign, suggesting that proximity to the bank is an important factor in reducing the likelihood of transitioning into discouragement. It could be that bank–firms' geographic proximity improves the exchange of bilateral information, leading to positive expectations on future bank financing outcomes.

The results in Table 5 confirm H1, as we show that both past experiences and a deterioration of firm-level credit risk have a significant effect on the probability of moving into discouragement.

Probability of moving out of discouragement

In this section, we specifically test the transitioning out of the discouragement status (H2). Table 6 reports the results of the regression model of Equation (1). In columns 1 and 2 we analyse term loans, while in columns 3 and 4 the focus is on credit lines. The regression results show that the propensity of moving out of discouragement is mostly driven by firm-level factors. As one can see, previous negative credit experiences (scarred) do not affect the propensity of moving out of discouragement in the context of term loans, on the contrary the coefficient is positive and statistically significant for credit lines. This suggests that in the case of credit lines, firms that transition out of discouragement are more likely to have experienced a partial or total rejection in the past. The result is interesting because it might imply that the higher exchange of information in the context of credit lines leads to lower 'scarring' effects on borrowers.

As regards the other determinants, the results show that turnover and the evolution of credit history are important firm-level factors for

transitioning out of discouragement. A positive sign for credit history suggests that firms that transition out receive positive feedback from their lending banks through interactions for both term loans and credit lines. Meanwhile for turnover increases, the positive and statistically significant sign of the coefficient suggests that a positive evolution of the profits improves entrepreneurial confidence in a positive outcome of a future loan application.

In the regression results, wave (time) fixed effects play an important role,[7] suggesting that with the improvement in economic conditions, the economic climate has not been perceived as a major barrier to bank financing. In short, business prospects improved with the more accommodating monetary policy environment (see Appendix A) and discouraged firms internalized this positive signal by moving out of their discouraged status.

The empirical evidence depicted in Table 6 supports H2. One can notice that firm-level improvements and the business climate are more important than past negative experiences (credit rejections) in determining the likelihood of moving out of discouragement.

Conclusions

In this study we analyse the evolving nature of borrower discouragement using a panel of Eurozone firms that were resurveyed along the waves of the ECB/EC SAFE survey. We analyse the evolution of these borrowers across different phases of the credit cycle (crisis and post-crisis) and across different lending products (term loans and credit lines). We show that the number of discouraged entrepreneurs and their characteristics vary throughout the economic cycle. Discouraged borrowers are on average smaller, younger and worse performing when compared to firms that got their loan application approved. However, when we divide the sample period into crisis and post-crisis, it emerges that discouraged borrowers are even worse performing than denied borrowers in the aftermath of the crisis, suggesting that discouragement is an efficient self-rationing mechanism during normal times. Importantly, by calculating a transitioning matrix from previous states, we show that discouragement is a transitory state over a firm's lifecycle. This preliminary result has implications for managers, since firms that self-ration because they know their risk profile and current performance are not sufficient to secure funds are acting rationally because to apply and fail leads to a deterioration in their credit risk status.

We then uncover the determinants that might lead firms to shift their status into discouragement over time. The results of the estimations show that borrower discouragement is an evolving process driven by entrepreneurs' experience of previous loan applications, firm risk factors and external factors (e.g. macroeconomic context). More precisely, we show that firms that experience a previous partial or full rejection are more likely to turn into a state of discouragement. The 'scarring effect' of previous negative loan experiences is similar across lending products and throughout the credit cycle. Among the firm-level risk indicators, we show that the evolution of capital and credit history are the most important firm-level risk indicators in determining the transition to discouragement.

In a final step, we analyse the transitioning out of discouragement. In this empirical investigation, we show that the transitioning out of discouragement is mainly driven by signals of an improved business climate. In terms of firm characteristics, improvements in profit outlook and credit history are important determinants of the probability of transitioning out of discouragement. Finally, we also show that the scarring effect has no long-lasting effects, since ex-rejected borrowers transitioned out of discouragement.

Our results provide some important insights for entrepreneurs, managers and policymakers. We show that discouragement is a transitory state in a firm's lifecycle and corresponds to periods in which the entrepreneur had a negative assessment of a possible application outcome due to internal (credit risk and result of previous applications) and external factors (credit cycle, banking sector structure and the state of the macroeconomy). However, this negative assessment is not always correct and might have implications in terms of forgone investment and employment opportunities.

For entrepreneurs and managers, our findings suggest that they should keep a close eye on their changing credit risk status and also the wider

[7]The log pseudolikelihood drastically increases with the addition of wave fixed effects. Wave fixed effects absorb time-varying effects unobserved by the econometrician.

macroeconomic situation, and use this to inform their future financing decisions. A failure to do so will increase the likelihood that they make erroneous applications that are likely to be rejected, or fail to make applications that would have likely succeeded.

Since many of the expectations are rational and discouragement is a transitory state in firms' lifecycle, government small business policies should be careful about targeting discouraged borrowers, as today's discouraged borrowers have a good chance of being tomorrow's successful borrowers. Policies should instead aim at bridging the gap for young and innovative borrowers.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section at the end of the article.