Dynamic Discouraged Borrowers

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Abstract

In this paper we provide new evidence on the dynamic evolution of discouraged borrowers over a long-time period. Using a cross-country panel of firms from the Eurozone, we first uncover the characteristics of discouraged borrowers, their evolution over the business cycle as well as the underlying reasons driving borrower discouragement. Then, as a second step, we link the outcome of both term loan and credit line applications for firms that declared to be discouraged in the past. We show that half of the ex-discouraged borrowers obtained a term loan and/or a credit line once they applied, suggesting that those borrowers are conscious that their credit risk profile had improved.

Keywords: Small business finance, credit rationing, discouraged borrowers, bank lending

JEL classification: L26, G21

1. Introduction

Whilst small businesses make a significant contribution to economic growth and employment across the world (Audretsch, Bonte, and Keilbach, 2008) it follows that problems with the allocation of investment capital to this key sector of the economy can inhibit the scale of their activities and hence reduce these benefits (Beck, Demirguc-Kunt, and Maksimovic, 2005). Although a great deal of attention has been paid to the development of theories of credit rationing (Stiglitz and Weiss, 1981; Bester, 1985) and the empirical identification of its presence in capital markets (Cowling, 2010), rather less attention has been paid to a unique subset of the small business population that are termed discouraged borrowers defined as small businesses who have a demand for capital but do not translate that demand into a formal application for bank loans (Kon and Storey, 2003). Further, of the empirical studies that have examined this phenomenon, the majority have taken a fairly static approach which implicitly assumes that once a discouraged borrower, always a discouraged borrower and that any shift in the presence of discouragement is at the margin where more small businesses become discouraged, for example, in economic crises (Cole and Sokolyk, 2016; Han, Fraser, and Storey, 2009; Cowling, Liu, Minniti, and Zhang, 2016).

In this paper we consider borrower discouragement as a dynamic and evolving process where each firm can become discouraged, become un-discouraged, or remain in a discouraged or undiscouraged state over time. In essence we set out to explore the temporal dynamics of the whole process of discouragement and non-discouragement. We are also able to explore this in the context of term loans and lines of credit. The unique setting we use is the Eurozone over the last decade which has particular relevance as the European Central Bank adopted a fluid and dynamic approach to policy interventions that spanned the Global Financial Crisis, the intermediate period of relative calm, and the Covid-19 pandemic. Our starting assumptions are that (a) small businesses respond to changing economic circumstance and signals from their banks by becoming more or less discouraged over time, and, (b) that changes in ECB policy interventions send market signals to small businesses about credit availability and hence change their behaviour in respect of funding applications. One final key aspect we directly address relates to whether or not self-rationing from credit markets was an appropriate response on the part of the firm to what they perceived to be tough credit market conditions and higher lending standards. This is particularly important as previous empirical studies have estimated that between 30% and 50% of discouraged borrowers would have got loans had they applied (Cole and Sokylyk, 2016; Cowling et al, 2016). For those firms that self-rationed incorrectly then we

are able to provide preliminary estimates of the aggregate level of missing growth and employment that would have been supported by lending.

To conduct our empirical investigation, we rely on restricted data drawn from the ECB's "Survey on the Access to Finance of Enterprises" (SAFE survey). This data source offers at least three advantages for our analysis as it allows us to: 1) extract a panel of firms that were re-surveyed over the waves of the survey to analyse discouragement in a dynamic setting; 2) generate comprehensive measures of both formal and informal credit constraints for different banking products: term loans and credit lines; 3) analyse a relatively long period (9 years) that span from the Global Financial Crisis (GFC) to a relatively calm period characterized by large-liquidity injections from the European Central Bank (from 2009H1 to 2018H2) with an extensive cross-country coverage of eleven Eurozone countries.

We first unveil the characteristics of discouragement from a static perspective. Using a univariate setting we analyse firm-level characteristics of discouraged borrowers and we show that smaller and younger borrowers with a worse outlook in terms of capital, profit and credit history are more likely to be discouraged. Importantly, by dividing the sample period in two-parts (*crisis* and *post crisis* period) we also provide preliminary evidence that in the post crisis period the self-rationing mechanism is more efficient. More precisely, firms that declare to be discouraged during the crisis are similar to firms that were partially or credit denied in full, while in the post-crisis period discouraged borrowers on average are worse performing than credit denied borrowers. After the static preliminary exploration, we move into a dynamic setting and we analyse the reasons why firms move from non-discouraged to discouraged and remain discouraged over time. Using a panel regression with a large set of fixed effects, we unveil that firms become discouraged because of a deterioration of their credit history. Importantly, most of the variation is explained by firm fixed effects suggesting that the self-rationing mechanism is largely related to unobservable characteristic at the firm level.

In order to observe the whole process of discouragement over time, we further analyse the application outcomes of firms that apply for bank financing conditional of being discouraged or not in the previous period, distinguishing also term loans and credit line products. To do so we run panel probit regressions with random effects and we show that firms that declare to be discouraged in the previous wave are less likely to obtain the full amount of external financing requested. The probability of facing credit constrains changes from the crisis period to the non-crisis period and across lending products, with ex-discouraged borrowers facing more difficulties in obtaining credit line financing during the crisis. In the post-crisis period, ex-discouraged borrowers face less difficulties in accessing credit lines products and higher

difficulties on obtaining term-loan financing, suggesting that those that apply for credit lines are more conscious on their creditworthiness. Additional analyses further confirm our main results.

The rest of the paper is set out as follow. The next section discusses the theoretical background and previous empirical evidence from which we formulate the main hypotheses, as well as the Eurozone context over the period of analysis. Section 3 presents the dataset and the variables. Section 4 presents and discusses the results from the empirical analyses. Section 5 concludes the paper.

2. Literature Review

2.1 Loan application and discouragement

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 about borrower's quality that submit a demand of funds. A second problem, arising once the loan is granted would be whether the borrower responds to an increase in interest rates by switching to riskier projects. To prevent behaviours that contrast with their interest, banks exert costly monitoring to ensure that borrowers use their cash flows to properly repay the debt. However, monitoring is costly, and borrowers have lower incentives to provide information to outsiders. Adverse selection and moral hazard resulting from information asymmetries between firms and banks leads 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 may not apply for a bank loan because they feel they will be rejected (discouraged borrowers). As shown in previous works (Cole and Sololyk, 2016; Cowling et al., 2016; among others), the frequency of discouraged borrowers in an economy usually exceeds the number of firms that experienced a formal rejection for external financing. Thus, the implications for economic welfare of an economy if misplaced fears of rejection compromise investments and job opportunities are relevant.

The issue of discouraged borrowers has received limited attention among academics and policy makers since the formal theory set out in Kon and Storey (2003). Building on the general credit rationing theories, the authors develop a theory that explain why discouraged borrowers exist. Information asymmetries are at the core of the Kon and Storey (2003) theory and their

existence influences the monetary cost of the application and the ability of banks to screen good borrowers. Under perfect information screening errors do not exist and every good borrower would apply and get the desired amount of credit, so there will be no discouragement. However, under imperfect information, screening is costly and requires lenders to spend time and resources in the acquisition of borrowers' information. Screening costs are passed to borrowers through loan application costs that would rise the cost of a bank loan to a level that may be not covered through the return of the financed project. Here, screening errors plays an important role to the sense that it increases (or decreases) discouragement by good (or bad) firms. If screening mechanisms are efficient, only uncreditworthy borrowers are discouraged to apply, on the contrary there would be a share of creditworthy firms that would erroneously be out of the credit market.

Application costs are a function of lenders' response to risk and transparency. Firms' size and age are important inputs in banks' credit screening technologies. Larger and older firms' have more established banking relationships (Cowling et al., 2012). Moreover, younger firms experience more problems in accessing bank loans due to their higher opaqueness, limited credit history and collateral (Canton et al., 2013; Berger and Udell, 2006). Performance, capital and credit history are also important inputs in credit scoring systems. In particular, the probability of repaying debt is higher for firms that improve their profitability and reduced their leverage. Moreover, credit history is an important piece of soft information that banks use in their risk assessment, an improvement of this factor also signals an improvement in bank-firm relationships which increases the probability of firms to repay their debts. Ownership structure is also helpful as it measures the firm's human and social capital. According to Bopaiah (1998) and Psillaki and Eleftheriou (2015), family-owned oriented enterprises have better access to credit because of less moral hazard problems and conservative investment strategies. Moreover, family firms usually have more established lending relationships in comparison to non-family firms that attenuates the effects of credit shocks (D'Aurizio et al., 2015).

The level and the characteristics of discouraged borrower are likely to be dependent on the economic cycle. After a negative shock for the economy, such as the Global Financial Crisis (GFC) and the European debt crisis, financial institution became unwilling to lend to small business. In this context, borrowers facing high agency costs receive a lower share of credit, as a result of a "flight to quality in lending" in which banks extend credit on lower risky borrowers whilst reducing credit to risky small businesses (Bernanke et al., 1996; Calabrese et al., 2020). In practice the outcomes of loan applications are less dependent on risk indicators such as: size, age and performance; whilst more reliant to measures that reduce information opacity, such as:

credit history as well as longer bank-firm relationships. In other words, firms that receive their loans will have to perform better than would be the case in non-recessionary economic periods. In line with this discussion and hypothesizing that self-rationing is an efficient mechanism, we can formulate our first hypotheses to characterize discouraged borrowers:

H1: Discouraged borrowers are more likely to be younger, smaller and low-performing firms.

H2: During crisis downturn there would be a larger share of creditworthy firms that declared to be discouraged.

In recognition of the dynamic nature of discouragement, over time firms change their status from not being discouraged to being discouraged and the other way around. Some of those are also likely to remain discouraged for a prolonged period of time. The underline reasons that drive changes in discouragement status over time can be traced back to at least three factors: the evolution of the economy and the environment in which firms operate; the deterioration of the firm level risk indicators; firm perceptions and unobservable entrepreneur characteristics. Regarding the first, it is reasonable to expect that a deterioration of the macroeconomic environment would increase the share of discouragement in an economy. As discussed above, banks change their lending policies depending on the economic cycle. Moreover, firm level risk varies also given the macroeconomic environment in which the firm operates.

As regard to firm level risk factors, it is possible that some risk factors are more important than others. For example, the evolution of banking relationships would be more important than a deterioration of the profit outlook. Information transparency reduces screening errors and the bilateral flow of information in firm-bank relationships. To this end, firms that use business credit lines (Cole and Sokolyk, 2016; Han et al., 2009; Petersen and Rajan, 2002) and/or have longer/better bank-firm relationships (Berger and Udell, 1998) are more likely to be discouraged because they received informal inquiries from their banks before deciding not to apply. According to a recent work of Rostamkalaei et al. (2020) firms with more established banking relationship are more likely to suspend they formal loan applications through informal talks with their banks rather than being discouraged by their own judgement.

Unobservable entrepreneur characteristics and experience might play an important role as being discouraged might be a result of psychological factors that are bounded in entrepreneurial dynamics, such as: entrepreneurial experience, knowledge and confidence in the evolution of the business. For example, a firm with previous experience in economic downturns would

adjust in anticipation perceptions on loan rejection rates, and therefore become a discouraged borrower.

H3: Among firm level risk indicators, the evolution of credit history is the most important factor in determining the changing status of discouragement over time.

A fraction of firms that were discouraged in the past set up an application for bank financing. Those firms might be creditworthy or uncreditworthy depending also on the macroeconomic environment in which they switch their status. The application costs and outcome would be different across lending products to which their applications relate. Credit lines are different than loans in several dimensions: contract and function; type of collateral usually pledged. In terms of contract dimensions, the main difference between a credit line and a standard loan contract is that a credit line allows firms to access a pre-committed amount of funds when firms need it (Holmstrom and Tirole, 1998). Loan terms give lenders the commitment and the discretion in granting funds ex-ante. 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 has only the 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 it most (Sufi, 2009). Firms with greater credit risk are monitored more often, causing direct monitoring costs for the bank and, as a result increasing the cost of the committed credit line (Acharya et al., 2014).

Given these differences, the intensity and the quality of the bilateral flow is likely to change across the two lending products. It is in fact possible that ex-discouraged borrower that apply for a credit line are more likely to obtain financing because of informal talks and/or better ability to adjust ex-ante perceptions on rejections. However, this assertion would vary depending on the credit cycle. During both the GFC and the sovereign debt crisis banks were funding constrained and face difficulties to grant liquidity to firms through credit lines (Ippolito et al., 2016). During normal times, banks provide funds through credit lines as they benefit also to credit lines as a channel for collecting borrower's information. Therefore, we hypothesize that discouraged borrower are aware that during the crisis credit lines are more likely to be denied and refuse to apply for this form of financing, those that apply are less likely to receive funds

from the banks as this financing product is characterized by more moral hazard issue. The opposite holds for the post-crisis period.

H4: During the crisis ex-discouraged borrowers are more likely to be rejected for credit line applications. The opposite holds in the post-crisis period and for bank loan terms.

2.2 Background on Eurozone context and firms' financing conditions

Before laying out the data and our empirical strategy in detail, we briefly describe the Eurozone context and firms' financing conditions during the longer period considered in our analysis. Beginning in the summer of 2007, the world macro-economic scenario was hit by the U.S. subprime mortgage crisis. Interbank interest rates rose sharply worldwide and then fell following aggressive easing by the main central banks. Further strong tensions were recorded in mid-September 2008 when the default of Lehman Brothers hit the markets. Since the outbreak of the financial crisis the ECB has implemented a long list of unconventional monetary policy measure to stimulate to restore the Eurozone economy. During the GFC, to overcome the liquidity dry-up in the interbank market, the ECB provided unlimited credit to banks at a fixed interest rate. Erupting in 2010, a further negative shock hit the Eurozone and prompted government and central bank to implement further interventions. At the end of the summer of 2010, yields on sovereign bonds issued by Italy and Spain hit record levels and those of Greece, Ireland and Portugal reached levels to get their overall stock of debt unserviceable. At the height of the sovereign debt crisis, access to finance was largely impaired for firms headquartered in stressed countries. For those firms, the probability to face credit rationing or higher loan rates was higher in comparison to firms from non-stressed countries (Ferrando et al., 2017).
In response to the sovereign debt crisis, the ECB started to purchase sovereign debt securities in secondary markets with the aim to restore financing conditions in affected Eurozone countries. The tools used were the long-term and the very long-term refinancing operations and the outright monetary transactions. These measures were effective in restoring balance sheets of banks with large holdings of sovereign bond of peripheral Eurozone countries, allowing them to lend to both large (Acharya et al., 2019) and small medium sized enterprises (Ferrando et al., 2019). In such a context SMEs' access to finance and loan terms improved, especially for those that borrow from banks with impaired balance sheets.

Despite massive ECB interventions in response to the GFC and the sovereign debt crisis, the Eurozone economy did not fully recover. With the aim of fully restoring credit markets and

spur investments the ECB has taken further unconventional monetary policy interventions, such as: negative policy rates, targeted long-term refinancing operations (TLTROs) and Corporate Sector Purchase Program (CSPP). More in detail, on June 2014, the ECB set negative interest rates with the aim of further reducing the cost of funding of banks. While on March 2016 the ECB announced the Corporate Sector Purchase Program (CSPP) aimed to directly purchase high grade corporate bonds in the primary and secondary market. Concomitant with these two interventions, the ECB conducted also the Targeted Long Term Refinancing Operations (TLTROs): programs aimed to provide direct liquidity to bank balance sheets to banks that lend to firms. As a result of these further liquidity interventions, SMEs' access to finance further improved (Heider et al., 2019; Ertan et al., 2020) and in 2019 Eurozone SMEs' ranked access to finance as the least important problem for their activities[1].

3. Data and empirical methodology

3.1 SAFE survey data description

Firm data is from the ECB/European Commission "Survey on the Access to Finance of Enterprises" (SAFE). The survey has three characteristics that makes it particularly suitable for our analysis: 1) it contains information on both the availability and needs of external finance in the six 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; 3) it collects information on firm characteristics such as country, sector, size, age, performance, legal status, ownership structure and export activity. The survey starts in 2009H1 and is conducted every six months. Firms surveyed are randomly selected from the Dun & Bradstreet business register and stratified by country, economic activity and size. Given the higher representativeness of bigger economies in EU, roughly 15-20% of firms in the sample come from Germany, France, Italy and Spain[2]. In terms of sectoral activity, survey respondents are divided in 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 from the survey. In 2014H1, the

[1] See for example, the April-November 2019 ECB survey on the access to finance of enterprises, available at: https://www.ecb.europa.eu/stats/accesstofinancesofenterprises/pdf/ecb.safe201911~57720ae65f.en.pdf

[2] The questionnaire provides weights to restore the proportions of the economic weight (in terms of number of employees) of each size class, economic activity and country. Weights are used in our regression specifications. See: https://www.ecb.europa.eu/stats/pdf/surveys/sme/methodological_information_survey_and_user_guide.pdf.

survey was supplemented with new questions related to the purpose of the bank financing application and the impact of the application in terms of real outcomes, such as: employment and investments.

In this study, we use twenty 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[3], for the 11 major Eurozone Economies (AT, BE, DE, ES, FI, FR, GR, IE, IT, NL, PT) in terms of gross domestic product. After eliminating missing data, we have 133,107 firm-level observations. In terms of sectoral stratification: 24.4% and 11.1% of firms are from manufacturing and construction; 26.7% from the services sector and 38% operates in the retail and trade sector. 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)[4].

3.2 Dependent variables

We classified firms based on their needs of external finance in two groups: those that needs external finance and those that do not need external finance. Those that needs external finance are further classified in two groups: discouraged borrowers and firms that apply for credit. Those that apply for credit are further classified in three subsets: firms that got everything; loan scaled (received less than 75% requested) and credit denied. Figure 1 provides a graphical representation of our firm classification.

[Insert Figure 1 about here]

To classify firms in groups, we use specific questions of the questionnaire that ask to firms' if they apply for a banking product as well as the reasons why not. More precisely, for ban 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 though you would be rejected [Discouraged]; (3) did not apply because you*

[3] See table A.1 for the details on the reference period. See table A.2 for the details on 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 annual basis (for example: firms domiciled in Hungary are surveyed every two waves).

[4] See table A.1 for the details on the reference period and on the main context.

had sufficient internal funds [Sufficient internal funds]; (4) did not apply for other reasons [Did not applied for other reasons].” For those that applied for a bank loan the survey ask 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: “*With regards to bank credit lines, could you please indicate whether you: (1) applied for them over the past 6 months [Applied]; (2) did not apply because you though 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 applied for other reasons].”* For those that applied for the survey ask information on the result of their credit line application: “*If you applied for a bank credit line 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*”.

We categorize firms as shown in figure 1 by reducing categories in the following way: those that do not apply for a bank loan and/or a credit line because of sufficient funds or for other reasons are categorized on firms that do not need external financing; those that receive a positive valuation by the banks but refused the loan and/or credit line because of higher costs and conditions are included in the category of firms that applied for a loan and got almost everything[5]; a missing value is given for those that have a loan application and/or credit line application still pending.

In an initial attempt to eye-ball the main outcome variables, in Figure 2a and 2b plot the evolution of loan demand and credit line demand over the waves of the survey.

[Insert Figure 2a about here]

[Insert Figure 2b about here]

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

As shown in Figure 2a and 2b, before wave 11 a considerable percentage of firms surveyed declared to not apply for a loan and/or a credit line in the past six months because of sufficient funds or for other reasons. The demand for bank financing (both loans and credit lines) slightly increases after wave 11 (corresponding to 2014H1). Discouraged borrowers are a relevant fraction of firms that do not apply for external financing. Before wave 11 discouraged borrowers increases to a peak of 9% of firm observations for bank loans and 8.4% for credit lines. After the peak reached in wave 11, the number of firms that declare to be discouraged borrowers constantly decreased for both loans and credit line products to a minimum level of roughly 4.5%.

In Figures 3a and 3b, we plot the application outcome of loans and credit lines, respectively.

[Insert Figure 3a about here]

[Insert Figure 3b about here]

The percentage of firms that got everything requested from both loans and credit lines increases along the waves of the survey. The increasing percentage is compensated by a decrease in both loan scaled and credit denial rates. The reduction is more visible for credit lines than for bank loan applications and started from wave 11 onwards.

This preliminary exploration highlights at least three important factors. First, after the GFC and the sovereign debt crisis both informal (discouraged borrowers) and formal (loan scaled and denied) credit constraints increased and then gradually stabilized until wave 11. Once the massive liquidity interventions began (from wave 11 onwards) banks eased their standards and credit constraints gradually diminished to slightly lower levels. Second, it underlines the importance and time-varying nature of discouragement. More precisely, in terms of observations discouraged borrowers are higher than firms that got their request of funds partially or totally denied. Those borrowers change their status along the waves of the survey moving from discouraged to firms that apply for financing, and this is particularly true from wave 11 onwards when credit market conditions progressively improved.

3.3 Firm-specific variables

Firm level explanatory variables can be classified into three groups: firm-level characteristics, ownership characteristics and other risk indicators. Table 1 provides the description and the

summary statistics of these three groups of variables. Firm level characteristics include: size, age, performance, capital and credit history. Firm size is modelled as a categorical variable by employee numbers: equal to one for micro firms (1-9 employees), two for small (10-49 employees); three for medium sized (50-249 employees). Age is given by the SAFE survey bands: equal to one for firms with less than 2 years, two for firms with 2-5 years of track records, three for firms with a range from 5 to 10 years and four from firms with 10 years or more. Table 2 shows that the average size is 1.89, corresponding to small sized firms. More precisely, 38% of the respondents are micro firms, 35% are small and 27% are medium-sized. In terms of age, most of the firms have more than 10 years (roughly 80% of the respondents).

Performance, capital and credit history is measured in banded changes over the past 6 months (increased, same or decreased). With these pieces of information, we create three dummy variables that switches to one when a firm reports an increase in sales (turnover improved), capital (capital improved) and credit history (credit history improved). Table 2 shows that 39% and 27% of firms report an improvement in their performance and leverage, while 26% of the respondents 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%).

[Insert Table 1 about here]

4. Results

This section first reports the descriptive statistics for discouraged borrowers along the two main subsample periods: crisis and the post-crisis period. After a preliminary exploration on the characteristics of discouraged borrowers, we move from the static mean comparison to the dynamic nature of the phenomenon to uncover the underlying reasons behind the changing status of discouraged borrowers along the time span. Further, we analyse if firms that were discouraged borrowers in the past receive bank financing in the form of both: terms loans and credit lines. Additional analyses reinforce and validates our main findings.

4.1 Categorizing discouraged borrowers

Table 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 result of the application process: got everything, loan scaled and loan denied. Both tables are divided in Panel A and B, where we analyse the evolution of discouraged borrowers and the other firm categories in both crisis period (before wave 11) and post crisis (after wave 11) period.

Discouraged borrowers represent 6.5% (8,044 observations) of the total firm observations (122,250 observations). As shown in figure 2.a and 2.b the majority of firms surveyed do not desire credit because of sufficient internal funds or for other reasons (80,043 out of 122,250 observations, corresponding to 63.5% of the observations). The level of discouragement both in the crisis (6.3% on average) and during the post-crisis (6.7% on average) is lower than that observed in the USA context by Cole and Sololyk (2016) and Han et al. (2009); and in line with that observed for similar studies using UK data (Freel et al. 2012; Cowling et al., 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 in means are notably relevant for all firm risk indicators and are larger both in terms of magnitude and significance when we compare discouraged borrowers over non applicant borrowers (Panel A and B of Table 2). By comparing discouraged borrowers over the credit cycle (Panel A vs Panel B), one can notice that after the crisis discouraged borrowers are: smaller in size, older and worst performing in comparison to firms that declare to be discouraged during the crisis.

[Insert Table 2 about here]

In Table 3, we compare discouraged borrowers with firms that applied for a loan by distinguishing between those that: got everything requested, receive less than 75% requested (loan scaled) and denied. In Panel A, it emerges that discouraged borrowers are not different from firms that got their application partially approved and denied. More precisely, discouraged borrowers are similar in terms of performance indicators (turnover and capital) on loan scaled firms, and similar in terms of age and performance (turnover, capital and credit history) of firms that got their application rejected. The similarity between discouraged borrowers and loan scaled firms suggest 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 those firms that declare to be discouraged are different from partially rationed and loan denied firms. More precisely, 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 leaved out the credit market uncreditworthy firms.

[Insert Table 3 about here]

Our key finding of 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 thigh their lending standards privileging borrowers with more established lending relationships.

4.2 "Old" and "New" discouraged borrowers

In this section we investigate the underlying factors driving borrower discouragement, moving from the static analysis of section 4.1 to a dynamic perspective. More precisely, we are interested in uncovering the firm-level determinants affecting the probability of: 1) switching from being not-discouraged (in t-1) to being discouraged in the following period (in t) (*New Discouraged*); 2) remaining a discouraged borrower for two consecutive waves (*Old Discouraged*). To do so, we estimate a panel fixed effects regression of the following form:

$$(y_t = 1|y_{t-1}) = \gamma X_{i,t} + \theta M_{c,t} + \delta_s + \vartheta_t + \rho_i + \epsilon_{i,t} \; [1]$$

Where $(y_t = 1|y_{t-1})$ is alternatively *New discouraged*: the probability of transition from not being discouraged in survey wave $t-1$ to being discouraged in survey wave t; and *Old discouraged*: the probability of remaining discouraged for at least two waves of the survey. $X_{i,t}$ is the vector of firm level covariates described in section 3.3. $M_{c,t}$ is a vector of country level macro controls, such as: employment, real GDP growth and the market share of the top 5 banking institutions as a measure of banking sector concentration. $\delta_s, \vartheta_t, \rho_i$ are sector, wave and firm fixed effects, which allow to control for a series of factors. More precisely, sector fixed effects control for the main activity of the firm. Firms operating in knowledge-intensive and technology sectors suffer from higher information asymmetries and thus, are more likely to

suffer from borrower discouragement (Freel et al., 2012). Wave fixed effects capture the evolution of the main macroeconomic environment. We also add firm fixed effects in the specification to control for time-invariant firm-specific heterogeneity, as for example the fact that some entrepreneurs are more inclined to declare to be discouraged in comparison to others with similar characteristics. Importantly, as suggested in Ferrando et al. (2017) in this setting firm fixed effects allow also to control for differences in firm demand of credit.

Table 4 reports the results of the regression model of equation 1. In columns 1 and 2, we rely on survey waves from 1 to 10 (crisis period), while in columns 3 and 4 we use survey waves from 11 to 20 (post-crisis period). Smaller firms are more likely to become discouraged during the crisis period. This result is consistent with our hypothesis on the relationship between firm size and banking relationships. The presence of credit scoring technologies suggests two reasons why small firms are more likely to be discouraged. First, scoring systems are based on accounting information, but smaller firms are thought to be informationally opaque. Second, scoring systems are often reinforced with soft information which is collected through the length of bank-firm relationships, but is alleged that smaller firms have less established lending relationships and thus the information flow is impaired. The evolution of credit history play an important role, the sign and significance of the coefficient confirms our third hypothesis (H3). A deterioration in credit history increases the probability of being discouraged for the first time (columns 1 and 3) during both the crisis and the post-crisis period. As shown in Rostamkalaei et al. (2020) small business who have a satisfactory relationship with their banks are more likely to self-ration themselves rather than apply for a loan or conducting an informal inquiry. This is because the small business owner correctly interprets the signal from the bank that if it applies the application would be rejected. Here, we do not observe the quality of the bank-firm relationship, however if we restrict the subsample of new discouraged borrowers to those that declare that credit lines are relevant, we observe a stronger negative significant coefficient for credit lines[6]. This suggest that firms correctly interpret the signals received from their banks and self-ration themselves because of fear of being rejected. Macroeconomic controls are also important in determining the share of new discourage firms. In particular, the unemployment share in an economy has an influence on firms' discouragement, suggesting that expectations about the evolution of the macroeconomic context play an important role.

The determinants of remaining discouraged for two waves are related to a deterioration of the credit history for the crisis period, confirming the importance of the evolution of the bank-firm

[6] Results not displayed. The information on the relevance of credit lines is available only during the post-crisis period.

relationship in determining discouragement. For the post-crisis period, the probability of remaining discouraged for at least two waves is mostly related to a worst performance in terms of turnover. The different result, in comparison to that observed for the crisis period, might be linked to the different health of the banking sector. In the post-crisis period, banks willingness to provide funds to SMEs increased and thus expectations of firms to receive external financing increased as well. Those expectations are not likely to increase for firms that experienced a reduction of their performance outlook over the recent period. Another important difference between the results for new discouraged and old discouraged is the limited role of macroeconomic factors in explaining the probability of remaining discouraged for two consecutive waves. In this case, none of the macroeconomic controls is statistically significant. Most of the adjusted R-squared of regressions results shown in Table 4 is captured by firm fixed effects. This suggests that firm unobservable characteristics explain most of the underlying reasons of moving from being discouraged as well as the reasons of remaining discouraged for a prolonged period. Among unobserved characteristics there would be entrepreneurial characteristics and other important factors that we are not able to observe with our data. As for example, informal turndowns in which the lender informs a SME owner that if a formal application is advanced it would likely be denied (Rostamkalaei et al., 2020).

[Insert Table 4 about here]

4.3 What happens if ex-discouraged borrowers apply for a loan and or a credit line?

In this section, we investigate the impact of being discouraged in the past on the outcome of loan and/or credit line application. To do so, we use a panel probit with random effects where we model the application result for each two banking products, loans and credit lines, as a function of being discouraged in the previous wave as well as firm characteristics and fixed effects:

$$Application\ result_{i,t} = \beta Discouraged\ borrower_{i,t-1} + \gamma X_{i,t} + \delta_s + \rho_c + \vartheta_t + \epsilon_{i,t} \quad [2]$$

Where: $Application\ result_{i,t}$ indicates either the result of the application outcome for loans and credit lines; $Discouraged\ borrower_{i,t-1}$ indicates if a firm declared to be discouraged in the previous wave, zero otherwise; $X_{i,t}$ is a set of firm level controls described in section 3.3;

δ_s, ρ_c, ϑ_t is a set of industry, country and time controls. Our main hypothesis concerns the coefficient β on the discouraged borrower variable. If the coefficient is negative for firms that got almost everything requested, it means that discouraged borrowers are more likely to be credit constrained. Similarly, if the coefficient is positive for credit constraints, denied or loan scaled, it means that discouraged borrowers are more likely to be credit constrained.

Table 5 presents the results for bank loans. In Panel A, we use survey waves from 1 to 10 (crisis period), while in Panel B we use survey waves from 11 to 20 (post-crisis period). During the crisis period, 222 unique discouraged borrowers applied for a bank term loan, of those 113 (51%) obtain the full amount of funds requested, while 34 (15%) were loan scaled and 76 loan denied (34%). By holding their firm level characteristics constant the marginal effects at means show that discouraged borrowers had a 14% lower probability of receive the total amount of funds requested during the crisis period. Put it differently, the probability of being loan scaled or credit denied is 3.8% and 9.5%. This first result highlights that firms that declare to be discouraged one wave before their loan application are more likely to be partially or totally credit denied during the crisis period.

In the post-crisis period, a similar number of unique discouraged borrowers applied for a loan (205 firms), of those 94 (45%) got almost everything requested, while 37 (18%) were loan scaled and 74 loan denied (37%). The marginal effects at means suggest that a not much higher share of ex-discouraged borrowers encountered difficulties in accessing on a bank loan in the post-crisis period. More precisely, the probability of being loan scaled or credit denied rises from 3.8% and 9.5% to 4.9% and 10.3%, respectively. The increased credit constraints are a result of a lower credit-quality of discouraged borrowers during the post-crisis period. As shown in section 4.1 in the post-crisis period the self-rationing mechanism was more efficient, as a higher share of poorer performing firms declared to be discouraged increases. It is possible that the share of ex-discouraged borrowers that applied for term loans in the post-crisis period are less creditworthy and experienced in comparison to those that applied during the crisis.

[Insert Table 5 about here]

Further, in Table 5 we observe a few interesting results in the control variables. Larger firms are less likely to encounter difficulties in obtaining a loan in both crisis and post crisis period. This result is related to greater collateral availability and/or to less opaqueness of larger firms in comparison to smaller firms (Berger and Udell, 2006). Capital improvement and age are important inputs to assess credit risk during the crisis period, while are no longer relevant during

the post crisis. Credit history has a prominent role in both periods, with a higher coefficient being associated during the post crisis. This result highlights the importance of banking relationships and the past performing track record in assessing the riskiness of a borrower. Family firms are less likely to face credit constraints during both periods. The result is in line with the findings of D'Aurizio et al. (2015) that suggests that family firm's governance structure results in less agency conflict in the borrower-lender relationship.

In Table 6, we repeat the estimations of equation 2 using the outcomes of credit line applications. During the crisis, 174 unique discouraged borrowers applied for this type of banking product, of those 71 (41%) got almost everything requested, 44 (25%) were loan scaled and 59 (34%) were credit denied. During the post crisis period, a similar number of discouraged borrowers applied for a credit line (179), of those 77 (43%) got almost everything, 42 (23%) were loan scaled and 60 (33%) were denied. Differently from term loans, the marginal effects at means suggest that in the post crisis period the probability of facing credit constraints on credit lines products for discouraged borrowers is lower than that observed during the crisis period. The explanation can be traced back to the health of the banking sector. During the financial crisis the interbank markets freeze. Banks that relied more on interbank funding were liquidity constrained on their liability side. Moreover, there is also evidence that firms increased to drawdown on available credit lines (Ippolito et al., 2016), which implies a liquidity shock on the asset side of banks. The liquidity shock drastically decreased banks' ability to provide funds to SMEs in the form of credit lines, resulting in more severe credit constraints for firms that applied for this form of financing. On the contrary, the post-crisis period is characterized by abundant liquidity in the financial market that result in a higher willingness of banks to provide liquidity to firms through credit lines. In this context a larger share of ex-discouraged borrowers that applied for this type of financing received the amount of funds requested. It is possible that, in comparison to term loans, ex-discouraged borrowers that applied for credit lines are more conscious about the result of their application as a result of the higher information bilateral flow of information between firms and banks for this type of financing product.

[Insert Table 6 about here]

Control variable coefficients suggest that size and age are more relevant during the crisis period. This could be related to the more established banking relationships of older and larger firms. In both periods, credit history is the most important factor in explaining access to credit line products, suggesting that monitoring is central for this form of bank financing product.

4.4 Additional analysis

In this section we provide a battery of additional tests that further confirm our main results. As a first test of our results on the outcome of the application for ex-discouraged borrowers, we rerun the estimations to account for the order nature of the main dependent variables. The dependent variable in this case takes a value of 1 if a firm got everything requested, a value of 2 if it received part of financing requested (loan scaled), a value of 3 if it is credit denied. Following the same approach of section 4.3, we again divide the sample period in two: crisis and post crisis period. Results of the estimation are shown in Tables 7 and 8 for bank loans and bank credit lines, respectively. To estimate a multinomial logit model one needs to select a base or reference category to which the coefficients estimates relate, we select the category of firms that received everything requested as the base category. Estimation results of Table 7 confirms our previous estimates of Table 5. More precisely, we confirm that firms that declare to be discouraged in the wave before of the loan application are more likely to be loan scaled or credit denied. Difficulties in accessing on bank loans for firms that declare to be discouraged in the past wave increased during the post-crisis period. Here the marginal effects are similar in terms of both magnitude and significance.

[Insert Table 7 about here]

In table 8, we report the estimations of the multinomial logit using credit lines application outcomes as a dependent variable. The base category is again the group of firms that got everything requested. Results of the estimation confirm the main results of the panel probit model with random effects of Table 6. More precisely, coefficient estimates show that firms that declare to be discouraged in the wave before are more likely to be loan scaled or credit denied. The marginal effects at means of the target independent variable suggest that the probability of receiving funds through credit lines do not decrease to much in the post crisis period. In table 5, the marginal effects were lower (7.4% loan scaled and 9.2% for credit denied) in comparison to that detected with the multinomial logit estimation (10.1% loan scaled and 10.5% for credit denied).

[Insert Table 8 about here]

We also run additional tests that we do not display here for reasons of brevity. We rerun all the estimations dividing the sample in "Core" (AT, BE, DE, FI, FR, NL) and "Peripheral" countries (ES, IE, IT, PT). The rationale behind this further division is that firms in peripheral countries suffered most the crisis and were more likely to be discouraged over the waves of the survey. The results for the estimation on the reasons behind the transition from being not discouraged to discouraged and from being discouraged (Table 5) remain the same. Similar results were obtained for the estimations on the outcome of loans and credit line applications for ex-discouraged borrowers.

As a final step, we look at the real effects of being discouraged borrowers in a previous period. More precisely, we look if ex-discouraged borrowers increase/decrease investments and/or e employment in the following wave. After 2014H1 the SAFE survey introduced two specific questions related on investments and employment. Specifically, it asks: "Have the following indicators decreased, remain unchanged or increased over the past six months? a) Investments; b) Employment". With this piece of information, we construct two distinct dummy variables that switch to one if a firm declares an increase in investments and/or an increase in employment levels. We then use the panel probit model of equation 2, with these two dummy variables as dependent variables. Table 9 reports the estimation results. Discouraged borrowers are more likely to decrease investments and employment. The effects are not dissimilar for discouraged borrowers of both loans and credit lines. More precisely, holding firm level covariates constant, firms that declare to be discouraged in the previous wave for a loan are 6.3% and 5.2% more likely to declare a decrease in investments and employment, respectively. The effect is lower for credit lines. In this case, firms that declare to be discouraged for credit lines in the previous wave are 4.4% and 2.7% likely to declare a decrease in investments and employment.

In terms of forgone investment and employment opportunities the impact is relevant. As shown in the previous section, roughly 43% of discouraged borrowers that applied for a loan and/or a credit line receive the full amount of funds requested. Given the fact that only a small share of discouraged borrowers applied and got the funds requested, the impact of self-rationing in terms of forgone investments and employment should be relevant for the Eurozone economy.

[Insert Table 9 about here]

5. Conclusions

In this study we focus on the dynamic evolving process of a relevant subset of entrepreneurs called discouraged borrowers. Using a large cross-country Eurozone sample over a longer period that encompasses the GFC and its recovery, our results show that discouraged borrowers are a relatively important share of the small business sector representing roughly 6% of borrowers. The number of discouraged entrepreneurs and their characteristics varies through the business cycle. Discouraged borrowers are on average smaller, younger and worst performing when compared to firms that got their loan application approved. However, when we divide the sample period in crisis and post-crisis period it emerges that discouraged borrowers are even worst performing than denied borrower in the aftermath of the crisis. Our results are in line with previous empirical evidence from the US (Han et al., 2009; Cole and Sokolyk, 2016) and the UK (Cowling et al., 2016) and suggests that discouragement is an efficient self-rationing mechanism.

We then uncover the firm-level determinants of small businesses switching from not-being discouraged to being discouraged and those that remain discouraged for two consecutive waves of the survey. Our results also show that borrower discouragement is an evolving process driven by external factors (such as for example: the macroeconomic environment) and internal factors, such as: bank-firm relationships and time-invariant entrepreneur characteristics. More precisely, our results indicate that the evolution of the credit history is the most important firm-level factor in driving small business discouragement, suggesting that firms correctly interpret signals arriving from their banks. If discouragement is an efficient self-rationing mechanism, we should observe that low-quality firm's voluntary chooses not to enter the credit market. We find strong support for this hypothesis through our empirical analysis, especially for the post-crisis period.

By linking the outcome of application of term loans and credit lines for borrowers who choose to be apply for bank financing after having declared to be discouraged in the previous wave, we further corroborate our interpretation on the importance of the information flow in bank-firm relationships. Within this empirical exercise, we uncover the fact that ex-discouraged borrowers are on average conscious about their improved status, and as a result a smaller share of their got their term loan or credit line application denied. In this sense, our findings show that half of the firms (roughly 50%) that applied for a term loan during the crisis received almost everything. The percentage is similar in the post-crisis period. As regards of credit lines,

roughly 40% of firms that apply receive almost everything, the share is higher in the post-crisis period.

Our results provide some policy implications. First, government small business policies should not target discouraged borrowers. As our results suggest, discouraged borrowers are riskier firms informed about their riskiness; hence for many their reluctance to set up an application for bank financing is rational. Second, we uncover the fact that the information flow in bank-firm relationships helps to bridge the information gap and leaves out the credit market uncreditworthy firms. Future policies should aim at bridging the gap of some young borrowers in establishing god firm-bank relationships through loan guarantee programmes. In this vein, the recent wave of merger and acquisition activity in the banking sector could arm policy makers, as the literature on small business financing shows that consolidated banking markets result in more transaction-based lending relationships.

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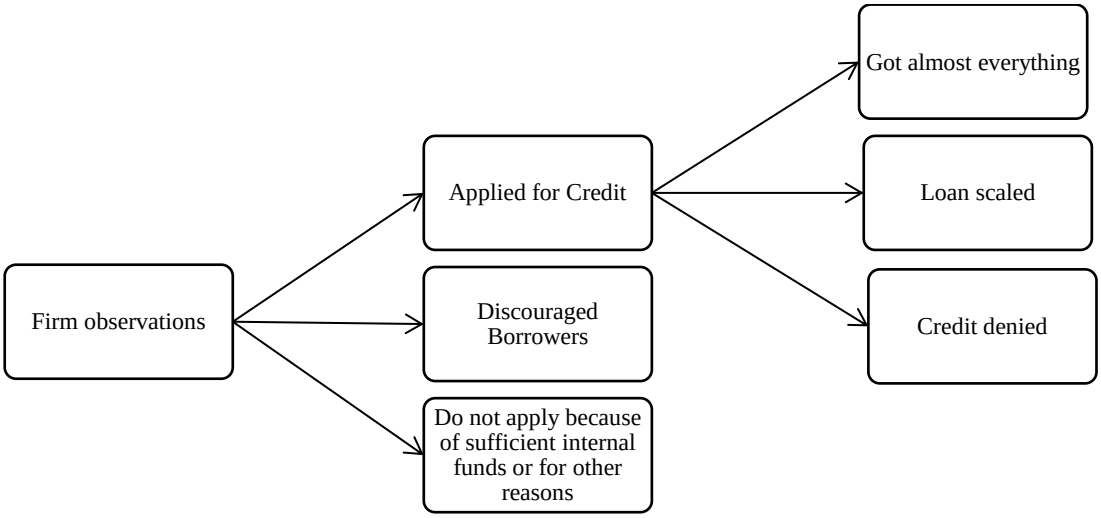
Figures

Figure 1: Firm classification



This figure shows the categorization of small businesses based on the dynamics of their borrowing activities and outcome.

Figure 2a. Loan Demand over the waves of the survey

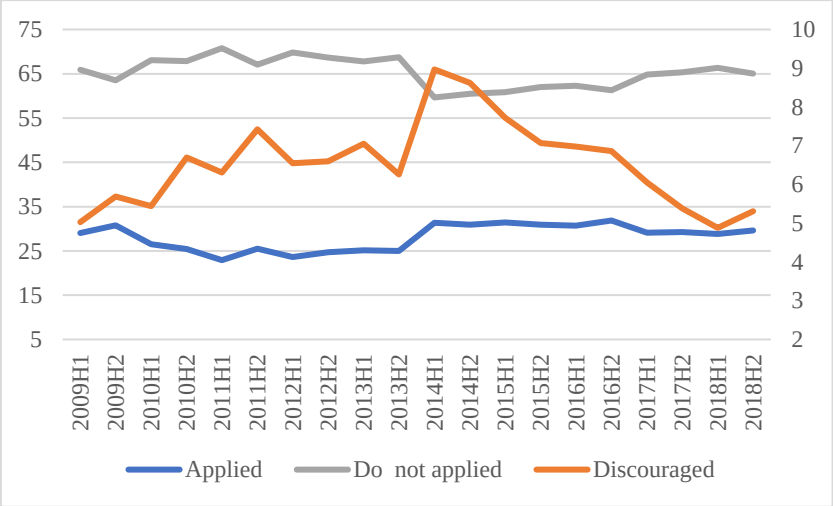
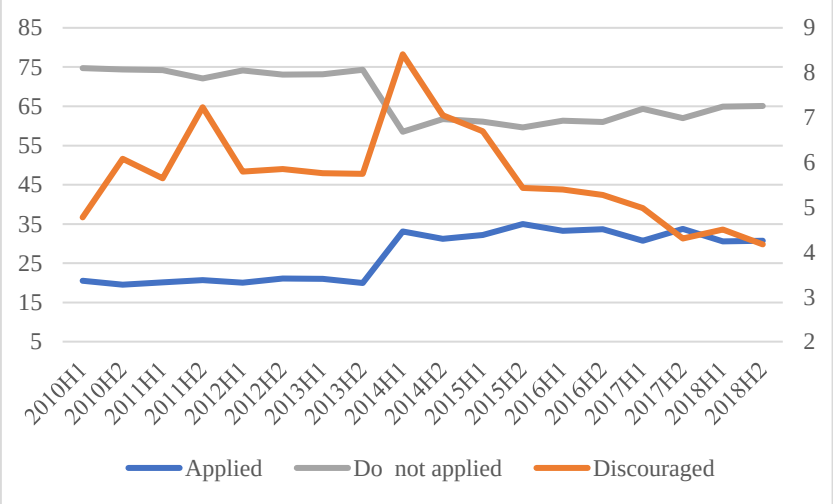


Figure 2.b Credit line demand over the waves of the survey



This figure shows the evolution of term loan demand (2a) and credit line demand (2b) over the waves of the survey considered. On the y-axis the variables: applied, do not applied and discouraged are in percentage points.

Figure 3a: Loan application results

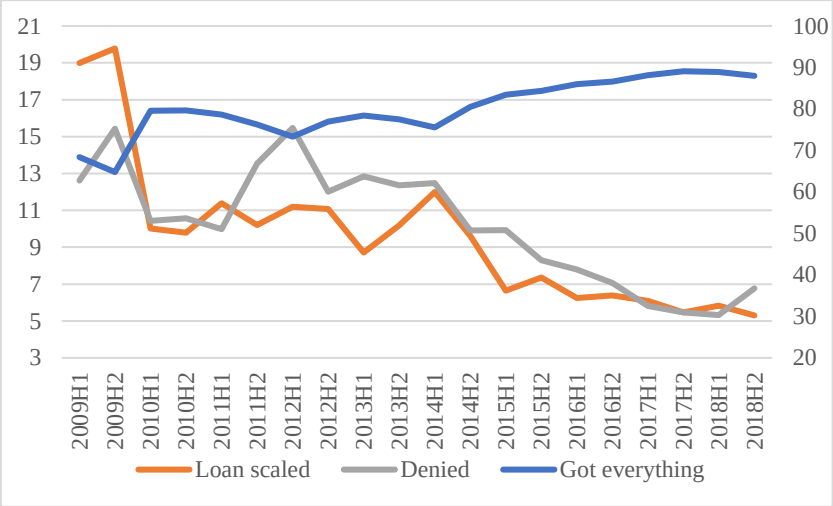
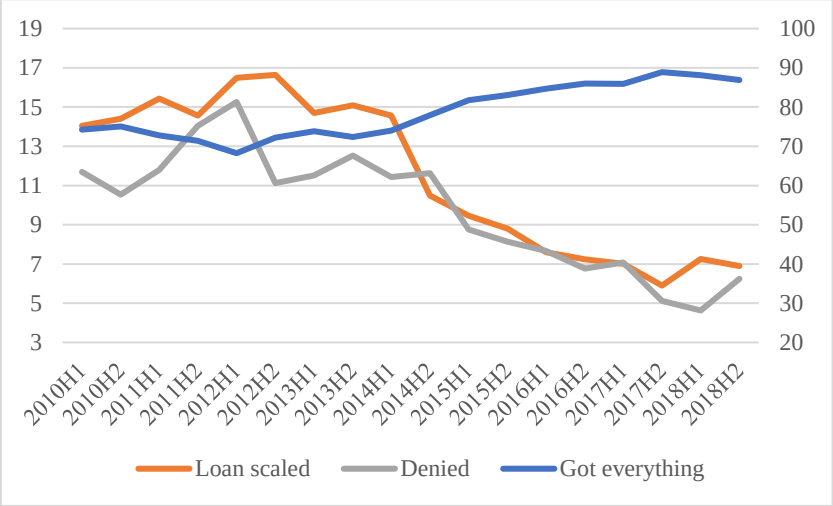


Figure 3b: Credit line application result



This figure shows the evolution of term loan (3a) and credit line application outcome (3b) over the waves of the survey considered. On the y-axis the variables: loan scaled, denied and got everything are in percentage points.

Tables

Table 1: Descriptive statistics

Variable	Description	Obs.	Mean	St. Dev.	Min	Max
Size	Variable equal to 1 for micro-firms (1-9 employees); 2 for small-firms (10-49 employees); 3 for medium-sized firms (50-249 employees). [Survey question: D1]	133,107	1.89	0.80	1	3
Age	Variable equal to 1 if the firm is less than 2 years old; 2 if a firm is between 2 and 5 years old; 3 if the firm is between 5 and 10 years old; 4 if the firm is 10 years of more. [Survey question: D5]	133,107	3.65	0.80	0	4
Turnover increase	Dummy variable equal to 1 if the firm's outlook with respect to sales and profitability improved in the past 6 months; zero otherwise. [Survey question: Q11c]	132,534	0.39	0.49	0	1
Capital improved	Dummy variable equal to 1 if the firm's capital position improved in the past 6 months; zero otherwise. [Survey question: Q11d]	131,528	0.27	0.44	0	1
Credit history improved	Dummy variable equal to 1 if the firm's credit history improved in the past 6 months; zero otherwise. [Survey question: Q11e]	127,875	0.26	0.44	0	1
Family owner	Dummy variable equal to 1 if the firm's owner is an individual or a family; zero otherwise. [Survey question: D6]	127,854	0.51	0.50	0	1

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.

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

Panel A: before interventions	(1) Discouraged (Obs. 4,023)		(2) Applied (Obs.16,100)		(3) Not-applied (Obs. 42,816)		(1) over (2)	(1) over (3)
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.		
Size	1.66	0.74	2.07	0.78	1.87	0.79	***	***
Age	3.45	0.95	3.56	0.93	3.51	0.99	***	***
Turnover increase	0.27	0.45	0.36	0.48	0.33	0.47	***	***
Capital better	0.15	0.35	0.24	0.43	0.25	0.43	***	***
Credit history	0.14	0.35	0.23	0.42	0.21	0.41	***	***
Family owner	0.55	0.50	0.61	0.49	0.54	0.50	***	
Panel B: After interventions	(1) Discouraged (Obs. 4,021)		(2) Applied (Obs.18,063)		(3) Not-applied (Obs. 37,227)		(1) over (2)	(1) over (3)
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.		
Size	1.57	0.72	2.05	0.80	1.84	0.81	***	***
Age	3.73	0.62	3.80	0.56	3.77	0.59	***	***
Turnover increase	0.31	0.46	0.48	0.50	0.43	0.50	***	***
Capital better	0.16	0.36	0.30	0.46	0.30	0.46	***	***
Credit history	0.19	0.39	0.33	0.47	0.30	0.46	***	***
Family owner	0.50	0.50	0.52	0.50	0.47	0.50	*	***

This table shows the descriptive statistics among firm groups. In panel A, we show descriptive statistics and 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 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. ***, **, * denotes significance at the 1%, 5% and 10% level

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. 4,023)		(2) Got-everything (Obs. 11,478)		(3) Scaled (Obs. 1,815)		(4) Denied (Obs. 1,904)		(1) over (2)	(1) over (3)	(1) over (4)
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.			
Size	1.66	0.74	2.12	0.78	2.09	0.78	1.80	0.79	***	***	***
Age	3.45	0.95	3.59	0.92	3.55	0.94	3.43	0.95	***	***	
Turnover increase	0.27	0.45	0.39	0.49	0.29	0.45	0.25	0.43	***		*
Capital better	0.15	0.35	0.27	0.44	0.16	0.37	0.14	0.35	***		
Credit history	0.14	0.35	0.25	0.43	0.17	0.38	0.13	0.34	***	***	
Family owner	0.55	0.50	0.61	0.49	0.64	0.48	0.58	0.49	***	***	**
Panel B: After interventions	(1) Discouraged (Obs. 4,021)		(2) Got-everything (Obs. 13,800)		(3) Scaled (Obs. 1,160)		(4) Denied (Obs. 1,289)		(1) over (2)	(1) over (3)	(1) over (4)
	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.			
Size	1.57	0.72	2.12	0.80	1.91	0.79	1.69	0.76	***	***	***
Age	3.73	0.62	3.82	0.53	3.77	0.59	3.69	0.68	***	**	*
Turnover increase	0.31	0.46	0.49	0.50	0.43	0.50	0.37	0.48	***	***	**
Capital better	0.16	0.36	0.32	0.47	0.24	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	0.50	0.50	0.52	0.50	0.55	0.50	0.48	0.50	*	**	

This table shows the descriptive statistics among firm groups. In panel A, we show descriptive statistics and 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 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. ***, **, * denotes significance at the 1%, 5% and 10% level.

Table 4. Old and new discouraged borrowers

	Crisis period		Post-Crisis period	
	(1)	(2)	(3)	(4)
	New Discouraged	Old Discouraged	New Discouraged	Old Discouraged
Size	-0.013**	-0.012	-0.002	-0.010
	(0.006)	(0.007)	(0.004)	(0.008)
Age	-0.001	0.002	0.005	-0.001
	(0.002)	(0.003)	(0.003)	(0.008)
Turnover increase	-0.003	-0.002	-0.002	-0.007**
	(0.004)	(0.004)	(0.002)	(0.003)
Capital improved	-0.002	0.006	-0.003	0.002
	(0.004)	(0.004)	(0.002)	(0.004)
Credit history improved	-0.005**	-0.009***	-0.005**	-0.005
	(0.002)	(0.003)	(0.002)	(0.003)
Family owner	0.002	0.002	0.007*	0.010
	(0.004)	(0.005)	(0.004)	(0.008)
Unemployment rate	0.673***	0.202	0.141*	0.182
	(0.148)	(0.234)	(0.088)	(0.193)
GDP growth	0.227	0.159	-0.064	-0.018
	(0.165)	(0.206)	(0.054)	(0.012)
CR – 5	-0.028	-0.089	0.053	0.011
	(0.094)	(0.103)	(0.038)	(0.074)
Wave FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	16,999	9,881	29,370	13,251
N. of Firms	4827	3562	7990	4392
Adjusted R^2	0.305	0.553	0.303	0.587

This table shows the estimation results of the panel fixed effect model of equation 1 using new discouraged and old discouraged as dependent variables. 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 variables description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denotes significance at the 1%, 5%, 10% level.

Table 5. Term Loan result

	(1) Got everything	(2) Scaled	(3) Denied
Panel A: Crisis period			
Discouraged borrower$_{t-1}$	-0.871***	0.279**	0.855***
	(0.150)	(0.139)	(0.163)
Size	0.191***	0.060	-0.366***
	(0.054)	(0.049)	(0.069)
Age	0.108***	-0.052	-0.110**
	(0.041)	(0.039)	(0.050)
Turnover increase	0.064	-0.014	-0.057
	(0.081)	(0.079)	(0.098)
Capital improved	0.262***	-0.191**	-0.219*
	(0.101)	(0.095)	(0.131)
Credit history improved	0.222**	-0.053	-0.330***
	(0.097)	(0.093)	(0.128)
Family owner	0.157**	-0.075	-0.150
	(0.078)	(0.075)	(0.092)
Marginal effects Discouraged t-1	-0.140***	0.038***	0.095***
	(0.025)	(0.019)	(0.013)
Wave FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N. of firms	3,080	3,080	3,080
N. Discouraged applicants	222	222	222
N. Discouraged/outcome	113	34	76
Panel B: Post crisis period			
Discouraged borrower$_{t-1}$	-1.537***	0.599***	1.687***
	(0.186)	(0.177)	(0.222)
Size	0.364***	-0.102*	-0.534***
	(0.063)	(0.061)	(0.088)
Age	0.058	-0.025	-0.046
	(0.090)	(0.101)	(0.105)
Turnover increase	0.269***	-0.219**	-0.214*
	(0.085)	(0.090)	(0.111)
Capital improved	0.145	-0.048	-0.227*
	(0.108)	(0.113)	(0.131)
Credit history improved	0.316***	-0.193*	-0.342***
	(0.100)	(0.106)	(0.126)
Family owner	0.153*	-0.027	-0.256**
	(0.090)	(0.092)	(0.116)
Marginal effects Discouraged t-1	-0.170***	0.049***	0.103***
	(0.019)	(0.015)	(0.012)
Wave FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N. of firms	3,480	3,480	3,480
N. Discouraged applicants	205	205	205
N. Discouraged/outcome	94	37	74

This table shows the estimation results of the probit model of equation 1 using bank loan outcomes as dependent variables: got everything, loan scaled and denied. In panel A the sample period spans from wave 1 to wave 10 (crisis period), in panel B the sample period considered is from wave 11 to wave 20 (post crisis). See table 2 for firm level control variables description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denotes significance at the 1%, 5%, 10% level.

Table 6. Credit line result

	(1) Got everything	(2) Scaled	(3) Denied
Panel A: Crisis period			
Discouraged borrower$_{t-1}$	-1.015***	0.361***	0.985***
	(0.147)	(0.126)	(0.161)
Size	0.137***	0.001	-0.255***
	(0.050)	(0.045)	(0.063)
Age	0.081**	-0.039	-0.085*
	(0.041)	(0.038)	(0.049)
Turnover increase	0.041	-0.079	0.056
	(0.080)	(0.076)	(0.096)
Capital improved	0.038	0.042	-0.155
	(0.099)	(0.093)	(0.128)
Credit history improved	0.464***	-0.326***	-0.365***
	(0.099)	(0.095)	(0.130)
Family owner	0.013	0.006	-0.065
	(0.077)	(0.072)	(0.099)
Marginal effects Discouraged t-1	-0.223***	0.071***	0.125***
	(0.030)	(0.024)	(0.019)
Wave FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N. of firms	2,298	2,298	2,298
N. Discouraged borrowers	174	174	174
N. Discouraged/outcome	71	44	59
Panel B: Post crisis period			
Discouraged borrower$_{t-1}$	-1.615***	0.767***	1.497***
	(0.203)	(0.166)	(0.227)
Size	0.323***	-0.146**	-0.368***
	(0.067)	(0.059)	(0.090)
Age	0.107	-0.070	-0.121
	(0.091)	(0.092)	(0.108)
Turnover increase	0.232**	-0.121	-0.282**
	(0.091)	(0.085)	(0.124)
Capital improved	0.180	-0.178	-0.002
	(0.116)	(0.109)	(0.151)
Credit history improved	0.338***	-0.145	-0.473***
	(0.101)	(0.094)	(0.140)
Family owner	0.092	0.001	-0.186
	(0.097)	(0.088)	(0.128)
Marginal effects Discouraged t-1	-0.185***	0.074***	0.092***
	(0.021)	(0.016)	(0.013)
Wave FE	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
N. of firms	3,206	4,908	4,908
N. Discouraged borrowers	179	179	179
N. Discouraged/outcome	77	42	60

This table shows the estimation results of the probit model of equation 1 using bank credit line outcomes as dependent variables: got everything, loan scaled and denied. In panel A the sample period spans from wave 1 to wave 10 (crisis period), in panel B the sample period considered is from wave 11 to wave 20 (post crisis). See table 2 for firm level control variables description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denotes significance at the 1%, 5%, 10% level.

Table 7. Multinomial logit – Term loan application results

	Crisis period		*Post crisis period*	
	(1)	(2)	(3)	(4)
	Loan Scaled	Denied	Loan Scaled	Denied
Discouraged borrower$_{t-1}$	0.840***	1.177***	1.578***	2.183***
	(0.272)	(0.216)	(0.257)	(0.208)
Size	-0.031	-0.486***	-0.173**	-0.615***
	(0.088)	(0.081)	(0.083)	(0.094)
Age	-0.109	-0.178***	-0.056	-0.039
	(0.070)	(0.068)	(0.159)	(0.111)
Turnover increase	0.061	-0.150	-0.229*	-0.280*
	(0.158)	(0.145)	(0.134)	(0.150)
Capital improved	-0.346	-0.342*	-0.164	-0.213
	(0.214)	(0.185)	(0.172)	(0.190)
Credit history improved	-0.195	-0.424**	-0.296*	-0.563***
	(0.202)	(0.185)	(0.152)	(0.186)
Family owner	-0.119	-0.134	-0.075	-0.313**
	(0.134)	(0.129)	(0.128)	(0.130)
Marginal effects Discouraged t-1	0.053***	0.103***	0.079***	0.110***
	(0.022)	(0.020)	(0.015)	(0.011)
Wave FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N. of firms	4,126		5,455	
Pseudo R2	0.102		0.112	
Log Pseudolikelihood	-2078.67		-1822.84	

This table shows the estimation results of a multinomial logit estimation using bank loan application outcomes 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 variables description. Regressions use fixed effects as specified. Robust standard errors are reported in brackets. ***, **, * denotes significance at the 1%, 5%, 10% level.

Table 8. Multinomial logit – Credit line application results

	Crisis period		*Post crisis period*	
	(1)	(2)	(1)	(2)
	Loan Scaled	Denied	Loan Scaled	Denied
Discouraged borrower$_{t-1}$	1.198***	1.750***	1.571***	2.222***
	(0.250)	(0.252)	(0.250)	(0.229)
Size	-0.096	-0.486***	-0.334***	-0.394***
	(0.081)	(0.108)	(0.084)	(0.096)
Age	-0.095	-0.084	0.023	-0.197*
	(0.070)	(0.082)	(0.135)	(0.110)
Turnover increase	-0.087	0.044	-0.242*	-0.367**
	(0.147)	(0.175)	(0.132)	(0.152)
Capital improved	-0.115	-0.245	-0.263	0.022
	(0.186)	(0.235)	(0.174)	(0.202)
Credit history improved	-0.445**	-0.511**	-0.17	-0.561***
	(0.189)	(0.226)	(0.147)	(0.187)
Family owner	0.004	-0.002	-0.067	-0.162
	(0.134)	(0.180)	(0.121)	(0.136)
Marginal effects Discouraged t-1	0.111***	0.124***	0.101***	0.105***
	(0.028)	(0.019)	(0.018)	(0.013)
Wave FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
N. of firms	2981		4908	
Pseudo R2	0.089		0.092	
Log Pseudolikelihood	-1758.34		-1951.2	

This table shows the estimation results of a multinomial logit estimation using credit line application outcomes 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 variables description. Regressions use FE as specified. Robust standard errors are reported in brackets. ***, **, * denotes significance at the 1%, 5%, 10% level.

Table 9. Real effects post crisis

	Investments		Employment	
	(1)	(2)	(3)	(4)
	Discouraged Loan	Discouraged Credit line	Discouraged Loan	Discouraged Credit line
Discouraged borrower$_{t-1}$	-0.247***	-0.177***	-0.230***	-0.121*
	(0.058)	(0.065)	(0.061)	(0.068)
Size	0.211***	0.233***	0.416***	0.435***
	(0.020)	(0.021)	(0.022)	(0.023)
Age	-0.063**	-0.066**	-0.146***	-0.160***
	(0.026)	(0.028)	(0.027)	(0.029)
Turnover increase	0.489***	0.496***	0.899***	0.917***
	(0.027)	(0.030)	(0.030)	(0.032)
Capital improved	0.194***	0.231***	0.183***	0.209***
	(0.032)	(0.034)	(0.033)	(0.035)
Credit history improved	0.191***	0.183***	0.169***	0.174***
	(0.030)	(0.032)	(0.031)	(0.033)
Family owner	-0.036	-0.043	0.004	-0.002
	(0.029)	(0.031)	(0.031)	(0.033)
Marginal effects Discouraged t-1	-0.063***	-0.044***	-0.052***	-0.027*
	(0.015)	(0.016)	(0.014)	(0.015)
Wave FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	18,303	16,162	18,674	16,562

Appendix A. Additional tables

Table A.1 Detail on the reference period

Wave	Survey round	Reference period – last 6 months	ECB intervention
1	2009H1	January-June 2009	GFC
2	2009H2	July-December 2009	GFC
3	2010H1	March-September 2010	Sovereign debt crisis
4	2010H2	September 2010-February 2011	Sovereign debt crisis
5	2011H1	April-September 2011	Sovereign debt crisis
6	2011H2	October 2011-March 2012	LTRO
7	2012H1	April-September 2012	LTRO, OMT –announcement
8	2012H2	October 2012-March 2013	LTRO, OMT –announcement
9	2013H1	April-September 2013	LTRO, OMT –announcement
10	2013H2	October 2013-March 2014	LTRO, OMT –announcement
11	2014H1	April-September 2014	Negative deposit rates and TLTRO I
12	2014H2	October 2014-March 2015	Negative deposit rates and TLTRO I
13	2015H1	April-September 2015	Negative deposit rates and TLTRO I
14	2015H2	October 2015-March 2016	Negative deposit rates and TLTRO I
15	2016H1	April-September 2016	Negative rates, CSPP and TLTRO II
16	2016H2	October 2016-March 2017	Negative rates, CSPP and TLTRO II
17	2017H1	April-September 2017	Negative rates, CSPP and TLTRO II
18	2017H2	October 2017 - March 2018	Negative rates, CSPP and TLTRO II
19	2018H1	April 2018-September 2018	Negative rates, CSPP and TLTRO II
20	2018H2	October 2018 – March 2019	Negative rates, CSPP and TLTRO III

This table provides information on the reference period of the survey rates together with the main ECB monetary policy interventions.

Table A.2. Sample split by country and sector of activity

	Manufacturing	Construction	Services	Retail and trade	Total
AT	1,689	1,003	1,989	3,403	8,084
BE	1,569	1,125	2,389	3,049	8,132
DE	4,782	2,208	3,630	7,408	18,028
ES	4,013	2,147	4,653	7,812	18,625
FI	1,830	1,015	1,196	3,326	7,367
FR	4,815	2,262	5,600	6,576	19,253
GR	1,344	794	4,178	2,205	8,521
IE	1,332	725	2,559	2,611	7,227
IT	7,375	1,536	4,483	6,511	19,905
NL	1,520	1,016	2,459	4,199	9,194
PT	2,201	1,012	2,352	3,206	8,771
Total	32,470	14,843	35,488	50,306	133,107

This table provides additional information on the sample composition by country and by sector of activity.

Table A.3. Share of discouraged borrowers by countries

	Crisis			Post-crisis		
	Non-discouraged	Discouraged	Freq.	Non-discouraged	Discouraged	Freq.
AT	2,320	51	2.5%	2,517	97	3.7%
BE	1,999	115	5.4%	2,574	111	4.1%
DE	5,222	249	4.5%	5,377	207	3.7%
ES	4,849	345	6.6%	6,351	348	5.2%
FI	1,857	21	1.1%	2,323	69	2.9%
FR	5,353	372	6.5%	6,927	372	5.1%
GR	2,041	322	13.6%	2,357	785	25%
IE	2,300	400	14.8%	2,029	214	9.5%
IT	5,492	262	4.5%	7,398	510	6.5%
NL	1,979	215	9.8%	2,544	238	8.5%
PT	2,616	179	6.4%	2,972	189	6.0%
Total	36,028	2,531	6.5%	43,369	3,140	6.7%

This table provides additional information on the distribution of discouraged borrowers by country and during the crisis and post crisis period.