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Financial literacy of micro-entrepreneurs and access to credit

by Riccardo Calcagno, Paolo Finaldi Russo, Ludovica Galotto and Anita Quas

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FINANCIAL LITERACY OF MICRO-ENTREPRENEURS
AND ACCESS TO CREDIT

by Riccardo Calcagno*, Paolo Finaldi Russo**, Ludovica Galotto** and Anita Quas***

Abstract

This paper investigates the relationship between the financial literacy of micro-entrepreneurs and their access to bank credit, drawing on data from a survey conducted by the Bank of Italy among a representative sample of Italian companies with fewer than 10 employees. Among those who require some external finance, we explore whether micro-entrepreneurs' financial literacy influences (i) the propensity to apply for the necessary bank loan, and (ii) the likelihood of bank approval. We find that micro-entrepreneurs with higher financial literacy are more likely to apply for a loan, i.e. they are less likely to be 'discouraged borrowers'. However, financial literacy does not significantly affect the likelihood of loan approval. We also shed light on two mechanisms underlying the relationship between financial literacy and borrowers' discouragement: entrepreneurs with higher financial literacy are more likely to seek professional advice and to be aware of the existence of public guarantee schemes in support of SMEs' access to credit, which in turn improve the chances of them applying for a bank loan.

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1   Introduction[1]

Bank loans are the primary source of external financing for small and medium-sized enterprises (SMEs) (Berger and Udell, 1998). At the same time, access to external finance is more challenging for small and medium-sized enterprises (SMEs) than for larger companies (Stiglitz and Weiss, 1987). SMEs are more often opaque borrowers, which entails higher costs of screening and monitoring by external investors. They are also, on average, younger companies that generally lack credit history, market reputation and assets that can be provided as collateral. Finally, regardless of their opacity, SMEs are usually riskier companies with weaker financial ratios and higher sales and profit volatility (Petersen and Rajan, 1994; Beck et al., 2006).

In this paper, we investigate the role of entrepreneurs' financial literacy in raising credit. This is a largely under-researched topic, mainly due to the scarcity of adequate data measuring entrepreneurs' financial competence. However, financial literacy can influence firms' ability to borrow for several reasons. First, it may affect the demand for credit by reducing the number of discouraged borrowers, i.e., firms that need credit but do not apply for it because they fear being turned down or because the application costs are too high (Kon and Storey, 2003). Second, it could reduce credit rationing or improve credit conditions as far as it lowers banks' screening and monitoring costs by improving the quality of financial reports (Wise, 2013); additionally, it could also reduce banks' expected losses due to the entrepreneur's better debt management skills (Hussain at al., 2018). The link between entrepreneurs' financial literacy and access to credit would be particularly important for micro-enterprises, which usually do not rely on financial management staff.

Besides analysing the effects of micro-entrepreneurs' financial literacy on both the probability to apply for the needed bank loan (discouragement) and the likelihood of obtaining the requested loan (credit rationing), we also investigate two possible mechanisms through which entrepreneurs' financial literacy could improve access to credit: the interplay of financial literacy with the use of professional financial advisors and with the awareness of the existence of public guarantee schemes to support business financing (D'Ignazio et al., 2022).

Our analysis is based on a representative sample of 1,998 micro-entrepreneurs interviewed as part of the Survey on financial literacy and digitalization of Italian micro-enterprises conducted by the Bank of Italy at the beginning of 2021. Our econometric analysis considers the multi-stage nature of an

entrepreneur's access to finance: actual receipt of a loan is conditional on having demanded it, which is in turn conditional on the firm's need for a loan. We model such sequence with a series of probit models with Heckman correction for selection bias. Moreover, we test the robustness of our main results addressing potential endogeneity issues of financial literacy in the context of access to credit by using an instrumental variable approach in which financial literacy is treated as endogenous.

Considering only those who need external financing and controlling for other entrepreneur's characteristics (gender, age, education, economic sector, geographical area, sales class), our main result indicates a positive correlation between credit demand and the financial literacy of the firm owner. This suggests that higher financial competences significantly reduce the probability of being a "discouraged borrower". The magnitude of the economic effect is not negligible. An increase in the entrepreneurs' financial literacy by 17 percentage points (one standard deviation with respect to the average of 75%) reduces the probability of being a discouraged borrower by almost 4 percentage points (to 11%, from an unconditional average of 15%).

We also find that financial literacy reduces borrowers' discouragement through two mechanisms. Financially literate entrepreneurs are more likely to ask for external advice and to be aware of public guarantees, and these two elements in turn improved the chances of applying for a loan conditional on needing one. However, including the help from financial advisors and awareness of public guarantees in our estimates does not fully offset the relationship between financial literacy and the demand for a needed loan. Finally, we find no significant correlation between financial literacy of entrepreneurs and their chances of obtaining the requested loan.

Our work contributes to two literature streams. First, within the broad field of SMEs access to credit and credit rationing, we especially contribute to the empirical literature studying the determinants of borrower discouragement, which mostly focuses on four main areas: firm features, macroeconomic conditions, credit market structure and entrepreneur personal characteristics (Han et al., 2009; Ferrando et al., 2015, Mac an Bhaird et al., 2016, Barasal Morales, 2022). Among the latter, we believe our study is the first to highlight a negative relationship between financial literacy and the likelihood of being a discouraged borrower.

Second, we add to the rising literature on the entrepreneurs' financial literacy. While the literature on the effects of financial literacy on households' planning, wellbeing, financial decisions and inclusion is vast (Lusardi and Mitchell, 2014 and 2023), research on SMEs is relatively dispersed, mainly because of the lack of data. Recent reviews (Anshika and Singla, 2022; Molina-Garcia et al., 2022), show that most of the existing literature examine the financial literacy of owners of micro, small and medium-sized enterprises (MSMEs) and the self-employed using small samples of companies in developing countries and relatively few works aim at analysing the effects on debt management or access to external

finance (Wise, 2013; Belas et al., 2018; Hussain et al., 2018). Our study adds to this literature by using a wide, representative sample of micro-firms located in a developed country and by using very detailed information on entrepreneurs' financial literacy and access to credit.

Finally, our study compares to other works on financial literacy of Italian small businesses. Finaldi Russo et al. (2022) compare the financial literacy of Italian micro-entrepreneurs with that of the rest of the population, revealing that the former had only a slight advantage in literacy over the latter. D'Ignazio et al. (2022), using the same OECD survey as this paper, explored entrepreneurs' financial literacy and found significant correlations between financial literacy, the transition to more digitalized business models, and greater resilience to external shocks. Trombetta (2023), using a sample of self-employed people in Italy, Spain, and the UK, finds a non-monotonic effect of financial literacy on a business' chances of survival.

The remainder of the paper is structured as follows. Section 2 develops our empirical hypotheses. Section 3 illustrates the sample and our methodology. In Section 4 we present the results of the econometric analysis and perform some robustness checks. Section 5 concludes.

2   Research hypotheses

2.1   *Financial literacy, demand and supply of credit*

Not all companies that need a loan apply for one. As first explained by Kon and Storey (2003), the imperfections in SMEs financing market, including application costs and imperfect bank screening of applicants, can lead to *discouraged borrowers*, i.e., to the possibility that some firms do not to apply for credit, despite of their potential creditworthiness, because they fear their application will be rejected. Kon and Storey (2003) argue that for discouraged borrowers the expected costs of applying for loans (i.e., the time spent on the application process and preparing the relevant documentation, as well as the costs of providing information to the banks) outweigh the expected benefits of obtaining credit, the calculation of which takes into account the expected low probability of having it granted.

Discouraged borrowers are a non-trivial proportion of firms that report obstacles to obtaining a bank loan. According to the ECB *Survey on the access to finance of enterprises* (ECB, 2023), between 2020 and 2023, around 5% of European SMEs that consider bank loans to be relevant for their business are discouraged, i.e. they reported that they did not ask for a loan for fear of rejection; this percentage is

significantly higher than that of businesses that were actually rejected for a loan (1.4%) or only received a limited amount of the requested loan they applied for (1.3%).[2]

Several studies investigate the determinants of the borrowers' discouragement. In terms of firm characteristics, discouraged borrowers are smaller, younger, riskier and less likely to be organized as corporations than applicant firms (Mac an Bhaird et al., 2016; Han et al., 2009; Freel et al., 2012; Cole and Sokolyk, 2016; Gama et al., 2017). Macroeconomic conditions also matter, and borrower discouragement is exacerbated in times of financial crises or economic recessions, when banks tend to tighten credit standards (Ferrando et al., 2015; Mac an Bhaird et al., 2016; Anastasiou et al., 2022). Results on other factors such as the concentration of credit markets, the strength of bank relationships and the physical distance from the branch are less clear-cut (Mac an Bhaird et al., 2016; Han et al., 2009; Chakravarty and Xiang, 2013; Gama et al., 2017; Alessandrini et al. 2009).

More relevant to this paper, some studies investigate the personal characteristics of the entrepreneurs that increase the likelihood of being discouraged. Female, less experienced and less educated entrepreneurs are more likely to be discouraged (Han et al., 2009; Cole and Sokolyk, 2016); entrepreneurs' cognitive factors (overconfidence, dispositional optimism and self-efficacy) are also relevant, and optimistic entrepreneurs are less likely to feel discouraged from borrowing (Barasal Morales, 2022).

We believe that the entrepreneur financial literacy is another characteristic which strongly influences her chances of being a discouraged borrower. According to the OECD definition, entrepreneurs with a higher degree of financial literacy possess the "*awareness, knowledge, skills, attitudes and behavior [...necessary] to make effective financial decisions to start a business, run a business, and ultimately ensure its sustainability and growth*" (OECD, 2018). These qualities include a better understanding of financial concepts such as interests on loans, financial risk and its trade-off with return on investment, as well as more "financially savvy" behaviors and attitudes. Because of these characteristics, entrepreneurs could more likely seek external credit when their business needs it, as it improves their (perceived) chances of obtaining credit. Moreover, literature has shown that higher financial literacy positively impacts various aspects of firms' performance or management, potentially influencing access to credit. Several authors have found positive effects of financial literacy on economic or financial performance of firms (Drexler at al., 2010; Dahmen and Rodriguez, 2014; Adomako et al., 2016; Eniola and Entebang, 2017; Alperovych et al., 2020), on budgeting and reporting (Maes et al., 2005; Siekei et

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[2] Similar evidences emerge for UK firms (Freel et al., 2012) and US firms (Cole and Sokolyk, 2016). Moreover, Cole and Sokolyk (2016) conduct a counter-factual analysis that indicates that between 21% and 55% of discouraged firms would have obtained credit if only they had applied for it.

al., 2013, Wise, 2013), and on innovation and risk attitude (Wahyono and Hutahayan, 2020, Liu et al., 2020). Hypothesis 1 then follows:

Hypothesis 1: The firm owner's level of financial literacy positively affects the likelihood of applying for a loan when credit is needed.

Based on the same evidence, we also expect that the entrepreneur's degree of financial literacy is positively related to the likelihood that her firm will be granted the requested loan, assuming that she has applied for it. Better financial literacy might, in fact, improve entrepreneurs' ability to provide more transparent and reliable financial information about their business, thus reducing the costs of information asymmetries. Moreover, more financially literate entrepreneurs could imply lower expected losses for banks as far as they show better capacity of debt management (Hussain at al., 2018). More recently, Rijssegem et al. (2023) find that Flemish entrepreneurs with a better financial knowledge have higher chances of obtaining finance (conditional on asking for it) because they are better to select and access relevant financial sources. In other terms, more financially literate entrepreneurs might be able to convey better soft and hard information to the banks when they ask for new loans. These considerations lead us to formulate Hypothesis 2.

Hypothesis 2: The firm owner's level of financial literacy positively affects the likelihood of obtaining a loan when it is applied for.

2.2 Financial literacy, professional financial advice and use of guarantees

We analyse two factors that may affect the relationship between financial literacy and access to credit, namely professional financial advice and public guarantees.

These mechanisms could in principle improve both the probability of applying for a loan – our first hypothesis - and the chances of obtaining a loan – our second hypothesis. The use of (professional) advice could significantly increase the chances of firms to both apply for a loan (if needed) and to get approval for their application. The assistance of an advisor could reduce the cost of the loan application (i.e., the time spent on the process and the cost of disclosing information to banks) and the likelihood of the entrepreneur being rejected, which are two key factors that explain why borrowers might be discouraged (Kon and Storey, 2003). The advisor intervention is also likely to improve the quality of

the loan application and therefore its success chances. As such, financial literacy might increase firms' access to credit if it leads to a higher tendency to ask for advice.

Current literature on the relationship between financial literacy and demand for advice is mostly focused on the general population of individuals, rather than entrepreneurs. A priori, financial literacy and the demand for advice could be complements or substitutes (Stolper and Walter, 2017). Social psychologists argue (see e.g. Kruger and Dunning, 1999) that less-knowledgeable people lack the ability to recognise their illiteracy, which leads them not to seek advice. In support to this view, some studies show that the degree of financial literacy of households and their demand for financial advice are positively correlated (Calcagno and Monticone 2015 and Collins 2012). Conversely, See et al. (2011) argue that subjective knowledge is an important deterrent to ask for advice: as a person's self-confidence in her own knowledge increases, her propensity to seek advice decreases. Moreover, studies focussed on the behaviour of financial investors find a negative relationship that emphasize the conflict of interests between individual investors and independent professional advisors (Inderst and Ottaviani 2012, Hung and Yoong 2009).

In the case of entrepreneurs, it is likely that there is a well-established working relationship between the entrepreneur and the advisor, and therefore agency conflicts between them are likely to be minimal. Moreover, considering the centrality of financial decisions (including the choice of asking for loans) for the success of the company, we believe that the financial literacy and demand for advice could be more likely complements rather than substitutes. In other terms, well-informed entrepreneurs are expected to recognise the importance of expert advice, suggesting that seeking advice could be one way in which financial literacy contributes to better access to credit. Thus, we formulate the following hypothesis.

Hypothesis 3: The firm owner's level of financial literacy positively relates to his/her use of external financial advice. This in turn improves the probability he/she access to bank credit.

In order to protect MSMEs hit by the severe economic consequences of the COVID-19 pandemic, in April 2020 the Italian government significantly expanded the state-backed guarantees for SMEs. Public guarantees for bank loans increase the supply of credit by protecting banks (partially or fully) against the risk of borrowers' insolvency (Hackney, 2023; Vogel and Adams, 1997). The (portion of) loans covered by the guarantee carry a zero per cent risk weight and therefore imply a lower absorption of bank regulatory capital. Government guarantees therefore increase the likelihood that banks will grant loans that they would normally have refused, in particular to less creditworthy clients (Cowling, 2010). In addition to their effect on loan supply, these public guarantees possibly also increased loan demand.

In turn, entrepreneurs who are aware of existing government guarantees and better understand their positive impact on the chances of obtaining the requested loan should have less fear of rejection and increase their demand for credit.

If the entrepreneur's financial literacy positively correlates with his/her awareness of the public guarantees, as suggested by D'Ignazio et al. (2022), we expect the relationship between financial literacy and demand for credit to be mediated by such awareness. Given the functioning of the public guarantees, a higher probability of asking credit, if needed, also increases the probability of obtaining the requested loan. Therefore, the same mediation effect should be present also if we observe a positive relationship between financial literacy and the requested loan being approved.

Hypothesis 4: The firm owner's level of financial literacy positively relates to the fact that he/she is aware of the existence of public guarantees on bank loans. This in turn increases the probability he/she access to bank credit.

3   Empirical approach

3.1   *Survey design and sample selection*

We test our hypotheses on a sample of micro-enterprises whose owner-managers responded to a survey conducted in 2021 by the Bank of Italy. The survey is the Italian adaptation of the proposed OECD survey on financial literacy for entrepreneurs (OECD, 2020). The data collection took place from March to May 2021 and focused on Italian companies operating in non-financial industries and with fewer than 10 employees. The questionnaire presents sections on entrepreneurs' characteristics (including their degree of financial literacy), business' characteristics, the need and the demand of loans together with the outcome of the loan application since the outset of the Covid-19 pandemic.

The survey includes responses from 1,998 micro-entrepreneurs who are owners of their companies and are responsible for taking the company's financial decisions. However, we narrowed down our sample to 1,586 companies excluding those with missing values in the variables of interest.

The survey used a stratified sampling design, in which strata are defined as the combination of 5 Italian geographical areas (i.e., North-East, North-West, Center, South and Islands) and 10 sectors of economic activity (based on NACE Rev 2 codes)[3]. For each respondent, the survey includes sampling weights for

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[3] Specifically, branches of economic activity are aggregated in the following 10 sectors: A. agriculture, forestry and fishing; C. manufacturing; F. construction; G. wholesale and retail trade; repair of motor vehicles and motorcycles; H. transporting and storage; I. accommodation and food service activities; J. information and

the corresponding strata, i.e., weights that denote the inverse of the probability that the observation is included because of the sampling design. We use such weights in all the regressions to limit the impact of response bias and ensure that the results are representative of the population of origin. Specifically, the 1,586 companies in the sample represent a population of 3,552,066 Italian micro-enterprises, as estimated by the Bank of Italy[4].

3.2 Main dependent variables on the access to finance, and model specification

The purpose of our analysis is to study the chances that companies ask for a loan and are granted a loan. However, a fundamental requisite for asking a loan is to need one. We begin by modelling the probability to need a loan in our sample of micro-enterprises using a probit specification in which the dependent variable is the dummy *LoanNeeded*, equal to 0 for 467 companies (i.e., 29.4% of the sample) who pointed out that they did not apply for a new loan for the business since the start of the COVID-19 pandemic because they "*did not need it*", and 1 for the 1,119 companies who either asked for a loan or did not do ask for it despite needing external financing.

Next, to model the chances to ask for a loan, conditional on needing it, we generate a dummy *LoanAsked,* defined only for companies who needed a loan (i.e., in the 1,119 cases in which *LoanNeeded* is equal to 1) and equal to 1 if companies responded positively to the question "*Since the start of the COVID-19 pandemic, have you applied for a new loan for the business?"*. This happened in 85.2% of cases, corresponding to 953 companies[5]. The remainder companies who did not ask for loans despite needing them are therefore considered as "discouraged borrowers". We resort to a probit specification with Heckman (1979) sample selection, in which we include all 1,586 companies and model simultaneously the probability of needing a loan and to ask for a loan conditional on needing one. More in details, we use the residuals of a first step probit on *LoanNeeded* to compute a correction term which takes into account the unobservable factors that distinguish companies needing a loan, which might also have an effect on the chances to demand for it. We then include this correction term in a second step probit on *LoakAsked*. Lastly, to analyse the successful obtaining of a loan, we focus on the subsample of 953 companies who asked for it, and generate a dummy variable equal to 1 for companies who answered to the question "*What was the outcome of the application?*" by selecting the answer "*The loan has been fully obtained*". This happens in 854 cases (89.6%). Again, as companies can obtain loans only if they

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communication; PQRS. Education; Human health and social work activities; Arts, entertainment and recreation; Other services activities; M. professional, scientific and technical activities; LN. Real estate activities; Administrative and support service activities. For further details on the survey, refer to D'Ignazio et al. (2022). Microdata are available at: https://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/alfabetizzazione-imprese.

[4] Results are virtually identical when frequency weights are not used, suggesting that response bias is anyway not an issue in our data.

[5] The survey does not provide any information about the amounts demanded.

ask for them, we use a probit specification with Heckman (1979) sample selection, in which the first step dependent variable is *LoanAsked* and the second step dependent variable is *LoanGranted*.

3.3 Main independent variables: financial literacy

The main independent variables of the study are meant to capture the financial literacy of respondents. We use three alternative indicators.

The first is based on the indicator suggested by the OECD which includes three components: the level of financial knowledge, measured as the number of correct answers to true or false questions on topics such as dividends, equity, risk-return relation, inflation and loan payments; the "savvy" skills and behaviors, which includes practices like creating separate accounts for personal and business use, shopping around for different financial products and comparing costs from different sources for the business; and the "savvy" financial attitude demonstrated through actions such as setting long term financial goals and plan carefully one's business. Appendix 2 illustrates in detail the methodology for the construction of this indicator, *FinLiteracy;* specifically, we follow the approach adopted by D'Ignazio et al (2022) to assign equal weight to the three components.

Our second independent variable is the financial knowledge component of the financial literacy indicator (*FinKnowledge*). Evidence in the personal finance literature show that financial knowledge is the most reliable of the three indicators (D'Alessio *et al.*, 2021). Notably, it is also highly comparable with other measures of financial literacy, as it encompasses two of the three concepts included in the "Big Three" questions of financial literacy, namely inflation and risk-reward relation.

Our third independent variable is an alternative measure of financial knowledge of the entrepreneurs which includes more aspects with respect to the OECD proposal. In particular, *FinKnowledge_extended* also considers the entrepreneurs' comprehension of: credit rating, balance-sheet, Return-On-Asset ratio, simple and compound interest rate, and risk diversification.

The three indicators vary between 0% to 100%. Sample averages for *FinLiteracy*, *FinKnowledge* and *FinKnowledge_extended* are respectively 75.7%, 75.6% and 70.9% and are lower than the value proposed by OECD (2021) to identify firms with relatively high levels of financial literacy (80%).

3.4 Other independent variables: use of professional advice and awareness of guarantees

In order to study the effects of external advice and loan guarantees on the demand and supply of credit, we generate additional variables. Specifically, the variable *ExternalAdvice* is a dummy equal to 1 for companies who indicated that the respondent has been assisted in the recent past[6] in taking financial

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[6] The question refers to the 24 months previous to the interview or since business creation if the business existed for less than 24 months.

decisions for the business by an external "*book-keeper or accountant*", "*business financial advisor*", "*financial intermediary (e.g. bank)*" or "*public agency or institution*". We focus here only on professional external advice, excluding that provided by "*business partners*", "*family or friends*" and "*someone else*". To make sure that the external advice pertained financial aspects of the business, we set the dummy to 0 cases in which the respondent mentioned the use of external advisors but did not indicate on which specific element they received financial advice (i.e., "*managing cash flows and liquidity needs, accessing external financing, evaluating financial performance, taxes, book keeping and risk exposure*"). 68.2% of respondent made use of external professional financial advice.

The variable *AwareLoanGuarantee* is defined as a dummy equal to 1 for companies who declared that they used *"public guarantee schemes [...] introduced during the COVID-19 crisis to support your firms' financial conditions"*[7] and for companies who declared that they did not used them, despite the fact that they were aware of the measure.[8] Unfortunately, the variable is available only for 1,252 respondents, because of additional missing values. 96.0% of the companies were aware of the public guarantees, confirming the knowledge of the widespread use of the Italian companies of government support schemes to alleviate the consequences of the COVID-19 pandemic extended lockdown periods.

3.5   *Controls and instruments*

We also include a set of control variables in our analysis. Respondents characteristics include age class dummies, a gender dummy and education level dummies. Company level characteristics include size classes dummies (in terms of sales), industry dummies, geographical area dummies and the logarithm of the age of the company in 2020 (plus 1), called *ln(Firm Age)*. Moreover, we included self-reported information on the health of the company balance sheets. Specifically, the survey asked "*Thinking about your business, how would you evaluate the level of the following items at the end of 2019?*". The variable *High_liquidity* is a dummy equal to 1 if respondents declared that the company liquidity (e.g., cash, very liquid financial instruments, committed credit lines) was adequate or high and 0 otherwise. *Low_ST_debt* and *Low_LT_debt* are dummies equal to 1 if respondents declared that their short-term financial debt and long-term financial debt, respectively, were adequate or low, and 0 otherwise.

To control for the selection bias and perform the Heckman correction term, we include two additional variables that are used as exclusionary restrictions in our models. *CovidImpact_empl* is a variable which

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[7] In April 2020 the Italian government extended the state-backed guarantees that can be granted by the Central Guarantee Fund for SMEs in various ways: extending of the eligibility criteria for access to the fund, abolishing the creditworthiness assessment system of the Fund, increasing the scope of cover for guarantees for loans with certain characteristics, and, in particular, the automatic granting (i.e. without prior approval by the Fund) of loans under €30,000, which became fully covered by the public guarantee (Bank of Italy, 2020).

[8] More specifically, to entrepreneurs who did not use the guarantees, the survey asked why so. The possible answers were "*because I was not aware of them*", "*because I was not eligible*" and "*because I did not need it or it was not convenient*".

captures the effect of the pandemic on the company's number of employees. Specifically, the survey asked *"How would you describe the impact of the COVID-19 crisis on the [number of employees] related to your business?"* and the answers ranged from 1 (large decrease) to 5 (large increase). In other terms, *CovidImpact_empl* takes higher values for companies who were less harmed, or even favoured by the COVID-19 pandemic in terms of number of employees. We expect this variable to influence the probability that a company needs a loan (the higher the hit, the higher the need for finance) in 2020, but not necessarily the chances of being discouraged borrowers: the fear of being rejected may depend more on financial indicators largely used by banks to assess borrowers' creditworthiness, rather than the number of employees. Therefore, this variable is used as exclusionary restriction in the probit with sample selection in which the dependent variable is *LoanAsked* and the selection is based on *LoanNeeded*.

The second instrument is *PreDgt_loan*, a dummy equal to 1 for companies who answered yes to the question "*Thinking about the period before the COVID-19 pandemic, at the end of 2019, have you signed a financing contract (e.g. a bank loan) completely online?*", and 0 otherwise. We think that companies that signed a loan online before the pandemic were less likely to be discouraged borrowers during the pandemic, but were not necessarily in a better position to have their loan requested granted. In other terms, the variable is a suitable exclusionary restriction in the probit whose dependent variable is *LoanGranted* and the sample selection depends on *LoanAsked*.

3.6 Sample statistics

The distribution of the sample by categories of respondents, characteristics of companies and access to loans is shown in Table 1. Most of respondents are male (72.3%), in the 30-69 age range and attended high school (57%) or have a university degree (31%). Companies most often follow in the 100,000-500,000 EUR bracket of annual sales in 2020, and the most represented industries are wholesale and retail trade (21%) and professional, scientific and technical activities (24.0%). Companies most often are located in Northern Italy, especially North-Western regions.

As previously mentioned, 70.6% of companies state that they need a loan. The percentage is higher among younger and less educated owner-managers, smaller companies operating in manufacturing and accommodation and food service activities, and in the South and Islands regions.[9]

85.2% of companies who need a loan asks for it, with higher incidence for older and less educated respondents, and smaller companies operating in the South and Islands areas. Instead, distributions

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[9] The chances to need a loan are significantly different across respondents' education levels ($\chi2(3)=19.88$, significant at the 1% level), sales classes ($\chi2(6)=12.47$, significant at the 10% level), sectors ($\chi2(9)=49.36$, significant at the 1% level) and geographical areas ($\chi2(4)=24.36$, significant at the 1% level), while they are not significantly different across respondents' age classes and gender.

across gender and industries are not different for companies asking for loans and for discouraged borrowers.[10]

Lastly, 89.6% of companies who asked for a loan obtained it. Interestingly, the only dimension across which the distribution of companies who obtained a loan is different with respect to the distribution of companies who did not obtain a loan is the sector, with much lower success rates in agriculture, forestry and fishing sectors.[11]

In Table 2, we provide some descriptive statistics on our main financial literacy measure, *FinLiteracy*, across groups of companies based on their access to finance. Some t-tests suggest that financial literacy is weakly significantly higher for companies who did not need a loan with respect to other companies (significant at the 10% level), and strongly significantly higher for companies who asked for a loan when they needed it (significant at the 1% level). We do not find differences in the financial literacy of companies who obtained a loan and those who did not. This preliminary evidence points to an important role of financial literacy on the chances of being discouraged borrowers.

Finally, we compare the degree of financial literacy of micro-entrepreneurs here considered with that of the broader Italian population, measured by the Survey of Adult Financial Literacy Competencies, carried out in 2020 by the Bank of Italy. Specifically, the survey examines the level of knowledge in three fundamental financial topics, closely related to the "Big Three questions" on financial literacy, which encompass compound interest rates, inflation, and the relationship between risk and diversification (Lusardi and Mitchell, 2014). Results reported in Table 3 show that Italian micro-entrepreneurs in our sample exhibit significantly higher financial knowledge compared to the Italian general population. The result, which is qualitatively in line with the findings of Finaldi Russo et al. (2022), is unsurprising, considering that financial decisions affect almost every aspect of an entrepreneur's day-to-day activity: from customer and supplier payment terms to liquidity management, from financial planning to inventory management, from relationships with banks to investment decisions. Among the three financial topics assessed, compound interest rate emerges as the area where the difference in knowledge is most pronounced.

Table 4 shows descriptive statistics of all the variables used in the analysis and Table 5 reports the correlation matrix. Besides the high correlation among the different financial literacy and financial

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[10] The distribution of firms not asking for loans even if they need one (discouraged borrowers) is different across respondents age classes ($\chi^2(3)$=6.47, significant at the 10% level), education levels ($\chi^2(3)$=8.31, significant at the 5% level), sales classes ($\chi^2(6)$=36.79, significant at the 1% level) and geographical areas ($\chi^2(4)$=20.23, significant at the 1% level).

[11] The χ^2 computed for the 9 sectors is equal to 24.21, significant at the 1% level.

knowledge variables, the other correlation indexes are quite limited, with the only exception of the one between *Low_ST_debt* and *Low_LT_debt*.

4 Results

4.1 *Financial literacy and access to credit*

First, we explore the potential impact of financial literacy on an entrepreneur's loan needs. Exploiting the full sample of 1,586 companies, we use a probit regression with *LoanNeeded* as the dependent variable. Results from three models, utilizing the three different financial literacy indicators, are presented in Table 6. Despite controlling for various factors, including industry, geography, sales class, age, education, and a constant term, we find no significant relationship between entrepreneurs' financial competences and their loan requirement. Notably, pre-pandemic financial conditions, such as higher liquidity and low long-term debt, are the only variables significantly correlated with the need for loans, both at the 1% level.

To analyse the role of financial literacy on the demand for loans, conditional on needing them, we resort to a probit specification with Heckman (1979) correction for selection bias, in which the selection depends on whether the company needed a loan (*LoanNeeded* is equal to 1) while the main dependent variable is the dummy identifying companies that asked for it (*LoanAsked* is equal to 1). Results are shown in Table 7[12]. The selection model in which the dependent variable is *LoanNeeded* analyses 1,586 observations. Besides controls and independent variables (which present similar coefficients with respect to those displayed in Table 6), we also include the exclusionary restriction *CovidImpact_empl*, assumed to influence the need for loans but not the propensity to ask for one (see paragraph 3.5)[13].

The main analysis of the role of financial literacy on the demand for loan (*LoanAsked* equal to 1), displayed in the top of the table, is performed on 1,119 companies who were "selected" into the sample of companies needing for a loan. We find a positive and significant association between all and each measure of financial literacy and the demand for loans, suggesting that more financially literate

[12] The reported *arthrho* variable, which indicates the correlation between the two equations, is not significant at standard statistical confidence levels. A similar result is found for the Wald test of independence between the main and selection equation. Both tests fail to reject the null hypothesis that there are unobserved factors that affect the need for loans and, consequently, the demand for loans if needed.

[13] Results displayed in the bottom of the table confirm that the former assumption holds: companies more strongly hit by the COVID-19 pandemic in terms of reduction of employees are more likely to need a loan. We tested the latter assumption by directly including the variable in a probit specification whose dependent variable is *LoanAsked*. The unreported results indicate that the coefficient of the variable *CovidImpact_empl* does not significantly (at standard confidence levels) influence the chances to ask for a loan, if in need.

entrepreneurs are less likely to be discouraged borrowers. Average marginal effects (computed with the delta method) indicate that a standard deviation increase in *FinLiteracy, FinKnowledge* and *FinKnowledge_extended* lead to a 3.7, 2.5 and 4.0 percentage points increases in the likelihood to ask for a loan, respectively. The statistical significance of the effects is high (at least with p-value<5%). Results provide support to our Hypothesis 1. Among the control variables, the coefficients of the larger sales class dummies are positive and significant at standard statistical levels, suggesting that larger firms tend to be less discouraged, which is consistent with the findings of numerous studies in the economics literature on borrower discouragement. It is interesting to note that the companies' characteristics that determine the need for loan (such as low liquidity) do not have a role in explaining the demand for loan once selection effects are accounted for.

In Table 8, we analyse the relationship between financial literacy and the likelihood to obtain the loan, controlling for the selection into companies who asked for it. In the selection equation the dependent variable is *LoanAsked* and the sample consists of 1,119 companies in need for a loan. Besides the usual set of controls and independent variables measuring financial literacy (which again show similar coefficients to those presented in Table 7), we include *PreDgt_loan* as exclusionary restriction, a dummy variable indicating whether a company signed a financial contract online before the COVID-19 pandemic (see paragraph 3.5). Results shown at the bottom of the table confirm that *PreDgt_loan* positively influences the chances to ask for a loan during the pandemic, arguably because those companies are more at ease in demanding loans in general. An unreported estimate confirms that this variable does not have a significant role in influencing the chances to actually obtain the asked loan.

In the main model the dependent variable is *LoanGranted* and the sample consists of the 953 companies who asked for a loan. We adopt the same specification used for analysing the demand for loans. Results show that none of the financial literacy variables are significant, suggesting that entrepreneurs' financial literacy does not affect significantly the chances that companies have their loan requests granted. Therefore, these results do not support our Hypothesis 2. Among control variables, only *ln(FirmAge)* and *Low_LT_debt* have estimated coefficients significantly different (higher) from zero, suggesting that older companies and firms with lower pre-pandemic outstanding long term debt are more likely to see their loan requests approved.[14]

Anyway, these results on the likelihood of obtaining the demanded loans should be interpreted cautiously since our data on access to credit refer to a peculiar phase of the credit market - the pandemic crisis-, which is characterized by a strong public intervention in support of MSMEs' funding that could

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[14] According to the results of Column III, chances of success are 4.5 percentage points higher for companies older by 1 standard deviation of *ln(FirmAge)*, and 5.6 percentage points higher for companies with low pre-COVID-19 long term debt.

have weakened bank incentives to an accurate screening of their borrowers. Consider that, starting from 2010, 2020 and 2021 were the only two years in which credit to Italian firms with less than 20 employees show an increase (by 6.8 and 1.1 per cent, respectively).

4.2 The role of professional advice

In this section we analyse the relation between financial literacy and the use of external professional advice. Table 9 shows the results of probit models based on the full sample of 1,586 survey respondents, whose dependent variable is the dummy *ExternalAdvice*. We find a positive association between entrepreneurs' financial literacy and seeking external advice, although with different levels of statistical significance depending on the metric used. In Column I, *FinLiteracy*'s coefficient is positive and significant at the 1% level, with average marginal effects suggesting an increase in the chances to ask for external professional advice of 4.7 percentage points for a standard deviation increase in financial literacy. In Column II *FinKnowledge* is not significant at standard statistical significance levels, while *FinKnowledge_extended* in Column III improves the likelihood of using external professional advice with a marginal effect of 2.8 percentage points for each standard deviation increase in financial knowledge (and a p-value<10%). These results offer partial support for the first part of Hypothesis 3 on a positive relationship between financial literacy and demand for external advice, confirming the complementarity of the two elements.

To test to what extent the employment of external advice drives the relationship between financial literacy and demand for loans, in Table 10, we replicate the analysis of Table 7, and additionally control for the demand for external advice. Interestingly, in the selection equation we find a positive correlation between the use of external professional advice and the need for a loan (p-value<5%)[15]. Moreover, external advice also loads positively on the chances to ask for a loan when needing one, with p-value<1%. The size of the effect is economically significant, and equal to 11.2 percentage points according to results shown in Column III. We also find that the effect of financial literacy on the demand for loans is still significant, although slightly lower than in Table 7: specifically, marginal effects for one standard deviation increase are lower than those estimated in Table 7, decreasing from 3.7 to 3.0 percentage points for *FinLiteracy*, from 2.5 to 2.3 for *FinKnowledge* and from 4.0 to 3.6 for *FinKnowledge_extended*. Overall, these results confirm that entrepreneurs with higher financial competences are more likely to seek professional financial advice, and this in turn improves their chances to ask for credit if needed, coherently with the second part of Hypothesis 3. However, seeking

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[15] In an unreported probit model in which we model *LoanNeeded*, the variable *ExternalAdvice* has average marginal effect equal to 6.2 percentage points.

external advice only partially mediates the relationship between financial literacy and demand for loans, and this suggests that other elements are at play.

4.3   The role of government guarantees

Next, we investigate the association between financial literacy and the knowledge of government guarantees on loans granted during the pandemic period. Because of missing values, the analysis is conducted on 1,252 observations. Results in Table 11 show that, coherently with the first part of Hypothesis 4, there is a positive association between financial literacy and the awareness of public guarantees schemes[16]. However, the effect is significant only for *FinLiteracy* (p-value<1% in column I) and *FinKnowledge_extended* (p-value<1%, column III) but not for *FinKnowledge*. Marginal effects indicate a 1.8 and 1.6 percentage points higher chances to be aware of guaranteed loans for a one standard deviation increase in *FinLiteracy* and *FinKnowledge_extended*, respectively.

Among the control variables, the respondent gender is the only significant one, with male respondents being (2.3 percentage points, according to Column III) more inclined to know about public guarantees, although statistical significance is weak (p-value<10%).

Lastly, we test the extent to which the relationship between financial literacy and demand for loans is moderated by the awareness of guarantees on loans, which, as shown, correlates with financial literacy. Table 12 once again replicates Table 7 on the relationship between financial literacy and demand for a loan (conditional on needing one), this time considering the awareness of loan guarantees among controls. Being aware of loan guarantees does not significantly influence the need for loan (i.e., *AwareLoanGuarantees* is not significant in the selection equation based on *LoanNeeded*), but it does influence the demand for loans with p-value<10% (or better). Specifically, the average marginal effect of *AwareLoanGuarantees* on the demand for loans is equal to 12.9 percentage points according to the results shown in Column III. Despite the strength of this relationship, our measures of financial literacy on the demand for loans are still significant. Marginal effects are smaller than in Table 7. The improvement in the demand for loans due to one standard deviation increase in financial literacy lowers from 3.7 to 2.7 for *FinLiteracy*, from 2.5 to 2.0 percentage points for *FinKnowledge*, and from 4.0 to 3.9 for *FinKnowledge_extended*. Overall, these results support the second part of Hypothesis 4 that the higher financial literacy increases the demand for loans by improving the awareness of public guarantees. Still, the effect of financial literacy on the likelihood of asking a loan, if needed, is only partially mediated by the awareness of guarantees.

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[16] This evidence is similar to that of D'Ignazio et al. (2022), who find that the financial literacy of entrepreneurs is correlated to the use of public guarantees during the Covid pandemic.

4.4   Robustness checks

An important robustness check for our analysis on the relationship between financial literacy and demand for loans concerns endogeneity. A possible source of endogeneity might derive from omitted variables influencing both financial literacy and demand for loans. For instance, our analysis ignores whether business owners have strong and enduring relationships with the banking system, which would lead to both higher financial literacy and a greater likelihood of applying for a loan when needed. Another source of bias could arise from reverse causality. Financial literacy could affect firms' propensity to apply for bank loans, but the reverse could also be true: firms with a high propensity to apply for loans might be willing to acquire more financial knowledge. Ignoring these possible sources of endogeneity might lead to biases in our estimated coefficients. To address this issue, we use an instrumental variable approach in which financial literacy is treated as endogenous.

Following the existing literature, we identify three instrumental variables for our measures of financial literacy. The desired characteristics of the instruments are their relevance (i.e., they correlate with financial literacy) and exogeneity in the main equation (i.e., they do not correlate with the error term of the model for the demand for loans once financial literacy is accounted for).

The first instrument captures the local exposure of a focal micro-entrepreneur to financial knowledge, which arguably influences her own financial literacy, but not the chances to look for loans of her company. We use the variable *FinKnowledge_province*, computed as the average financial knowledge of the entrepreneurs located in the same province where the focal entrepreneur operates its business. Similar instruments were employed by Bucher-Koenen and Lusardi (2011), who used political attitudes at the regional level as a proxy for exposure to financial knowledge of others in the same region, and by Xu et al. (2020), who used the average level of financial literacy in the community to instrument entrepreneurs' financial literacy's impact on credit access.

The other two instruments are specific to the entrepreneur, and capture her chances to have developed financial literacy before having established a company. Specifically, our second instrument proxies for the chances that the focal entrepreneur has acquired economic skills in her family. *Entrepreneurial_family* is a dummy taking value 1 if "*the respondents' parents currently own or have owned a business in the past*[17]"), and 0 otherwise. Similar instruments were used by Alessie et al. (2011), Agnew et al. (2013), who instrumented financial literacy with survey respondents' siblings' and parents' understanding of financial matters; Arrondel et al. (2012) also controlled for the possible inheritance of financial portfolios. Our third instrument captures the level of education entrepreneurs acquired in high

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[17] As explicitly described in the survey instructions, the purpose of this question is to determine whether the respondent may have acquired entrepreneurial skills in the family, not whether the respondent has a family business.

school. We generated a dummy variable *EconomicEduc_HighShool,* taking value 1 for entrepreneurs whose maximum scholastic attainment was high school and that declared that "*they received education in subjects related to business, economics, or finance in high school*". Similar instruments were used by Van Rooij, Lusardi, and Alessie (2012), who used information on how much of the respondent's education was devoted to economics.

Table 13 shows the results of the IV-approach using the three variables as instruments. Specifically, we resort to a probit model whose dependent variable is *LoanAsked*, defined only if *LoanNeeded* is equal to 1, with our three measures of financial literacy modeled as continuous endogenous covariates[18]. In the bottom of the table we show the results of the first step in which our three measures of financial literacy are predicted. Each one of our three instruments have positive and significant coefficients in each of the three measures of financial literacy, as expected: financial literacy is higher for entrepreneurs located in provinces where other entrepreneurs are also more financially literate, who had an entrepreneurial family and who received an economic education in high school. To confirm the relevance of the instruments, for each model, we report the Sanderson-Windmeijer multivariate F test of excluded instruments, which is significant at the 1% level and whose value is above the 10% maximal IV relative bias critical value for three instruments (i.e., 9.1, according to Stock and Yogo, 2005). The Sargan statistics testing the overidentification of all instruments and its p-value are also reported and confirm the instrument's exogeneity in the main analysis[19].

The main probit analysis (upper panel of Table 14) confirms our baseline results on the positive effect of financial literacy on the likelihood of asking for a loan conditional on needing it, significant at least with p-value<5%. Moreover, the Wald tests fail to reject the null hypothesis of exogeneity of our financial literacy measures in the analysis of the demand for loans, suggesting that endogeneity is not a concern and that our main probit regressions might be appropriate.

Another fundamental robustness check is needed in this study because of the very special period in which our analysis was conducted. As mentioned, the survey was administered after the COVID-19 pandemic, and in this period both the supply and the demand for loans were likely to be massively influenced by the extensive use of public schemes to support businesses, most importantly guarantees. The public guarantee reduces the risk for the bank to extend a loan, and therefore increases the bank incentive to supply credit. As shown, entrepreneurs aware of this effect were more prone to ask for loans with the intention of benefiting from guarantees, expecting lower rejection rates. The results we have

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[18] Note that the number of observations slightly drops because of the missing values in our instruments.
[19] We conducted our analysis using the ivprobit command in Stata 17. Results on the tests of relevance and exogeneity of the instruments were conducted using the ivreg2 Stata command.

seen so far on the relationship between financial literacy and demand for loans in this special period might not be replicable in another context.

Unfortunately, Bank of Italy survey on financial literacy of micro-entrepreneur was first conducted in 2021. However, even in 2021, the relationship between financial literacy and demand for loans was arguably not influenced by the massive presence of public guarantees for companies who did not use them. Therefore, as robustness check, we replicate our analysis on a (sub)sample of entrepreneurs who declared they did not use guarantees. In other terms, we exclude from the sample entrepreneurs who were granted guaranteed loans. Some entrepreneurs declared that they did not use the guarantees either because they were "*not aware of them*", or because they were "*not eligible*", or because they "*did not need it or it was not convenient*". Arguably, the demand for loans of entrepreneurs not aware, not eligible or not in need of guarantees was not influenced by the guarantees. Similarly, the supply of credit for these companies was not influenced, at least directly, by the presence of the guarantees. So, in this subsample, the relationship between financial literacy and demand and supply for loans should be less biased by the widespread presence of guarantees.

In our sample, 899 entrepreneurs were not granted a guaranteed loan, 48.1% (432) of which were in need for loans, 61.6% (266) of which asked for loans, and finally 62.8% (167) of which obtained non-guaranteed loans. Results of these estimations are presented in Table 14. The coefficients in Column I, based on the measure of *FinLiteracy*, are consistent with the main results and confirm that financial literacy does not influence the need for loans, but it does boost the chances to ask for loans in absence of guarantees. In Column II, *FinKnowledge* loses significance in the main equation. In Column III, *FinKnowledge_extended* loads negatively on the chances to need a loan, although the positive relationship with the demand for loan is maintained with p-value<10%.

5   Conclusions

Access to external financing for SMEs is associated with considerable challenges, which are mainly due to information asymmetries. A large body of literature shows that these asymmetries affect the supply side of SMEs' financing, i.e. the availability of credit. In this paper we focus on the demand side of SMEs' financing, i.e. the firms' likelihood to apply for credit, when in need. One notable aspect affecting SMEs credit demand is the entrepreneurs' perception of their ability to access credit, which determines whether they become "discouraged borrowers", i.e. they do not apply for external loans even if they need them (Kon and Storey, 2003; Cole and Sokolyk, 2016; Ferrando and Mulier; 2016). We focus on the financial literacy of the firm owner, which could play a crucial role in overcoming these challenges. However, this aspect has only been researched to a limited extent, mainly due to the limited data available.

To address this gap, we employ a survey administered by the Bank of Italy in 2021 among a representative sample of 1.998 Italian micro-entrepreneurs that includes detailed data on firm owners' financial literacy and their access to credit. First, we analyse the impact of entrepreneurs' financial skills on the likelihood of asking for a loan, conditional on needing one. In other words, we point to highlight whether financial literacy reduces "borrowers' discouragement", which is a widespread obstacle to the access to credit market of MSMEs also in developed countries. Second, we study whether entrepreneur's financial literacy is related with the chances of obtaining the demanded credit, i.e. we investigate on the effect of financial literacy on firms' credit rationing. Third, we shed light on the mechanisms beyond these relationships, focusing on the role of professional financial advisors and public guarantees schemes.

We find that micro-entrepreneurs with higher financial literacy are less likely to be discouraged borrowers. This result holds either if we measure entrepreneurs' financial literacy according to the OECD approach (2020) - which includes objective financial knowledge and qualitative items related to the owners' savvy financial behavior, and savvy financial attitudes - or if we focus on different measures of the objective financial knowledge. If anything, we find that the more comprehensive measure of financial knowledge has the largest marginal effect on the entrepreneurs' chances of applying for a loan. Moreover, we checked the robustness of this result by instrumenting the financial literacy variables to control for their potential endogeneity and by excluding companies who used a publicly guaranteed loan during the pandemic.

As for the possible mechanisms through which entrepreneurs' financial literacy might influence access to credit, we find that entrepreneurs with higher financial competences are more likely to use external advice and to be aware of the existence of the public guarantees. Both these factors partially explain the positive relationship between financial literacy and the likelihood of demanding credit.

Finally, among those who demand credit, our analysis does not highlight any significant relationship between entrepreneurs' financial literacy and their likelihood to obtain a loan.

Overall, our results contribute to the empirical literature on small business access to credit as, to our knowledge, this is the first analysis to show a negative relationship between financial literacy and the likelihood of being discouraged from borrowing. Moreover, we add to the still scant literature that studies the effects of entrepreneurs' financial literacy on their choices and performance by using a wide, representative sample of micro-firms located in a developed country and exploiting very detailed information on entrepreneurs' financial literacy and access to credit.

The policy implications of these results are straightforward and point to the importance of the entrepreneurs' financial education for a smooth access to credit markets: as the number of discouraged borrowers is significantly larger than that of rationed borrowers, measures aimed at addressing the fear

of rejection by strengthening financial literacy might be an effective complement to traditional supply-side measures.

Our findings on the relationship between financial literacy and access to credit also raise questions that can be addressed in future research on this topic. One open issue is whether borrower discouragement is negative per se, i.e. whether entrepreneurs should always ask for loan when they need it, regardless of their credit history or growth prospects. On the one hand, discouragement could lead to the financial exclusion of creditworthy entrepreneurs, but on the other hand, it could prevent undesirable situations of over-indebtedness (and possible business failures) especially if the credit scoring procedures of intermediaries are weak. In this context, financial education could play a crucial role by improving entrepreneurs' self-assessment and making them more aware of their debt needs and repayment capacity. Unfortunately, with the information from the survey used in this paper, we are not able to link data on the entrepreneur's credit history or financial statements (before and after the loan application).

Another topic that should be explored further is the impact of financial literacy on the likelihood of obtaining new loans. A limitation of our study is the fact that our data refer to the pandemic period. In times of economic recession, the discouragement of borrowers could be even greater. In addition, the massive use of public guarantees to support access to credit for small businesses may have weakened banks' incentives to scrutinise and monitor borrowers. We have attempted to deal with these issues, but future studies could usefully replicate our analysis in a less turbulent time and/or with an international sample of firms.

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Appendix 1: Tables

Table 1: Sample distribution by characteristic of the respondent or company and access to loans

	Full sample		Needed a loan		Asked for a loan		Were granted a loan	
	N	%	N	% of full sample	N	% of needed a loan	N	% of asked for a loan
Total	1586	100.00	1119	70.55	953	85.17	854	89.61
By age of the respondent								
<30 years	48	3.03	36	75.00	31	86.11	26	83.87
30-49 years	716	45.15	507	70.81	445	87.77	395	88.76
50-69 years	746	47.04	522	69.97	435	83.33	395	90.80
>=70 years	76	4.79	51	67.11	42	82.35	38	90.48
By education level of respondent								
Primary education or less	16	1.01	12	75.00	8	66.67	7	87.50
Middle school	180	11.35	145	80.56	115	79.31	102	88.70
High school	898	56.62	647	72.05	556	85.94	503	90.47
Tertiary education	492	31.02	315	64.02	274	86.98	242	88.32
By gender of respondent								
Male	1146	72.26	803	70.07	682	84.93	615	90.18
Female	440	27.74	316	71.82	271	85.76	239	88.19
By annual sales of the company in 2020								
<10,000 EUR	15	0.95	12	80.00	7	58.33	5	71.43
10,000- 50,000 EUR	78	4.92	52	66.67	32	61.54	26	81.25
50,000- 100,000 EUR	181	11.41	141	77.90	116	82.27	101	87.07
100,000- 500,000 EUR	833	52.52	590	70.83	510	86.44	463	90.78
500,000 - 1,000,000 EUR	280	17.65	191	68.21	173	90.58	151	87.28
1,000,000- 2,000,000 EUR	126	7.94	84	66.67	71	84.52	68	95.77
>2,000,000 EUR	73	4.60	49	67.12	44	89.80	40	90.91

By industry (NACE Rev. 2 code) of the company

A - Agriculture, forestry and fishing	119	7.50	77	64.71	61	79.22	45	73.77
C - Manufacturing	108	6.81	88	81.48	72	81.82	61	84.72
F - Construction	137	8.64	106	77.37	96	90.57	88	91.67
G - Wholesale and retail trade	333	21.00	248	74.47	209	84.27	187	89.47
H - Transporting and storage	43	2.71	29	67.44	25	86.21	24	96.00
I - Accommodation and food services	100	6.31	86	86.00	73	84.88	66	90.41
Other personal services	190	11.98	135	71.05	113	83.70	100	88.50
J - Information and communication	42	2.65	26	61.90	23	88.46	22	95.65
M - Professional, scientific and technical activities	381	24.02	227	59.58	204	89.87	190	93.14
Other services to companies and families	133	8.39	97	72.93	77	79.38	71	92.21
By macroregion							
Nord-East	331	20.87	209	63.14	184	88.04	161	87.50
Nord-West	425	26.80	281	66.12	252	89.68	233	92.46
Center	354	22.32	263	74.29	230	87.45	209	90.87
South	321	20.24	247	76.95	193	78.14	170	88.08
Islands	155	9.77	119	76.77	94	78.99	81	86.17

Table 2: Descriptive statistics on financial literacy

	N	Mean	SD	Mean difference t-test p-value
All companies	1586	75.7	17.1	
Company did not need a loan	467	76.9	15.8	0.062
Company needed a loan	1119	75.1	17.5	
Company needed a loan but did not ask for it	166	68.9	19.2	0.000
Company needed a loan and asked for it	953	76.250	17.1	
Company asked for a loan which was not granted	99	77.1	15.9	0.585
Company asked for a loan which was granted	854	76.1	17.2	

Table 3: Comparison between the Italian population and SMEs

Question	Population (excluding self-employed) (1)		SMEs	
	% Correct	% Don't know	% Correct	% Don't know
Compound interest rate	28,1	21,6	59,3	7,8
Inflation	64,1	18,4	88,2	7,1
Risk and diversification	48,1	27,3	70,3	9,2
N of observations	1787		1586	

(1) Data for the Italian population derives from the Survey of Adult Financial Literacy (2020). Here we exclude self-employed individuals (namely entrepreneurs, merchants/artisans and farmers). Microdata are available on the website of the Bank of Italy.

Table 4: Descriptive statistics of the variables used in the models

Variable	n	Mean	Median	SD	Min	Max
LoanNeeded	1586	0.706	1.000	0.456	0.000	1.000
LoanAsked	1119	0.852	1.000	0.356	0.000	1.000
LoanGranted	953	0.896	1.000	0.305	0.000	1.000
ExternalAdvice	1586	0.682	1.000	0.466	0.000	1.000
AwareLoanGuarantee	1252	0.960	1.000	0.196	0.000	1.000
FinLiteracy	1586	75.674	78.519	17.106	0.000	100.000
FinKnowledge	1586	75.561	80.000	23.130	0.000	100.000
FinKnowledge_extended	1586	70.933	72.727	21.789	0.000	100.000
Male	1586	0.723	1.000	0.448	0.000	1.000
ln(FirmAge)	1586	2.363	2.197	0.821	0.000	5.024
High_liquidity	1586	0.648	1.000	0.478	0.000	1.000
Low_ST_debt	1586	0.883	1.000	0.321	0.000	1.000
Low_LT_debt	1586	0.842	1.000	0.365	0.000	1.000
CovidImpact_empl	1586	2.762	3.000	0.736	1.000	5.000
PreDgt_loan	1586	0.201	0.000	0.401	0.000	1.000

Table 5: Correlation matrix of regressors used in the models (n= 1,252)

		1	2	3	4	5	6	7	8	9	10	11
1	*ExternalAdvice*	1.00										
2	*AwareLoanGuarantee*	0.00	1.00									
3	*FinLiteracy*	0.09	0.11	1.00								
4	*FinKnowledge*	0.02	0.07	0.59	1.00							
5	*FinKnowledge_extended*	0.02	0.12	0.55	0.77	1.00						
6	*Male*	-0.03	0.05	0.04	0.02	0.07	1.00					
7	*ln(FirmAge)*	-0.03	0.06	-0.02	0.06	0.05	0.00	1.00				
8	*High_liquidity*	0.02	0.06	0.10	0.06	0.08	0.04	0.02	1.00			
9	*Low_ST_debt*	-0.06	0.08	0.04	0.04	0.07	0.00	-0.02	0.28	1.00		
10	*Low_LT_debt*	-0.06	0.07	0.04	0.03	0.03	-0.03	-0.02	0.30	0.55	1.00	
11	*CovidImpact_empl*	0.00	0.04	0.07	0.04	0.05	0.00	-0.04	0.17	0.12	0.06	1.00
12	*PreDgt_loan*	0.07	0.07	0.05	0.04	0.03	0.02	-0.01	-0.01	-0.03	-0.08	-0.01

Table 6: Analysis of the role of Financial literacy on the need for loans

The table shows the coefficients and standard errors of probit specifications in which the dependent variable is *LoanNeeded*. The analysis is conducted on the full sample and includes the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. * p<0.1, ** p<0.05, *** p<0.01

	I	II	III
Male	-0.032	-0.031	-0.028
	(0.097)	(0.096)	(0.096)
ln(FirmAge)	-0.001	-0.005	-0.007
	(0.040)	(0.040)	(0.040)
High_liquidity	-0.695***	-0.689***	-0.687***
	(0.092)	(0.091)	(0.091)
Low_ST_debt	-0.234	-0.230	-0.225
	(0.158)	(0.156)	(0.157)
Low_LT_debt	-0.493***	-0.493***	-0.494***
	(0.143)	(0.142)	(0.142)
FinLiteracy	0.002		
	(0.002)		
FinKnowledge		-0.001	
		(0.001)	
FinKnowledge_extended			-0.002
			(0.002)
N of observations	1586	1586	1586
Population size	3,552,066	3,552,066	3,552,066
F	11.585***	10.938***	11.165***

Table 7: Analysis of the role of Financial literacy on the demand for loans conditional of the need for loans

The table shows the coefficients and standard errors of Heck-probit specifications in which the dependent variable is *LoanAsked* and the selection depends on the variable *LoanNeeded*. The analysis is conducted on the full sample of respondents. The exclusion restriction in the selection model is *CovidImpact_employees*, which (according to an unreported estimate) is not significant in the model for *LoanAsked.* In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male, ln(FirmAge), High_liquidity, High_ST_debt* and *High_LT_debt* are included in the model for *LoanNeeded* but not reported in the table (available upon request). * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	III
Main model - Dep Var: *LoanAsked*			
Male	-0.069	-0.065	-0.084
	(0.106)	(0.103)	(0.104)
ln(FirmAge)	0.040	0.035	0.040
	(0.063)	(0.062)	(0.062)
High_liquidity	0.077	0.085	0.069
	(0.242)	(0.247)	(0.295)
Low_ST_debt	0.033	0.039	0.018
	(0.158)	(0.153)	(0.156)
Low_LT_debt	-0.248	-0.260	-0.270
	(0.178)	(0.176)	(0.186)
FinLiteracy	0.009***		
	(0.003)		
FinKnowledge		0.004**	
		(0.002)	
FinKnowledge_extended			0.007***
			(0.003)
Selection model - Dep Var: *LoanNeeded*			
CovidImpact_empl	-0.237***	-0.237***	-0.238***
	(0.063)	(0.063)	(0.063)
FinLiteracy	0.002		
	(0.002)		
FinKnowledge		-0.001	
		(0.001)	
FinKnowledge_extended			-0.001
			(0.002)
athrho	0.271	0.316	0.397
	(0.610)	(0.622)	(0.753)
N	1,586	1,586	1,586
N_selected	1,119	1,119	1,119
N_nonselected	467	467	467
Population size	3,552,066	3,552,066	3,552,066
F	2.465**	1.915*	2.187**

Table 8: Analysis of the role of Financial literacy on the receipt of loans conditional on the demand for loans

The table shows the coefficients and standard errors of Heck-probit specifications in which the dependent variable is *LoanGranted* and the selection depends on the variable *LoanAsked*. The analysis is conducted on companies who needed a loan (*LoanNeeded*=1). The exclusion restriction in the selection model is *PreDgt_loan*, which (according to an unreported estimate) is not significant in the model for *LoanGranted*. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male*, *ln(FirmAge)*, *High_liquidity*, *Low_ST_debt* and *Low_LT_debt* are included in the model for *LoanAsked* but not reported in the table (available upon request). * p<0.1, ** p<0.05, *** p<0.01

	I	II	III
Main model - Dep Var: *LoanGranted*			
Male	0.176	0.177	0.178
	(0.142)	(0.141)	(0.141)
ln(FirmAge)	0.328***	0.328***	0.328***
	(0.089)	(0.086)	(0.087)
High_liquidity	0.264	0.260*	0.256
	(0.159)	(0.154)	(0.155)
Low_ST_debt	0.115	0.105	0.112
	(0.176)	(0.178)	(0.175)
Low_LT_debt	0.323*	0.332*	0.330*
	(0.168)	(0.168)	(0.168)
FinLiteracy	-0.004		
	(0.004)		
FinKnowledge		-0.001	
		(0.002)	
FinKnowledge_extended			-0.002
			(0.003)
Selection model - Dep Var: *LoanAsked*			
PreDgt_loan	0.465**	0.476**	0.479**
	(0.194)	(0.195)	(0.198)
FinLiteracy	0.009***		
	(0.003)		
FinKnowledge		0.005***	
		(0.002)	
FinKnowledge_extended			0.008***
			(0.002)
athrho	-0.051	-0.034	-0.023
	(0.709)	(0.527)	(0.520)
N	1,119	1,119	1,119
N_selected	953	953	953
N_nonselected	166	166	166
Population size	2,536,379	2,536,379	2,536,379
F	2.348**	2.38**	2.386**

Table 9: Analysis of the role of Financial literacy on the demand for external advice

The table shows the coefficients and standard errors of probit specifications in which the dependent variable is *ExternalAdvice*. The analysis is conducted on the full sample. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs 'age, entrepreneurs 'education fixed effects and a constant term. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	III
Male	-0.084	-0.082	-0.090
	(0.066)	(0.066)	(0.065)
ln(FirmAge)	0.020	0.010	0.012
	(0.069)	(0.067)	(0.067)
High_liquidity	0.026	0.043	0.042
	(0.055)	(0.052)	(0.052)
Low_ST_debt	-0.087	-0.076	-0.089
	(0.125)	(0.127)	(0.128)
Low_LT_debt	-0.130	-0.135	-0.132
	(0.128)	(0.127)	(0.129)
FinLiteracy	0.008***		
	(0.002)		
FinKnowledge		0.002	
		(0.002)	
FinKnowledge_extended			0.004*
			(0.002)
N	1,586	1,586	1,586
Population size	3,552,066	3,552,066	3,552,066
F	12.996***	13.041***	12.09***

Table 10: Analysis of the role of Financial literacy on the demand for loans, conditional of the need for loan, testing for the demand for financial advice mediation

The table shows the coefficients and standard errors of Heck-probit specifications in which the dependent variable is *LoanAsked* and the selection depends on the variable *LoanNeeded*. The analysis is conducted on the full sample of respondents. The exclusion restriction in the selection model is *CovidImpact_employees*, which (according to an unreported estimate) is not significant in the model for *LoanAsked*. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male*, *ln(FirmAge)*, *High_liquidity*, *Low_ST_debt* and *Low_LT_debt* are included in the models for *LoanAsked* and *LoanNeeded* but not reported in the table (available upon request). * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	II
Main model - Dep Var: *LoanAsked*			
ExternalAdvice	0.436***	0.471***	0.456***
	(0.108)	(0.108)	(0.104)
FinLiteracy	0.008**		
	(0.003)		
FinKnowledge		0.004**	
		(0.002)	
FinKnowledge_extended			0.007**
			(0.003)
Selection model - Dep Var: *LoanNeeded*			
CovidImpact_empl	-0.238***	-0.238***	-0.239***
	(0.065)	(0.064)	(0.064)
ExternalAdvice	0.201**	0.206**	0.209**
	(0.095)	(0.094)	(0.095)
FinLiteracy	0.002		
	(0.002)		
FinKnowledge		-0.001	
		(0.001)	
FinKnowledge_extended			-0.002
			(0.002)
Athrho	0.261	0.311	0.423
	(0.759)	(0.797)	(1.006)
N	1,586	1,586	1,586
N_selected	1,119	1,119	1,119
N_nonselected	467	467	467
Population size	3,552,066	3,552,066	3,552,066
F	3.595***	3.6***	4.171***

Table 11: Analysis of the role of Financial literacy on the knowledge of guarantees

The table shows the coefficients and standard errors of probit specifications in which the dependent variable is *AwareLoanGuarantees*. The analysis is conducted on the full sample, net of missing values. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	III
Male	0.305*	0.298*	0.276*
	(0.161)	(0.156)	(0.156)
ln(FirmAge)	0.045	0.035	0.030
	(0.090)	(0.088)	(0.089)
High_liquidity	0.068	0.089	0.080
	(0.165)	(0.161)	(0.165)
Low_ST_debt	0.260	0.250	0.228
	(0.201)	(0.193)	(0.195)
Low_LT_debt	0.231	0.217	0.218
	(0.160)	(0.157)	(0.159)
FinLiteracy	0.011***		
	(0.004)		
FinKnowledge		0.004	
		(0.003)	
FinKnowledge_extended			0.010***
			(0.003)
N	1252	1252	1252
Population size	2,595,251	2,595,251	2,595,251
F	4.956***	2.466**	2.559**

Table 12: Analysis of the role of Financial literacy on the demand for loans, conditional of the need for loan, testing for the knowledge of guarantees mediation

The table shows the coefficients and standard errors of Heck-probit specifications in which the dependent variable is *LoanAsked* and the selection depends on the variable *LoanNeeded*. The analysis is conducted on the full sample of respondents. The exclusion restriction in the selection model is *CovidImpact_employees*, which (according to an unreported estimate) is not significant in the model for *LoanAsked*. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male*, *ln(FirmAge)*, *High_liquidity*, *Low_ST_debt* and *Low_LT_debt* are included in the model for *LoanAsked* and *LoanNeeded* but not reported in the table (available upon request). * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	III
Main model - Dep Var: *LoanAsked*			
AwareLoanGuarantees	0.579**	0.605**	0.521*
	(0.276)	(0.274)	(0.297)
FinLiteracy	0.007*		
	(0.004)		
FinKnowledge		0.004*	
		(0.002)	
FinKnowledge_extended			0.007**
			(0.003)
Selection model - Dep Var: *LoanNeeded*			
CovidImpact_empl	-0.265***	-0.265***	-0.262***
	(0.076)	(0.076)	(0.075)
AwareLoanGuarantees	-0.125	-0.118	-0.108
	(0.237)	(0.235)	(0.236)
FinLiteracy	0.001		
	(0.002)		
FinKnowledge		-0.001	
		(0.002)	
FinKnowledge_extended			-0.002
			(0.002)
athrho	0.569	0.586	0.851
	(0.560)	(0.546)	(0.814)
N	1,252	1,252	1,252
N_selected	913	913	913
N_nonselected	339	339	339
Population size	2,595,251	2,595,251	2,595,251
F	3.135***	2.332**	2.791**

Table 133: Analysis of the role of Financial literacy on the demand for loans, conditional of the need for loan, testing for financial literacy endogeneity

The table shows the coefficients and standard errors of the IV model specifications. The first-step regression is shown at the bottom of the table. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male*, *ln(FirmAge)*, *High_liquidity*, *Low_ST_debt* and *Low_LT_debt* are also included in the models for *LoanAsked* but not reported in the table (available upon request). * p<0.1, ** p<0.05, *** p<0.01

	I	II	III
Dep Var:	*LoanAsked*	*LoanAsked*	*LoanAsked*
FinLiteracy	0.036***		
	(0.013)		
FinKnowledge		0.021**	
		(0.009)	
FinKnowledge_extended			0.024**
			(0.010)
First step: Dep Var:	*FinLiteracy*	*FinKnowledge*	*FinKnowledge_ extended*
Male	-0.318	-1.307	1331
	(-1.111)	(1.511)	(1.384)
ln(FirmAge)	-1.015	0.182	-0.809
	(0.690)	(0.940)	(0.860)
High_liquidity	2.232**	0.309	0.101
	(1.056)	(1.437)	(1.316)
Low_ST_debt	0.764	0.621	2344
	(1.695)	(2.307)	(2.113)
Low_LT_debt	-1.203	-1203	-1161
	(1.489)	(2.026)	(1.856)
FinKnowledge _province	0.264***	0.554***	0.382***
	(0.071)	(0.099)	(0.088)
Entrepreneurial_family	2.632***	2.336*	4.576***
	(0.995)	(1.370)	(1.265)
EconomicEduc_HighSchool	3.684***	3.727**	5.295***
	(1.278)	(1.738)	(1.608)
N	1097	1097	1097
χ^2	114.139***	97.020***	99.729***
Wald test χ^2	2.648	2.407	2.200
P-value	(0.104)	(0.121)	(0.138)
Sanderson-Windmeijer F	9.42	12.98	13.95
P-value	(0.000)	(0.000)	(0.000)
Sargan statistic χ^2	0.149	0.913	0.054
P-value	(0.928)	(0.634)	(0.973)

The table shows the coefficients and standard errors of Heck-probit specifications in which the dependent variable is *LoanAsked* and the selection depends on the variable *LoanNeeded*. The analysis is conducted on the sample of respondents who declared that they did not use loan guarantees. The exclusion restriction in the selection model is *CovidImpact_employees*, which (according to an unreported estimate) is not significant in the model for *LoanAsked*. In all models we introduced the correction for survey response bias with respect to the population of Italian MSMEs. All models include industry, geographical area, sales class, entrepreneurs' age, entrepreneurs' education fixed effects and a constant term. Control variables *Male*, *ln(FirmAge)*, *High_liquidity*, *Low_ST_debt* and *Low_LT_debt* are included in the model for *LoanAsked* and *LoanNeeded* but not reported in the table (available upon request). * $p<0.1$, ** $p<0.05$, *** $p<0.01$

	I	II	III
Main model - Dep Var: *LoanAsked*			
FinLiteracy	0.010**		
	(0.004)		
FinKnowledge		0.004	
		(0.002)	
FinKnowledge_extended			0.005*
			(0.003)
Selection model - Dep Var: *LoanNeeded*			
CovidImpact_empl	-0.323***	-0.322***	-0.327***
	(0.076)	(0.075)	(0.077)
FinLiteracy	-0.002		
	(0.003)		
FinKnowledge		-0.003	
		(0.002)	
FinKnowledge_extended			-0.006**
			(0.003)
Athrho	0.114	0.127	0.167
	(0.372)	(0.365)	(0.381)
N	899	899	899
N_selected	432	432	432
N_nonselected	467	467	467
Population size	2,011,841	2,011,841	2,011,841
F	2.515**	2.408**	2.621**

Appendix 2: Indicators of entrepreneurs' financial literacy

According to the OECD approach (2018), financial literacy score of entrepreneurs is the sum of three components: financial knowledge, financial behavior and financial attitude.

Financial knowledge is captured as the percentage of correct answers given by the respondent to 5 questions of financial knowledge, and specifically: 1) "*Dividends are part of what a business pays to a bank to repay a loan*" (correct answer: false), 2) "*When a company obtains equity from an investor it gives the investor part of the ownership of the company*" (correct answer: true), 3) "*If a financial investment offers the chance to make a lot of money it is likely that there is also a chance to lose a lot of money*" (correct answer: true), 4) "*High inflation means that the cost of living is increasing rapidly*" (correct answer: true), and 5) "*A 15-year loan typically requires higher monthly payments than a 30-year loan, but the total interest paid over the life of the loan will be less*" (correct answer: true). The number of correct answers is normalized (i.e., divided by 5 and multiplied by 100) to take values between 0 and 100, and saved in a variable *FinKnowledge*.

The second component of financial literacy is financial behavior, computed as the percentage of "financially savvy" behaviors, according to the OECD. Specifically, we sum the number of positive answers to the questions of whether the respondent 1) "*manage strictly separate accounts for [their] household and for [their] business*", 2) when asked how they made their most recent choice about a financial product or service for the business, "*considered several options from different financial providers before making [their] decision*" or "*looked around but there were no other options to consider*"; 3) "*keep track of the financial records of the business*" "*in electronic format*", "*in paper form*", "*though a third person*" or "*in another way*" ; 4) "*thought about how [they] will fund [their] own retirement or maintain [themselves] when [they] will no longer work due to old age*"; 5) in case of theft of business equipment, "*would use money that [their] business has set aside for emergencies*" or "*would claim insurance on all or part of the equipment*"; 6) agreed or strongly agreed with the sentence "*I keep secure data and information about the business*", 7) agreed or strongly agreed with the sentence "*I compare the cost of different sources of finance for the business*", 8) agreed or strongly agreed with the sentence "*I forecast the profitability of the business regularly*" and 9) agreed or strongly agreed with the sentence "*I adjust my planning according to the changes in economic factors*". The total number of financially savvy behaviors is normalized by dividing by 9 and multiplying by 100.

The third component of financial literacy, according to the OECD definition, is the "financially savvy" attitude of respondents. This is captured by three elements: 1) agreement or strong agreement with the sentence "*I set long term financial goals for the business and strive to achieve them*", 2) agreement or strong agreement with the sentence "*I am confident to approach banks and external investors to obtain business finance*" and 3) disagreement or strong disagreement with the sentence "*I prefer to follow my instinct rather than to make detailed financial plans for my business*". However, considering the focus

of our study, we did not consider the respondent answer to the question regarding the confidence in approaching banks and external investors to obtain business finance, as we believe that this attitude leads to a stronger tendency to ask for loans by construction. We therefore consider the elements 1) and 3) of the original, OECD-proposed variable of financial attitude. The number of financially savvy attitudes is divided by 2 and multiplied by 100.

Finally, and following the approach adopted by D'Ignazio et al (2022), we generate a weighted financial literacy indicator that accounts for all the three components with equal weights, and is the average of financial knowledge, financial behavior and financial attitude scores. The resulting variable, *FinLiteracy,* is the first indicator used in the analysis and varies between 0 and 100 by construction.

The second indicator of entrepreneurial financial competences corresponds to the component of financial knowledge computed as described above (*FinKnowledge*).

The third indicator, *FinKnowledge_extended*, is computed as follows. We create a new variable of financial knowledge by considering, beyond the 5 elements included in the original financial knowledge indicator, 6 additional questions. Specifically, we count the number of correct answer to the true or false questions: 6) "*credit rating is an evaluation of the ability of a prospective borrower to pay back their debt*" (correct answer: true), 7) "*If a farmer grows several types of fruit and vegetables each year, she has a lower risk of losing all her crops to disease*" (correct answer: true), 8) "*Imagine that someone puts €100 into a savings account with a guaranteed interest rate of 2% per year. They don't make any further payments into this account and they don't withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made*?" (correct answer: 102), 9) "*...and how much would be in the account at the end of five years?*" (correct answer: more than €110), 10) "*Could you tell me which of these best describes a balance sheet?*" (correct answer: A financial snapshot, taken at a point in time, of the firm's assets and liabilities) and 11) "*Could you tell me which of these best describes the Return-on-Assets ratio (ROA)?*" (correct answer: An indicator of the firm's performance). The total number of correct answers is divided by 11 and multiplied by 100.