Micro-entrepreneurs' financial and digital competences during the pandemic in Italy

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Abstract

We exploit new survey data from a representative sample of about 2.000 Italian micro-entrepreneurs to assess their level of financial and digital competences and to investigate whether these skills help them cope with unexpected shocks. We find that the financial literacy and digital skills of Italian micro-firms are quite limited, especially among one-person businesses and firms run by owners with little education. Controlling for several business characteristics, we also find that financial literacy is significantly correlated with the transition to more digitalized business models and with greater resilience to external shocks: financially savvy entrepreneurs were better able to build liquidity buffers prior to the Covid-19 crisis and to access government aids during the pandemic. As for the role of digital skills during the crisis, empirical evidences are less clear-cut.

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1. Introduction

In recent years, financial and digital competences have increasingly turned into critical factors for businesses of all sizes. On the one hand, financial decisions have become more complex due to the rapid evolution of the financial sector, with an increase in the range of financial instruments potentially available and in the number of financial services' providers (Boschmans and Pissareva, 2018). On the other hand, technological progress in many sectors is forcing companies to a continuous innovation path in order to remain competitive in the market (OECD, 2021).

For micro-entrepreneurs, which can hardly rely on employees with specific financial or digital skills, an adequate level of these competences may even be key to the survival of their business. This is especially important when economic activity is hit by deep and unexpected shocks - such as that generated by the Covid-19 pandemic - and entrepreneurs need to quickly adapt to new circumstances.

Notwithstanding the role that entrepreneurs' financial literacy and digital skills play in the performance of firms of all sizes, the empirical literature on this topic is rather scant and mostly focused on emerging countries. Moreover, there is very little evidence on micro-firms, mainly due to the limited availability of firm-level data for these enterprises. Most of these analyzes are based on case studies, small samples, or self-reported measures of financial literacy.

The main results of this strand of literature indicate that, on average, financial literacy improves management financial practices - such as budgeting, reporting, and credit management - and firm performance in terms of profitability and growth (Bruhn and Zia, 2011; Siekei et al., 2013; Dahmen and Rodríguez, 2014; Drexler et al., 2014; Eniola and Entbang, 2017; Alperovych, Calcagno and Lentz, 2020; Atandi, 2021). Other analyses focus on the relationship between entrepreneurs' financial literacy and their ability to access external finance; for instance, Hussain et al. (2018) emphasize the role of financial literacy in mitigating information asymmetries and collateral deficit in lenders' evaluation of loan applications. Finally, some studies highlight that business owners with higher financial competences are more likely to repay their debt regularly and are less likely to close their businesses involuntarily (Wise, 2013; Kotzé and Smit, 2008).

As for the impact of digital technologies, empirical evidence shows that ICT positively affects micro-firms performance (Chege et al., 2020; Chew et al., 2011; Jagun et al., 2008). However, the capability to adopt innovative technologies is heterogeneous across firms, depending on both the level of productivity of the firm and on the orientation and the attitudes of the entrepreneur (Beck et al., 2018; Chatterjee et al., 2020; Tang and Konde, 2020).

The role of financial literacy and digital skills is not limited to firm performance, but likely affects entrepreneurial entry too. For instance, Oggero, Rossi and Ughetto (2019) investigate the role of both financial literacy and digital skills on the decision to become an entrepreneur, and find that both of them are relevant factors in shaping entrepreneurship.

In this paper, we make a twofold contribution to this research area. In particular, we: (i) measure and describe the level of financial literacy and digitalization of micro-firms in a developed

country such as Italy; (ii) highlight the role of both financial and digital competences in coping with unexpected economic shocks, such that caused by the pandemic.

To this aim, we exploit data collected through a new survey conducted by the Bank of Italy in spring 2021, involving about 2,000 non-financial firms with less than 10 employees. The survey was part of a larger initiative to measure entrepreneurs' financial competences and to assess the use of digital tools to run the business, promoted by the G20 Italy Presidency 2021. It was undertaken in collaboration with OECD/INFE and involved nine G20 (Brazil, China, France, Germany, Italy, Mexico, Russia, Saudi Arabia and Turkey) and five non-G20 members (Georgia, the Netherlands, Peru, Portugal and Spain).

A specific section of the questionnaire focuses on the impact of the Covid-19 pandemic on business activity and on the financial decisions taken by the firms during this difficult period. This section is key to our research. Since the pandemic was unexpected and strongly challenged all firms in an arguably similar way, regardless their level of financial literacy and digital skills, it provides an ideal ground to investigate the role of such competences in small business management.

Our results suggest that the financial literacy of Italian micro-entrepreneurs is limited in absolute terms: less than 4 in 10 business owners have an "adequate" level of financial skills, according to international standards. Still, it is larger than that displayed by micro-entrepreneurs headquartered in most other countries that participated to the survey. Based on a multivariate approach, financial literacy is especially low for less educated entrepreneurs and for one-person businesses. Basic legal forms (such as simple partnerships) and entrepreneurial experience also correlate with lower financial competences. The level of digitalization of the business appears to be quite limited too: only one in four entrepreneurs uses a dedicated website to sell products/services and less than 20 per cent of them have signed a financing or an insurance contract entirely online. Nevertheless, the Covid crisis has triggered a substantial increase in the digitalization of firms, which has been larger among more financially literate firms. Finally, the level of financial literacy is associated to an overall lower impact of the crisis, whereas we do not find a similar correlation for digital skills. The role of financial literacy seems to be mainly related to the ability to build liquidity buffers in normal times and to use the emergency financing instruments provided by the government to support SMEs.

The remainder of the paper is organized as follows. Section 2 sets out the survey and the sampling strategy. Section 3 describes the metrics used to measure micro-entrepreneurs' financial competences and illustrates how they differ across firm and entrepreneur characteristics. Section 4 sets out the metrics used to measure micro-entrepreneurs' digital skills and shows how they evolved during the pandemic. Section 5 investigates whether financial literacy might have helped firms mitigate the impact of the pandemic and through what channels. Section 6 replicates the research question of the previous section by focusing on the role of digital skills. Finally, Section 7 concludes and sketches some policy implication of the results.

2. The Survey

The sample consists 1,998 of non-financial Italian firms (both partnerships and limited liability companies) with less than 10 employees. In particular, the survey targeted owners of micro-enterprises, as well as CEO in the case of limited liability companies, with responsibilities in taking financial decisions. Both autonomous firms and branch establishments with own legal personality were included, while branch establishments without own legal personality, financial firms and no-profit firms were excluded.

The firms were chosen according to a stratified sampling design with random selection of units within the strata and proportional allocation. The population of non-financial firms with less than 10 employees includes around 4.4 millions of businesses. It was partitioned in 50 strata, obtained by the Cartesian product of 10 sectors of economic activity defined at the level of NACE2 sections[1], and 5 geographical areas (North West; North East; Centre; South; Islands). For each stratum, the target number of sampled firms is proportional to the number of population firms belonging to that stratum. The survey was administered from March to May 2021 by means of a CAWI (Computer Aided Web Interviewing) methodology. Figure 1 highlights the representativeness of the sample by comparing the distributions of population and sampled firms by economic sector and geographical area. To enforce representativeness, firm-level weights have also been elaborated to account for sampling design and unit non-response. All our results are robust to the inclusion of sampling weights in the empirical analysis.

Figure 2 deepens the characteristics of our sample with regard to firm size, gender and education of the respondents.[2] About 10 per cent of the firms are one-person businesses[3], while the rest is split almost equally between the 2-4 and the 5-9 employees groups. Slightly less than 30 percent of interviewed entrepreneurs are female. University-level education was achieved by about 30 percent of the entrepreneurs, while about 50 percent of them achieved a secondary school or upper school diploma at most; less than 2 percent of them completed primary school only, or did not get any formal education at all. The majority of interviewed people (60 percent) were aged between 40 and 59 years, while only about 3 percent had less than 30 years. As for the amount of revenues, about 50 per cent of firms had a turnover between 100,000 euro and 500,000 euro, while slightly less than 30 per cent reported a turnover greater than 500,000 euro; about 8 per cent of at most 50,000 euro.

The questionnaire used for the survey was developed by OECD/INFE over last years as an instrument to measure the financial literacy of small firms, building upon the financial literacy core competency framework for MSMEs (OECD, 2018). In 2020, it was further revised to take

[1] 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 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.

[2] Table 1 shows the distribution (and other descriptive statistics) also for other characteristics of the respondents.

[3] More specifically, the questionnaire asks to indicate the number of (full-time equivalent) people working in the firm including the owner. With this approximation in mind, the entrepreneurs who claim to work in one-person businesses are referred as self-employed throughout the paper.

into account the implications of the COVID-19 crisis on businesses and to investigate small businesses' digitalization. The final version of the questionnaire includes the following seven sections: Characteristics of the business; Knowledge and use of financial products; Managing and planning business finances; Financial knowledge and attitudes; Financial education and protection; Demographics of the respondent; Impact of the COVID-19 crisis on the business.[4]

3. Financial literacy

This section illustrates the metrics we use to measure levels and components of financial literacy of Italian micro-entrepreneurs (3.1). Building on these metrics, we compare the levels observed in Italy with those prevailing in the countries participating the 2021 OECD/INFE survey (3.2). Further, and with regard to Italy, we scrutinized how financial skills vary across different groups, depending on characteristics such as education, gender, age of the entrepreneurs, as well as economic sector, geographical area, and legal form of their businesses (3.3).

3.1 The metrics

In line with the existing OECD/INFE (2018) definition, already exploited to conduct analyses and cross-country comparisons among adults[5], financial literacy is measured as a combination of financial knowledge, attitudes and behaviors.

The knowledge score is computed as the number of correct responses to five financial knowledge questions, involving the understanding the meaning of dividends and inflation, the relationships between equity and ownership, between risk and return, between interest payments and duration of a loan (see Table 2). On average, the share of correct responses to financial knowledge questions is 72 per cent. The lowest share is associated to the understanding of the relationship between equity and ownership of a company (47 per cent), while the highest one is associated to knowledge of concepts of dividends and the relationship between risk and return (about 85 per cent for both; see fig. 3, panel a).

The financial behavior score is computed as the number of "financially savvy" behaviors, assessed using nine questions. Such questions appraise whether entrepreneurs: keep their personal and business finances separate; shop around for financial products and services for the business; keep track of financial records in formal ways; thought about how to fund their own retirement; have thought about a strategy in case business equipment is stolen; keep data and information about the business secure; compare costs of different sources of funding for the business; forecast the profitability of the business; adjust their planning according to changes in economic factors (see Table 2). On average, firms report financially desirable behaviors in about 8 out of 10 cases. The worse entrepreneurs' performance is recorded with respect to thinking about their own retirement (only about 50 per cent of entrepreneurs do) and to shopping around

[4] The full version of the questionnaire is available at: https://www.oecd.org/financial/education/2020-survey-to-measure-msme-financial-literacy.pdf.
[5] See D'Alessio et al. (2020).

for financial products and services for the business (about 60 per cent of them do). On the other hand, 97 per cent of the entrepreneurs keep track of financial records in formal ways and 92 per cent keep data and information about the business secure (see fig. 3, panel b).

Finally, the financial attitudes score is computed as the count of "financially savvy" attitudes, assessed by means of three questions assessing whether entrepreneurs: set long term financial goals for the business and strive to achieve them; are confident to approach banks and external investors to obtain business finance; prefer to follow their instinct rather than to make detailed financial plans for the business (see Table 2). On average, entrepreneurs show financially savvy attitudes 65 per cent of times. The worst performance refers to entrepreneurs' attitude towards risk and insurance, as almost 50 per cent of them agreed with the statement "I prefer to follow my instinct rather than to make detailed financial plans for my business" (see fig. 3, panel c).

In order to create a financial literacy score we need to combine the scores of the three components of financial literacy. An immediate way to perform such task could be following the methodology suggested by the G20/OECD-INFE (2021), where the overall financial literacy score is computed as the sum of the financial knowledge score (yielding up to 5 points), the financial behavior score (up to 9 points) and the financial attitudes score (up to 3 points). While such an approach is simple and easily explainable, it might suffer from a couple of drawbacks, as noticed by di Salvatore et al. (2018).

Firstly, employing the plain sum of the three financial literacy components' scores would implicitly give a larger weight to the part counting on the largest number of questions, i.e. the financial behavior score (yielding 9 points at most, out of 17; together, the financial knowledge and the financial attitude score would yield instead 8 points at most). A second potential drawback involves the possibility that "savvy" attitudes and behaviors are strongly correlated, leading in this case to a sort of double counting. However, this is not the case in our sample, as the correlation between the financial behavior score and the financial attitudes' one is relatively low (0.42)[6].

Drawing from the above considerations, we decide to employ a "weighted" financial literacy score, where each of the three components (knowledge, behavior, attitudes) is given an equal importance. In order to attribute an equal weight to each component, we normalize each financial component's score between 0 and 1 (dividing the raw score by the number of questions) and then sum them up. In this way, we obtain an overall financial literacy score ranging from 0 to 3. Expectedly, the correlation between the weighted financial literacy score and the raw one (i.e., the one obtained as a plain sum of the three components' scores) is extremely high (0.97); however, as shown in Figure 4, such correlation is less pronounced if we consider observations belonging to the second and to the third quartiles of the raw financial literacy score distribution only (0.52 and 0.60, respectively).

Overall, Italian micro-entrepreneurs show a weighted financial literacy score of 2.2, which corresponds to about the 70 per cent of the maximum level of the score. Moreover, the share of

[6] di Salvatore et al. (2018) also pointed out how setting-up comparable indicators capturing desirable behaviors could be challenging due to differences in individual preferences, moments in the life-cycle, and institutional conditions faced by respondents.

respondents with an adequate level of financial literacy (higher than 80 per cent of the maximum score, i.e. 2.4) is lower than 40 per cent.[7] Keeping in mind that the questions used to calculate the scores look at very basic knowledge, behavior and attitudes, these evidences point to a quite limited level of financial literacy among Italian micro-firms.

3.2 An international comparison

Building on the weighted measure of financial literacy, we also evaluate the financial competences of Italian micro-enterprises with respect to those of the other countries that participated to the OECD-INFE 2021 survey. All in all, Italian micro-entrepreneurs display quite high financial literacy scores with respect to micro-entrepreneurs belonging to other participating countries, ranking third after Portugal and Spain (see fig. 5). When considering the financial knowledge score only, the performance of Italian micro-firms is slightly worse, ranking fifth after Spain, Germany, France and Portugal.[8]

As outlined by the OECD-INFE (2021), Italy is also one of the countries covered by the OECD survey where the share of entrepreneurs with relatively high levels of financial literacy, measured by an overall score of at least 80 out of 100, is quite high (43 per cent). This share is the third-highest one among the countries that participated to the survey, again with Portugal and Spain being at the top of the ranking (both with a share of 54 per cent).

This figure partially contrasts with the evidence available on financial literacy of the adult population, which shows the presence of Italy among the low performing countries (see D'Alessio et al., 2020). However, the comparison of the results stemming from the two surveys is hampered by a very different composition of the participating countries: only three of them took part at both surveys (Germany, Georgia and Portugal). In addition, selection effects associated with the different targets of the two surveys (i.e., adult population vs micro-entrepreneurs) are arguably at work.

Although Italy ranks among the higher performing countries, the share of entrepreneurs endowed with adequate financial skills, in the sense given by the OECD, is admittedly low and hard to ignore. It paves the way for a closer investigation of vulnerable entrepreneurs and a within-country exploration of the links between financial competence and its correlated factors.

3.3 Levels across groups

As expected, the financial literacy score increases with both firm size and level of education of the entrepreneur (Figure 6 and Table 4). Concerning age groups, financial competence is smaller for the youngest portion of entrepreneurs (less than 30 years old) and for the oldest one (80 years old or more), being on the other hand similar across other age groups. Female entrepreneurs exhibit a slightly lower level of financial competence with respect to males but the difference is not statistically significant. Among economic sectors, transportation, shipping and storage, as

[7] The threshold of 80 per cent of the maximum score is the value proposed by OECD-INFE (2021) to identify firms with relatively high levels of financial literacy.

[8] The ranking of Italian entrepreneurs in the financial literacy table remains unchanged if we consider the unweighted financial literacy score employed by OECD-INFE, measuring the financial literacy as a plain sum of its three components' scores.

well as accommodation and food services display the lowest financial literacy scores; on the other hand, financial competences are highest for trade, legal and accounting information, and information and communication.

In order to assess the correlation between financial competences and entrepreneurs' and firm characteristics, other things being equal, we move to a regression analysis. In particular, we estimate a linear regression model where the dependent variable is, in turn, the (weighted) financial literacy score and each of its three components (knowledge, behavior and attitude). Covariates are represented by a large set of firm and entrepreneur characteristics, such as size, education, sector of economic activity, gender, age, geographical area and entrepreneurial experience. Moreover, we include a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise[9], and a dummy equal to one for business with more complex legal forms (i.e. partnerships). Table 1 provides the full descriptive statistics for the set of covariates.

Table 5 and Figure 7 show that the most important explanatory variables of financial literacy are entrepreneurs' schooling and firm size. In particular, entrepreneurs with university-level education display a financial literacy score greater by 0.61 points (about 30 per cent of the mean financial literacy score) with respect to entrepreneurs with primary school education or no education at all, ceteris paribus.

Concerning firm size, business owners with 5-9 employees display a financial literacy score greater by about 0.27 points (about 15 per cent of the mean financial literacy score) with respect to self-employed respondents, other firm and entrepreneurs' characteristics being equal. A lower – but still statistically significant – gap in financial literacy stands between self-employed and 2-4 employees firms, and between 2-4 employees and 5-9 employees firms. The positive correlation between firm size and financial literacy of entrepreneurs might reflect the organizational complexity of larger firms, whose management might require a deeper economic and financial knowledge.

There is instead, on average, no gender gap in financial literacy of Italian micro-entrepreneurs, other things being equal, differently from evidence about Italian households (D'Alessio et al., 2020).

Concerning the firm's legal form, partnerships are associated to a lower financial literacy with respect to limited companies, other things being equal. This result might depend on the fact that, arguably, limited companies tend to rely more on external finance with respect to partnerships, and hence have a larger stimulus to improve their financial competences. Moreover and as already pointed out with regard to firm size, limited companies can present a higher complexity in terms of internal organization; further, they need to comply with much more stringent accounting rules with respect to partnerships, and hence they might need a larger set of financial competences for the ordinary management of the firm.

[9] This variable aims at capturing the potential effects of lockdown measures on firms' financial literacy, due to the fact that more penalized firms might have striven to search financial means to cope with the crisis, thus increasing their level of financial knowledge, behaviour and attitude.

The experience of the entrepreneurs plays a role too: entrepreneurs with at least ten years of experience display greater financial competences, other characteristics being equal. Such a link can reflect spillover effects at work among different dimensions of human capital accumulated by entrepreneurs during business management. On the other hand, age, expressed by a dummy taking value one for entrepreneurs with 40 or more years, is not associated with financial competences, once entrepreneurial experience, among other characteristics, is controlled for. Finally, a large portion of the heterogeneity in financial literacy reflects that of the distribution of firms across economic sectors, other things being equal; expectedly, firms belonging to trade and legal and accounting information sectors associate with larger financial literacy with respect to other sectors' firms.

Table 5 also displays the relationship between entrepreneurs' characteristics and each of the three components of the financial literacy score. Both the level of education of the entrepreneur and firm size positively correlate with the three components of financial competences. Entrepreneurial experience positively correlates with financial knowledge but not with desirable financial behaviors and attitudes. Entrepreneurs' age, which is not correlated with the overall level of financial competences, displays instead a positive relationship with financial knowledge. The latter result might suggest that entrepreneurs' learning process through life may positively affect financial knowledge.[10]

While showing the same level of financial competences, financial knowledge and financial attitudes with respect to male entrepreneurs, female entrepreneurs display a lower financial behavior score, other characteristics being equal. To some extent, this result points to the relevance of behavioral skills as a driver of gender gaps in financial literacy, as well as the importance of dealing with non-cognitive dimensions when financial education policies are set-up.[11]

4. Digital competences

In this Section we study digital competences of Italian business owners of micro firms. After describing the metrics, we analyze digital skills owned by micro entrepreneurs at the end of 2019, i.e. before the start of the Covid-19 crisis. Then we investigate whether small business increased their engagement in digital activities during the pandemic. The question is relevant as digital technology arguably represented a key factor, for many firms, to preserve business continuity during the crisis, which implied significant constraints on social mobility and commercial activities; further, the impact the pandemic on the economy might have pushed entrepreneurs to

[10] Conversely, the relationship between age and financial behaviors or attitudes is intuitively less clear. Firstly, temporal changes in behavior and attitudes might come less easily than knowledge, since habits and behaviors are relatively sticky over time. Secondly, some questions used to assess financial behaviors or attitudes involve activities (such as planning or setting long term goals) that could be more relevant for younger people, who could hence engage more likely in these activities with respect to older entrepreneurs.

[11] In the same vein, Bucher-Koenen (2017) find a higher propensity to use the 'I do not know' option on the part of females.

accelerate the digital transformation of the production system to enhance efficiency, competitiveness and market shares.[12]

4.1 The metrics

We analyze pre-pandemic firm digitalization levels and their variation over the pandemic by focusing on both digital competences associated with financial activities and digital competences used for marketing.

In contrast to the measurement of financial literacy, which is based on a wide range of information, it is important to emphasize that only five questions in the survey aim to assess the level of digitalization among microenterprises. Moreover, these questions refer to the use of ICT tools or services from which we infer the digital skills of business owners (i.e. the survey does not include direct questions on the knowledge of digital technologies). These drawbacks necessarily imply a higher degree of approximation in the measurement of digital competences, which should be taken into account when assessing the results of the analysis.

Digital competences are proxied by looking at the entrepreneurs' engagement with five different digital activities, related to both financial products/services, and sales or business advertising. In particular, digital activities related to financial products and services involve: (i) opening a bank account completely online; (ii) signing a financing contract (e.g. a bank loan) completely online; (iii) signing an insurance contract completely online. Digital activities related to sales and advertising involve: (iv) having a dedicated website to showcase the products or services of the business; (v) having a dedicated website to sell the products or services of the business. Entrepreneurs were asked whether they engaged in each of these activities before the pandemic, and whether they engaged in them after the pandemic started (see Table 3). Based on this information, in the next paragraph we also build synthetic indicators of digitalization aimed at simplifying the analysis conducted with a multivariate approach.

Obviously, opening on-line accounts or signing financial or insurance contracts requires not only digital competences but also the entrepreneur's need to conclude financial transactions, as well as the supply of digital services by financial institutions. The analyses on digital financial competences of entrepreneurs has to be assessed having this caveat in mind.

4.2 Digital competences before the pandemic

Digital competences associated to financial activities, referring to the pre-pandemic period, exhibit a large heterogeneity among Italian micro-entrepreneurs. In particular, 52 percent of entrepreneurs indicated that they opened a bank account completely online before the pandemic; the share was largest among firms with 5-9 employees, and lowest among one-person businesses (fig. 8). The extent of digitalization before the pandemic correlates also with the level of education of the entrepreneur: 56 percent of MSMEs owners holding at least a bachelor degree opened a bank account completely online before the end of 2019, against about 37 percent of micro-firms owners holding a primary school degree, or no education at all. The link between

[12] The analyses on the links between the pandemic and our variables of interest conducted throughout this study refer to the microfirms observed in the period May-June 2021. Selection issues potentially associated with births and deaths of small businesses during the pandemic crisis are not addressed here.

education and pre-pandemic levels of digital competences suggests the presence of complementarities among different dimensions of human capital. Unsurprisingly, age also seems to play a role: slightly less than 60 percent of entrepreneurs with less than 30 years opened a bank account completely online before the pandemic, against less than 50 percent among the MSMEs owners with at least 60 years.

Less than one out of five entrepreneurs signed a financing contract completely online before the pandemic. The share is lowest among self-employed (13 percent) and largest among firms with 5-9 employees (21 percent). All in all, the share of MSMEs owners who have signed a financing contract online displays a low degree of heterogeneity across various other characteristics such as sector, age and gender.

About one out of six entrepreneurs signed an insurance contract completely online. As for the two previous digital activities related to financial products and services, the involvement is larger for entrepreneurs with 5-9 employees. A significant heterogeneity in the share of MSMEs owners involved in this digital activity arises across sectors too: the share of entrepreneurs in the real estate sector that signed an insurance contract completely online by the end of 2019 is twice that of entrepreneurs operating in the primary sector.

With regard to other digital activities, about 54 percent of firms had a website to showcase their products or services; the share is significantly increasing along with the number of employees. Once again, the level of education of MSMEs owners plays a significant role in shaping the distribution of this digital skill across entrepreneur's characteristics. The share of firms with a website to showcase their products is larger than 60 per cent among entrepreneurs holding a bachelor degree, against about 37 per cent for those with primary education or no education at all. As expected, firms belonging to the accommodation and food services sector display a marked use of website for advertising purposes, while agriculture firms displayed the lowest one. The engagement in this digital activity was slightly larger for female entrepreneurs.

A similar picture emerges by analyzing the distribution of firms having a website to sell their products, although the overall number of firms endowed with an online-sale technology before the pandemic was significantly smaller with respect to that of firms with a showcase website, and amounting to about one quarter of firms.

In order to assess which individual characteristics correlate with the extent of digitalization before the pandemic, other things being equal, we employ a regression analysis. We devise two alternative proxies of digitalization measured in the pre-pandemic situation: (i) a digital score, ranging from 0 to 5, displaying to the number of digital activities performed by the firms before the pandemic; (ii) a binary indicator of digitalization, equal to one for firms with a digitalization score above the median, and zero otherwise.

Table 6 and Figure 9 show that firm size is positively associated with digital skills measured before the pandemic, other things being equal. The digital score is about 0.4 points larger for firms with 5-9 employees with respect to self-employed, and about 0.2 points larger with respect to firms with 2-4 employees (Table 6, column 1). The level of education correlates with the proxy of digitalization: ceteris paribus, entrepreneurs holding a university level degree or postgraduate education degree display a digital score about 0.6 points larger with respect to entrepreneurs

having primary education or no formal education at all. On the other hand, no statistically significant differences arise between entrepreneurs whose education level is below the university one. As expected, age is negatively associated with digitalization, other things being equal, while entrepreneurial experiences is positively correlated with the digital score. The negative link between digitalization and age of entrepreneurs suggests that the ability to adapt to technological progress, and to accumulate additional human capital, can be lower for older entrepreneurs. Finally, no correlation emerges between digitalization in the pre-pandemic scenario and belongingness to the "essential" sectors not directly affected by the lockdown measures approved in Italy in spring 2020.

Similar results characterize the relationships between firm and entrepreneurs characteristics and the alternative binary indicator of engagement in digital activities before the pandemic, described above (Table 6, column 2).

All in all, the use of ICT by Italian micro-enterprises seems to be quite limited, both for financial and marketing activities. Moreover, the analysis points to the existence of complementarities in the development of digital skills. In fact, digitalization seems to be more prevalent among individuals with higher levels of education and among entrepreneurs running larger and complex businesses.

4.3 Digital competences during the pandemic

During the pandemic Italian MSMEs increased, on average, their level of engagement in digital activities. Digitalization involved activities related to both financial products/services, and sales/business advertising. The increase in the digital engagement, arguably accelerated by the pandemic[13], emerges in all countries that participated in the OECD/INFE 2021 Survey (OECD-INFE, 2021). For Italian micro-firms, however, it was rather weak and heterogeneous across firm characteristics.

Almost 54 per cent of Italian micro-firms opened a bank account online after the start of the pandemic, just about two percentage points above the pre-pandemic scenario (Fig.10). The increase in the engagement was larger for firms with 2-4 employees with respect to larger firms, reflecting also the lower engagement of the former in this activity before the pandemic. Similarly, entrepreneurs holding at most a primary school degree showed the largest increase of engagement, while there was no difference across gender. All in all, the pandemic led to a lowering of the heterogeneity in this digital activity across firm size, entrepreneur's age and level of education.

Slightly less than one quarter of firms signed a financing contract online during the pandemic, a share significantly higher than that of the pre-pandemic scenario (fig. 10). Self-employed – which had the lowest level of engagement in this digital activity before the pandemic – experienced the largest increase over the crisis. A larger engagement in digital activities during the pandemic characterized also firms whose owner had a higher level of education and male owners.

[13] See, for instance, Bellmann et al. (2021) and Guo et al., (2020).

Less than one out of five firms signed an insurance contract completely online during the pandemic, a share about three points higher than that characterizing the pre-pandemic scenario. The increased involvement in this digital activity was greater for larger firms, and for enterprises whose owner had a higher level of education. Again, the link between digitalization on the one hand, and education and firm size on the other hand, can reflect spill-over effects in the human capital accumulation processes of small entrepreneurs, as well a higher perception of the importance of financial competences among those leading more sizable and complex businesses.

Both the number of MSMEs owning a website to showcase products or services and that of firms endowed with website to sell products or services experienced an increase over the pandemic. In relative terms, the increase of digital engagement was more pronounced for the usage of websites to sell products, which was particularly sharp for trade and agriculture firms and for enterprises whose owners had less than 30 years. Greater level of education associated with a larger increase in this digital activity, while both women and men owners showed a comparable increase.

In the remainder of this Section we investigate which entrepreneur's characteristics associated with a greater extent of digitalization during the pandemic, other things being equal. To this aim, we need to devise a measure of digital switch first. We employ as baseline measure a dummy variable, taking value one if during the pandemic the firm engaged in at least one digital activity for the first time, and zero otherwise. In order to take into account firms that did not switch because they were digitalized even before the pandemic, we remove all those firms that had engaged, before the pandemic, in at least four activities out of the five we considered. This leaves us with an estimation sample of 1794 firms. Among them, 16 per cent registered a digital switch during the pandemic (see Table 7).

Table 8 shows that, other things being equal, the probability to increase the engagement in digital activities during the pandemic is positively correlated with the financial competences of the firm. In particular, an increase of one standard deviation of the financial literacy scores associates with an increase of the probability of digital switch of 1.6 percentage points, about 10 per cent of the average probability of performing a digital switch (16.1 per cent; see Table 7). Among other firm and entrepreneur characteristics, only age and juridical form display a statistically significant correlation with digitalization. In particular, the probability of an increase in the engagement in digital activities is lower for micro-entrepreneurs with more than 40 years with respect to younger owners, other things being equal. Similarly, also partnerships displayed a lower probability to have engaged in more digital activities during the pandemic with respect to limited companies, ceteris paribus.

On the other hand, the probability of a digital switch during the pandemic is not associated to the size of the firm, the gender of the entrepreneur and her experience, other things being equal.

Since the indicator of digital switch consists of both non-finance (website for advertising, website for sales) and finance (opening a bank account completely online, signing a financing contract completely online, singing an insurance contract completely online) aspects, we also investigate the correlation between firm characteristics and probability of digital switch concerning finance and non-finance activities separately.

Not surprisingly, financial literacy positively correlates with the probability of increasing the level digitalization in financial activities, highlighting the possible complementarities between entrepreneurs' financial competences and the use of a growing range of digital financial services provided by both traditional and innovative financial intermediaries (Table 8, columns 2 and 3)[14]. On the other hand, the relationship between financial literacy and digitalization in commercial activities is (marginally) not statistically significant, although the estimated coefficient is positive.

In order to gather further insights on the relationship between firm and entrepreneur characteristics and the engagement in digital activities during the pandemic, we run a couple of robustness exercises. Firstly, we employ an alternative measure of digital engagement during the crisis. In particular, we devise a digitalization score given by the difference between the number of digital activities (among the five discussed above) that the firm engaged in during the pandemic and the number of activities engaged in before. Results, displayed in Table 9 (columns 1-3), confirm the previous findings, showing that digitalization is positively correlated to entrepreneurs' financial literacy and negatively correlated with firm owner's age. Moreover, the digitalization effort is lower for partnerships with respect to limited companies.

As a second robustness exercise, we focus on those firms that before the pandemic did not engage in any of the five digital activities considered, i.e. the firms displaying the lowest possible digitalization level before the pandemic. In this case, we employ as dependent variable a binary variable, taking value one if during the pandemic the firm engaged in at least one digital activity for the first time, and zero otherwise. The estimation sample, due to the strong condition imposed on the level of digital engagement before the pandemic, consists of 489 firms only. The estimation results confirm the previous findings, showing a positive correlation between digitalization during the pandemic and financial literacy (see Table 9, columns 4-6).

To sum up, we analyzed the characteristics of micro-entrepreneurs - and of their businesses - who were more likely to increase the level of digitalization during the pandemic. The results suggests that financial skills can have enhanced the ability of owners to assess the importance of (and to effectively engage in) digitalization and point to the existence of valuable complementarities in the development of (digital and financial) competences among Italian entrepreneurs.

5. Financial literacy and the consequences of the pandemic

In this Section we provide an analysis on the relationship between financial literacy and the consequences of the pandemic on revenues, liquidity and employment, controlling for a set of

[14] A strand of literature, still at its infant stage, started to track the links between digitalization and financial skills. The links can go both ways as both financial and digital skills can generate, under certain conditions, mutually reinforcing effects. For instance, French, McKillop, and Stewart (2020) show how the use of mobile apps tailored on the management of personal finance can improve financial skills and behaviors of users. Bianco et al. (2021) provide finding suggesting that, among young people, experience with digital devices, especially if oriented toward valuable goals, can stimulate open-minded approaches toward planning and financial capabilities.

firm and entrepreneur's characteristics (5.1). We then analyze whether financial literacy proved to be relevant in enhancing the resilience of firm owners to the negative effects of the shocks (5.2). Finally, we verify empirically the relevance of possible 'channels' through which financial competences might have operated to mitigate the impact of the crisis (5.3).

5.1 The effects of the pandemic on small businesses and the role of financial literacy

The pandemic shock has strongly affected Italian micro-firms on several aspects of their business, and in a very uneven fashion. About 60 per cent of firms declared that the overall impact was negative or very negative; the share of heavily hit firms was larger in the accommodation and food industry (involving about 90 per cent of firms, a share double of that in the professional activities sector). The share of firms witnessing a negative impact of the crisis on liquidity, profits, employment and overall was smaller among those with more financial competences (Figure 12).

Other things being equal, the probability to have faced a drop in the profits during the pandemic decreases as the financial competences of the entrepreneur increases (Table 10). In particular, an increase of the financial literacy score by one standard deviation associates with a reduction of the probability to have experienced a drop in profits during the pandemic by about 3 percentage points, about 5 per cent of the average probability to have experienced a drop in profits during the pandemic (66 per cent). As expected, those firms belonging to the so-called "essential sectors" displayed a significantly lower probability to have experienced a fall in profits with respect to other firms, by about 14 percentage points. On the other hand, other firm and entrepreneur's characteristics do not show a statistically significant correlation with the fall in profits during the pandemic.

Similar findings emerge when we investigate the impact of the pandemic on liquidity: a one standard deviation increase in the financial literacy score yields a reduction of the probability to have experienced a lack of liquidity of about 3.7 percentage points, about 7 per cent of the average probability. This result might suggest, for instance, that financially savvy behaviors led firms to setup a liquidity buffer. Moreover, also firm size played a role, with the probability to face liquidity problems being smaller of about 7.5 percentage points for firms with 5-9 employees with respect to smaller firms, suggesting a greater capacity for larger firms to be endowed with an adequate financial structure before the pandemic, other things being equal (including the financial competences). As before, firms belonging to essential sectors display a lower probability (by about 10 percentage points) to experience a lack of cash.

No correlation emerges instead between financial literacy and the probability to have witnessed a negative impact on occupation. On the other hand, firm size largely explain the probability to experience a reduction in the number of employees: for firms with 5-9 employees such probability is lower by about 13 percentage points with respect to the sample average value (26

per cent).[15] Partnerships and firms not belonging to the category of essential sectors displayed a larger probability to experience a reduction of employees too.

The weak links between occupation and other variables during the pandemic should be evaluated in light of the effects of the measures introduced by the government to support employment for workers and families.[16] For instance, measures such as the 'cassa integrazione', have been strengthened during the crisis to protect large categories of workers, included those who were previously excluded from various protection schemes.

Finally, the multivariate analysis on the economic effects of the Covid-19 crisis does not highlight differences by gender. In fact, the estimated coefficient of the female variable is never statistically significant, whatever is the dependent economic variables under investigation. This result is different from that referring to all G20 economies participating to the Survey (OECD/INFE, 2021), showing that the impact of the crisis was higher for businesses conducted by female owners.[17]

5.2 The channels: financial literacy and state-aids during the pandemic

On a theoretical ground, firms with larger financial competences should have a more balanced financial and cost structures, and a lower risk profile with respect to less financially literate firms. These factors could have played a role in building their "ex-ante" resiliency to a crisis, allowing them to cope better with the shock of the pandemic with respect to less financially competent firms. Secondly, financial literacy arguably played also a role "ex-post". For instance, more financially literate firms were able to obtain emergency external finance, needed to deal with the shortfall in revenues, or to restructure their debts, more easily with respect to other firms. At this regard, a massive set of firm-aid programs was undertaken by several national governments worldwide in 2020-2021, including Italy, where such aids took mainly the form of non-repayable grants, public credit guarantees, debt moratoriums and employment support measures. The evidence, drawn from more than 700,000 limited companies, shows that such measures were effective in containing firms' liquidity needs and supporting bank credit to firms during the pandemic, avoiding a credit crunch (Bank of Italy, 2021)[18].

More than 50 per cent of micro-firms in our sample received state aids in the form of non-repayable grants, while more than 40 per cent exploited public credit guarantees (including those

[15] This result is only partially due to the fact that, by construction, self-employed cannot show any drop in the number of employees. Also with respect to businesses with 2-4 employees, larger firms show a significantly higher probability to have reduced the number of employees during the pandemic.
[16] The measures were introduced by Decree Laws 18/2020 ('Cure Italy' decree), 23/2020 (the 'Liquidity Decree'), 34/2020 ('Relaunch Decree') and 104/2020 (the 'August Decree').
[17] Also with regard to German self-employed, there is evidence of a gender gap in the negative effects of the crisis; however, this result is largely explained by selection issues, because women disproportionately work in industries that were more affected by the pandemic (Belitsky et al, 2021; Graeber et al, 2021).
[18] Financial constraints may amplify the effects of the pandemic on small businesses activity (Balduzzi et al, 2020). Our data do not allow to analyse whether during the pandemic micro-firms' credit access has deteriorated with respect to previous period. However, we find that among owners who asked for a loan during the crisis almost all of them (99 per cent) have been granted the full or a partial amount requested, arguably benefitting from the measures introduced by the government to support firm liquidity needs.

on small loans, up to 30,000 euro, characterized by a coverage ratio of 100 per cent); less than 20 per cent of Italian micro-SMEs enjoyed debt moratoriums, while 60 per cent of them used measures to support employment. All in all, about 83 per cent of Italian micro-firms used at least one form of state aids during the pandemic. This share is significantly larger with respect to that of the G20 average (63 per cent), and the second-largest after Saudi-Arabia (90 per cent), followed by Turkey (70 per cent) and France (67 per cent).

Firms with higher financial competences were able to better screen the government aids and to find the most suitable one with respect to less financially competent firms. About 90 per cent of the Italian micro-firms in the group with the highest level of financial competences used government's measures to support firm's financial condition during the pandemic (fig. 13).

A statistically significant correlation between financial literacy and access to government's measures also emerges after controlling for a large set of firm and entrepreneur's characteristics. Table 11, column 1, shows a positive and statistically significant relationship between financial literacy and having accessed state-aids during the pandemic, although the magnitude of the relationship is small. In particular, a one standard deviation increase in the financial literacy scores associates with an increase of the probability of having used financial state aids of 2.7 percentage points, which is about 3.3 per cent of the average probability of having used financial state aids (83 per cent).

Both firm size and entrepreneur's education plays a role too. In particular, one-person businesses' probability to have accessed state aids during the pandemic was smaller by about 10 percentage points with respect to larger firms; moreover, entrepreneurs with at most primary school education or no formal education at all accessed state aids with a probability smaller of about 20 percentage points with respect to other business owners.

On the other hand, entrepreneurial experience is positively correlated to the probability of having accessed public measures to support firms during the pandemic. In particular, having at least ten years of experience associated with a probability to have used state aids larger by about 5 percentage points with respect to that characterizing less experienced entrepreneurs. Other things being equal, female owned firms accessed state aids with a larger (by about 3 percentage points) probability with respect to male owned firms. As expected, firms belonging to essential sectors used firm aids with a lower probability with respect to firms belonging to other sectors, arguably due to lower needs.

5.3 The channels: financial literacy and firms' ex-ante resilience

Finally, we investigate whether more financially literate firms were more financially equipped (for instance, those having a liquidity buffer or those capable to access external finance promptly) to face the pandemic shock with respect to other firms. To this aim, we focus on the subset of firms – slightly less than 50 per cent of the sample – whose cash inflows during the pandemic were insufficient to cover cash outflows or to pay for expected expenses of the business. For this set of firms, we estimate the probability to recur to a bunch of strategies, other things being equal,

including: (a) using available liquidity; (b) paying staff, taxes or loan repayments late; (c) suspending the business temporarily or for good.

All in all, the share of firms who used available liquidity to face the cash shortage was larger among firms belonging to the two groups with largest financial competences (fig. 13). Moreover, in the more financially literate groups of firms, the share of those that had to suspend the business or to pay staff or taxes late was lower with respect to the other groups.

A statistically significant relationship between financial literacy and the probability to have used available liquidity (such as cash, liquid financial instruments, or committed credit lines) to face a cash shortage emerges in a linear regression setup, after controlling for a large set of firm and entrepreneur's characteristics (see Table 11, column 2). In particular, a one standard deviation increase in the financial literacy scores associates with an increase of having used available liquidity by about 7 percentage points other things being equal (16 percent of the average probability of having used available liquidity).

Moreover, more financially literate firms show a lower probability, with respect to other firms, to postpone staff or taxes payments or loan reimbursements. A one standard deviation increase in the financial literacy scores associates with a reduction in such a probability of about 4 percentage points, about 20 percent of the average probability or late payments. Finally, the probability of having suspended the business temporarily or for good is significantly lower for firms with higher financial literacy: an increase of the financial literacy score of one standard deviation associates with a decrease of the probability to suspend the business of about 5 percentage points ceteris paribus, almost 30 percent of the average probability (Table 11, columns 3 and 4).

All in all, the results presented in this section suggest that financial literacy plays an important role in helping micro-entrepreneurs cope with the negative effects of unexpected shocks. Financially literate entrepreneurs seem to be more able to accumulate precautionary funds in good times and to take advantage of public intervention in bad times.

6. Digitalization and the consequences of the pandemic

In this Section we investigate whether firms that were more digitalized at the dawn of the pandemic were more able to cope with the crisis, other things being equal. On a theoretical ground, firms that at the beginning of 2020 were endowed with a website to both advertise and sell online their products could have had an easier way through the pandemic with respect to other firms, other things being equal. Along the same line, firms that were already able to use digital financial services could have suffered less with respect to others during the lockdown.

In order to investigate whether the pre-Covid level of digitalization might have played a role during the pandemic, we employ the proxy of digitalization given by the number of digital activities that firms engaged in before the pandemic. As before, we consider two non-finance-related activities (website for advertising, website for sales) and three finance-related activities

(opening a bank account completely online, signing a financing contract completely online, singing an insurance contract completely online).

Then, we estimate a linear regression model were the probability to face a drop in profits (or to experience a drop in liquidity, or to have suffered a fall in employment) is explained by the pre-Covid digitalization score, controlling for a large set of firm and entrepreneur characteristics. Since the impact of the pandemic was very uneven across sectors, we interact the digitalization score with both the sector dummies and the belonging to the group of essential sectors.

Other things being equal, the probability to experience an overall negative impact of the pandemic on the firm activity is not associated, on average, to the level of firm digitalization at the beginning of the pandemic. However, such relationship is negative and statistically significant for firms belonging to the trade sector. For the latter, the relationship between suffering a lack of cash or a fall in employment and the digitalization score is also negative, although marginally statistically not significant (Table 12).

This result is coherent with the larger importance that digital activities might arguably play in trade sectors with respect to other sectors, such as manufacturing and transportation. Differently from trade sectors, the proxy of digitalization measured before the pandemic does not show any correlation with the consequences of the pandemic for firms belonging to accommodation and food services. The latter result might reflect the effect of the measures to contain the spreading of the virus, which involved the closure of hotel and restaurants over several weeks.

Anyway, these results must be evaluated with caution since, as already mentioned, the level of digitalization is measured drawing from only five mandatory questions (the only ones available in the questionnaire, with respect to the seventeen used to measure financial literacy), and this arguably might lead to less accurate estimates.

7. Conclusions and policy implications

In this paper, we exploit new survey data from a representative sample of Italian micro-firms to assess their level of financial and digital competences and to investigate whether these skills help entrepreneurs to deal with unexpected shocks such as the one triggered by the Covid-19 pandemic.

Our results indicate that the share of Italian business owners endowed with adequate financial competences is quite low (about 37 per cent). Taking into account a large set of entrepreneur and business characteristics, we find that financial literacy is especially low among business owners with little education and for smaller firms. The importance of these factors as main drivers of financial literacy is consistent with the presence of complementarities among different dimensions of human capital that amplify when they are exploited within large (and organizationally complex) businesses.

Moreover, we find sizable financial competences among owners endowed with sound entrepreneurial experience. This result supports the hypothesis that learning processes over the

course of entrepreneurial life and management may play an important role in building financial literacy. Conversely, there are no significant differences between women- and men-owned businesses, confirming that gender gap in financial literacy tend to narrow or even disappear when women engage in entrepreneurial activities (D'Alessio et al., 2020).

Our evidences also show a robust association between micro-firms' financial literacy and their ability of to cope with the effects of external shocks: other characteristics being equal, more financially skilled entrepreneurs have experienced a less negative impact of the Covid-19 crisis on firm profitability and liquidity. We investigate some possible reasons behind this higher resilience, finding that financial literacy correlates with a larger use of state aids issued during the pandemic and a higher availability of liquidity buffers built before the crisis.

As far as digitalization is concerned, we find that the use of ICT in Italian micro-enterprises seems to be quite limited: only one in four entrepreneurs uses a dedicated website to sell products/services and less than 20 per cent of them have concluded a financing or insurance contract entirely online. Business digitalization is more prevalent among younger and better-educated entrepreneurs, as well as those who run larger and more complex businesses. The Covid 19 crisis triggered a surge in ICT use that is significantly greater among businesses with higher levels of financial competences. Unsurprisingly, financial literacy is positively correlated with the likelihood of increasing the level of digitalization of financial activities. Finally, we find no significant correlation between digitalization and the ability to mitigate the impact of the pandemic. However, these results should be viewed with caution, as the survey has limited ability to measure accurately micro-enterprises' digitalization.

Our study adds to the existing literature on small business financial literacy in several directions. First, thanks to the data collected from a representative sample, we provide robust evidence on the limited financial literacy of micro-enterprises in a developed country. Second, by leveraging on the unexpected shock of the pandemic, we are able to identify a significant correlation between business owners' financial literacy and firms' resilience in time of crisis. Third, we highlight a significant positive relationship between financial literacy and the transition to more digitized business activities, especially in the area of digital finance.

The results of our study have interesting policy implications. Policymakers should consider micro-enterprises (especially self-employed individuals and entrepreneurs with limited experience in business management, such as start-ups owners) as a priority target for financial education initiatives.[19] Indeed, these firms not only have inherent weaknesses due to imbalanced capital structures or high variability in cash flows, but also have limited financial skills to deal with liquidity constraints or to make financial decisions that are better suited for their own growth. The empowerment of their financial competences may have a notable positive impact on their ability to make more appropriate financial decisions. In Italy in particular, such policy initiatives could contribute to economic growth, financial stability, and resilience to external shocks to a greater extent than in other advanced countries, as micro-enterprises account for a

[19] The OECD Recommendation of the Council on Financial Literacy, adopted on 29/10/2020, includes micro and small entrepreneurs among target groups that should specifically be taken into account by national strategies of financial education.

large share of national employment and value added (43 and 26 percent, respectively, compared with 29 and 19 percent for the EU average).

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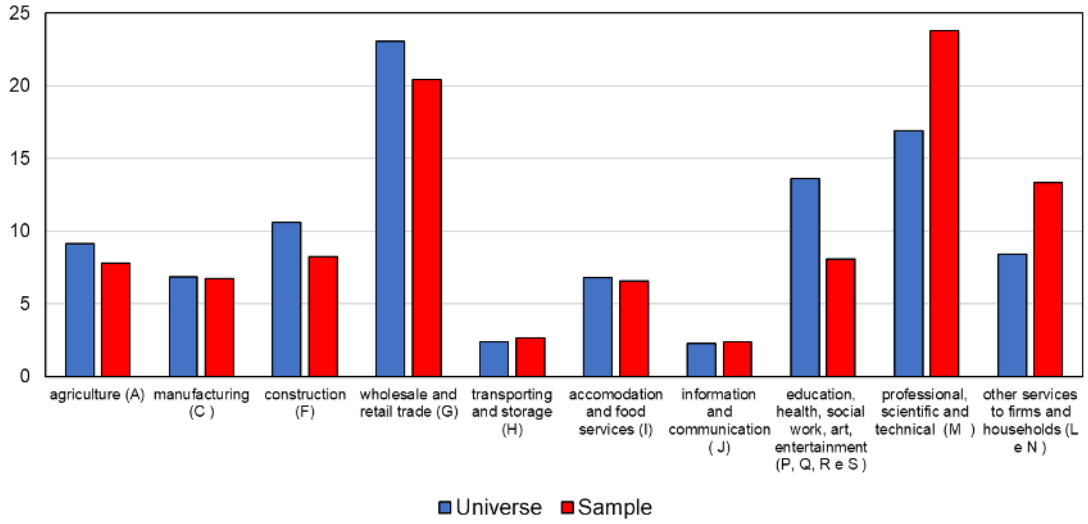
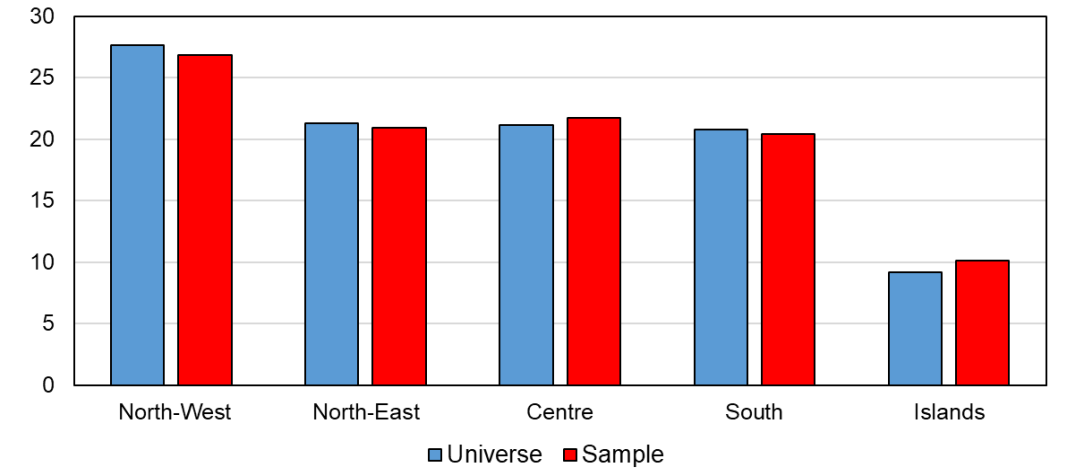
Figures and Tables

Figure 1 – The representativeness of the sample (percentage values)

(a) economic sectors



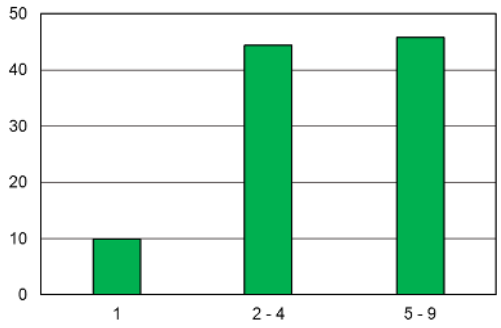
(b) geographical localization



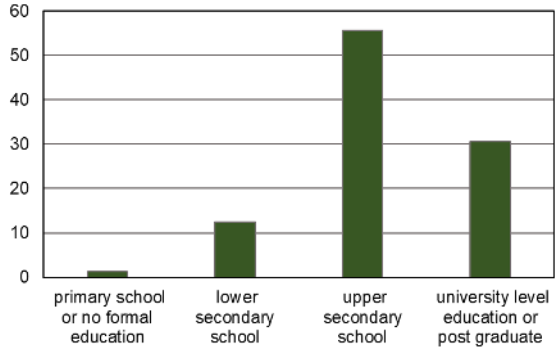
Notes: Distribution of both population and sampled non-financial Italian firms with less than 10 employees by economic sector and geographical area.

Figure 2 – Sampled firms (percentage values)

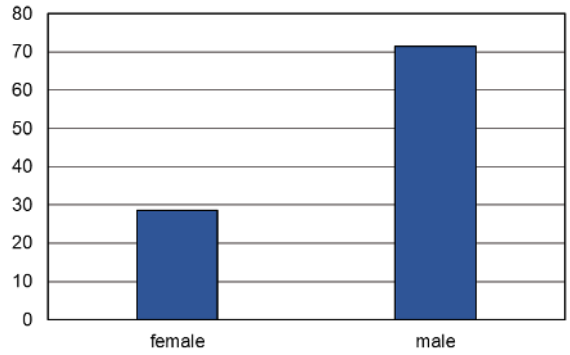
(a) by number of employees



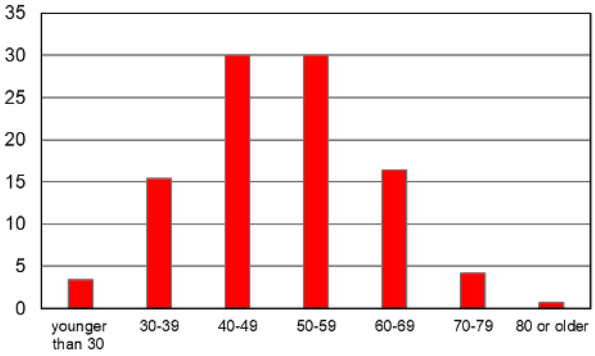
(b) by level of education



(c) by gender



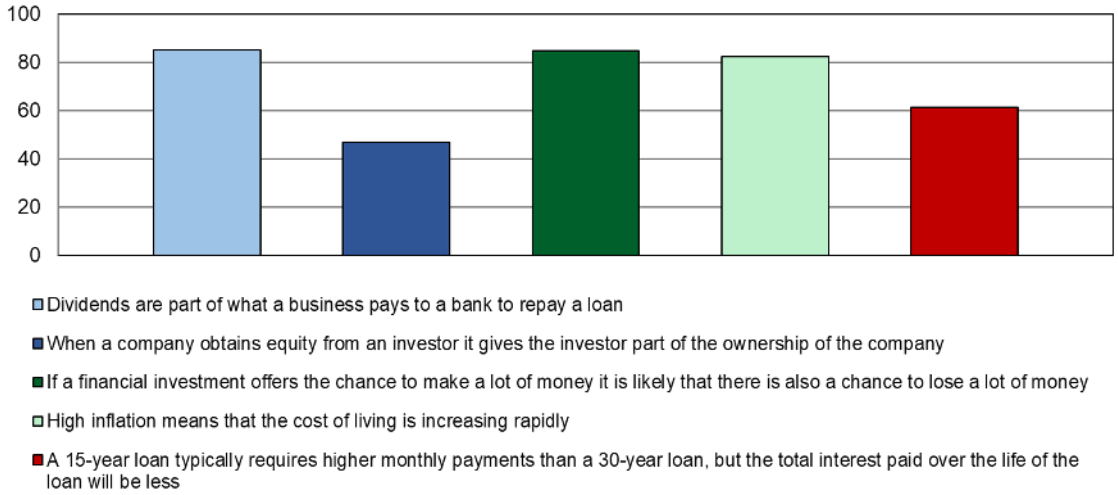
(d) by age



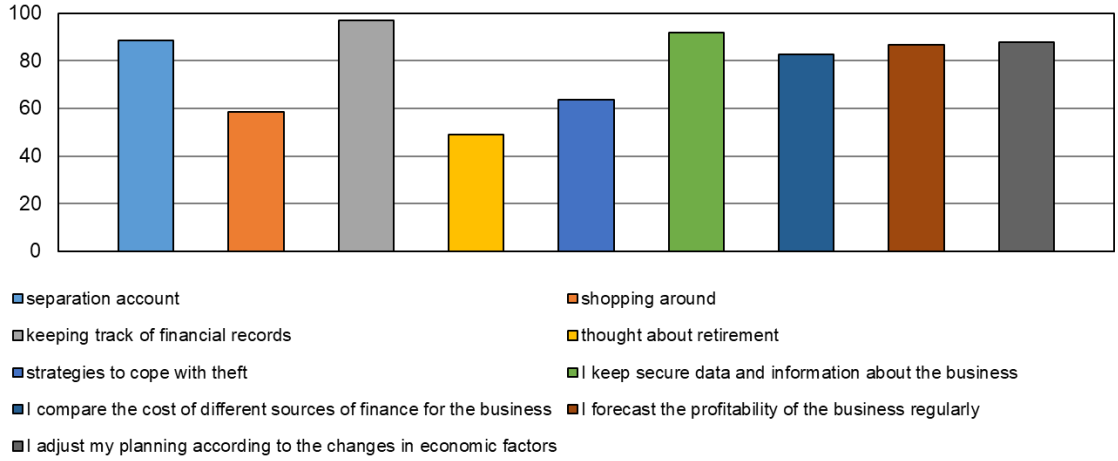
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees.

Figure 3 – The three components of financial literacy: questions and share of correct answers (percentage values)

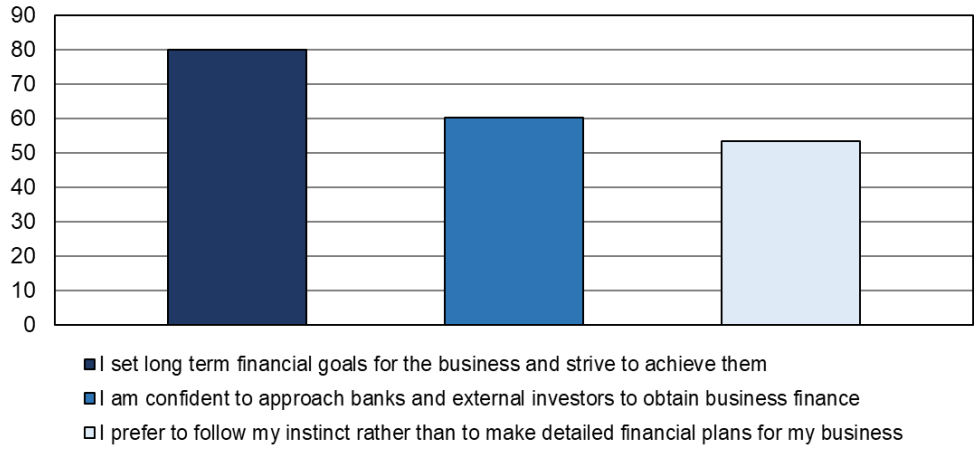
(a) financial knowledge questions



(b) financial behavior questions

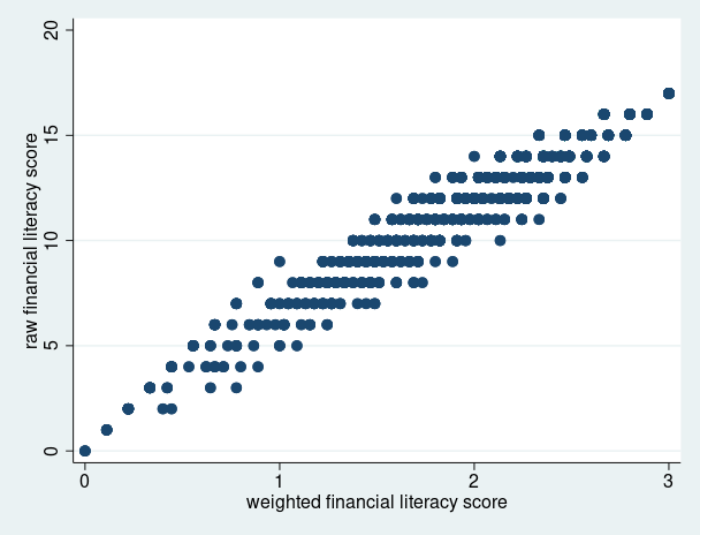


(c) financial attitudes questions



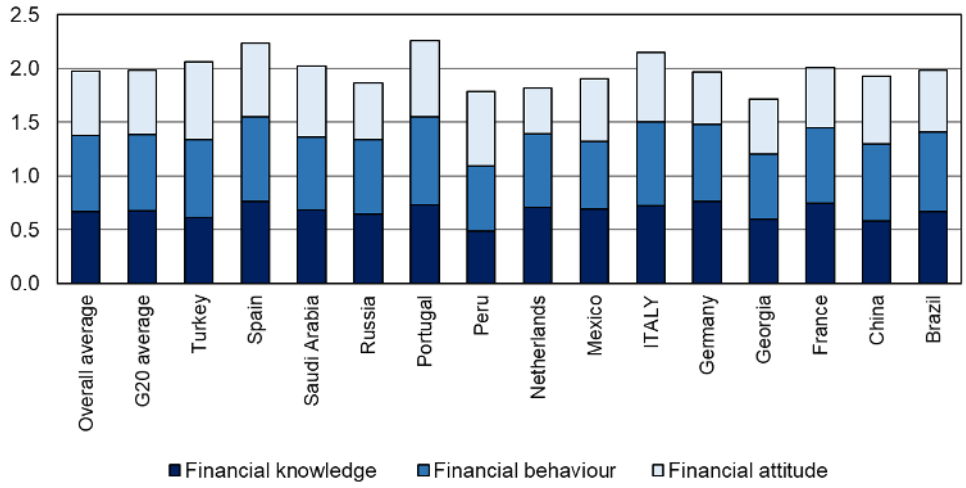
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. Panel (a): share of correct questions for each of the five questions used to assess financial knowledge; panel (b): share of the "financially savvy" behaviors for each of the nine questions used to assess the financial behavior score; panel (c): share of the "financially savvy" attitudes for each of the three questions used to assess the financial attitudes score.

Figure 4 – Financial literacy: weighted score vs raw score



Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. The raw financial literacy score is computed following the G20/OECD-INFE (2021) methodology, as the sum of the financial knowledge score (yielding up to 5 points), the financial behavior score (up to 9 points) and the financial attitudes score (up to 3 points); it ranges from 0 to 17. The weighted financial literacy score gives an equal importance to each of the three components (knowledge, behavior, attitudes) by first normalizing each of them between 0 and 1 and then summing them up; it ranges from 0 to 3.

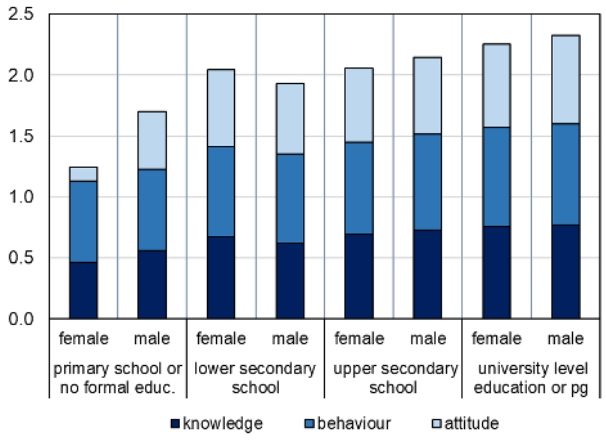
Figure 5 – Financial literacy of micro-SMES: an international comparison



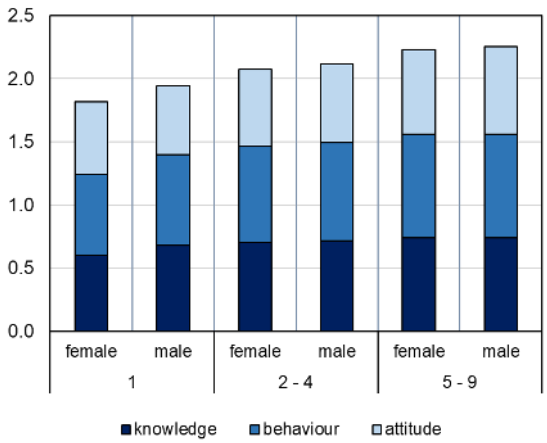
Notes: Sample of firms with less than 10 employees referring to the fourteen countries that participated in the survey (Brazil, China, France, Germany, Italy, Mexico, Russia, Saudi Arabia, Turkey, Georgia, the Netherlands, Peru, Portugal, Spain). The weighted financial literacy score ranges from 0 to 3 and is obtained as a sum of three components (knowledge, behavior, attitudes), each ranging from 0 to 1.

Figure 6 – Financial literacy and firm's characteristics

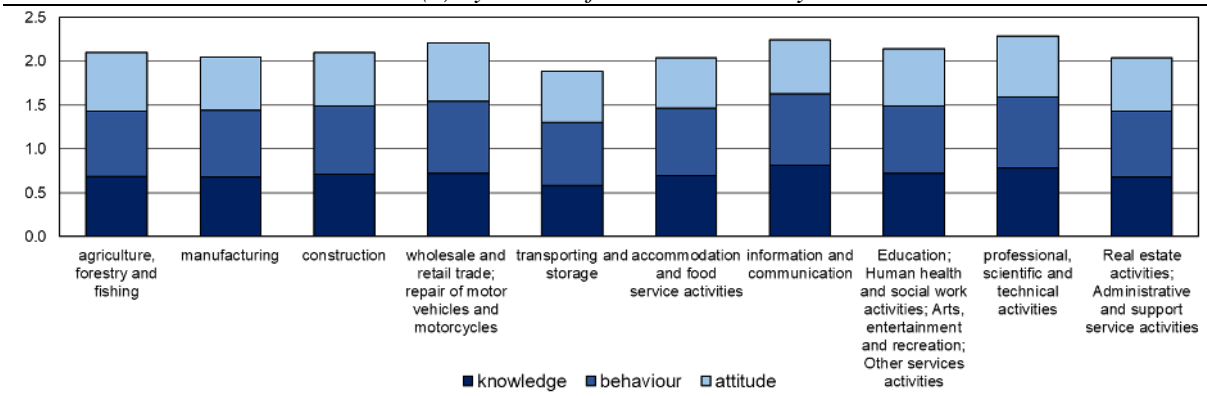
(a) by level of education and gender



(b) by number of employees and gender

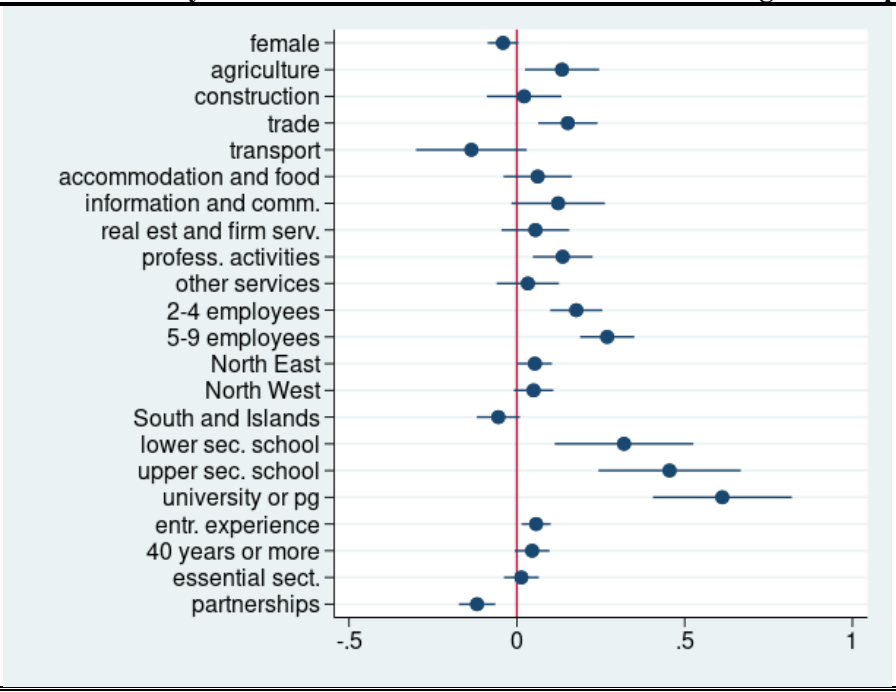


(c) by sector of economic activity



Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. The weighted financial literacy score ranges from 0 to 3 and is obtained as a sum of three components (knowledge, behavior, attitudes), each ranging from 0 to 1.

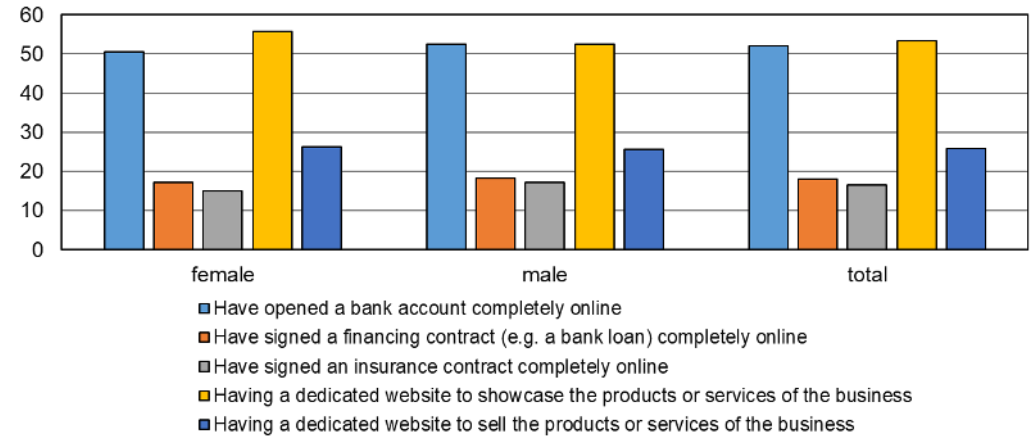
Figure 7 – Financial literacy and firm's characteristics: a multivariate regression approach



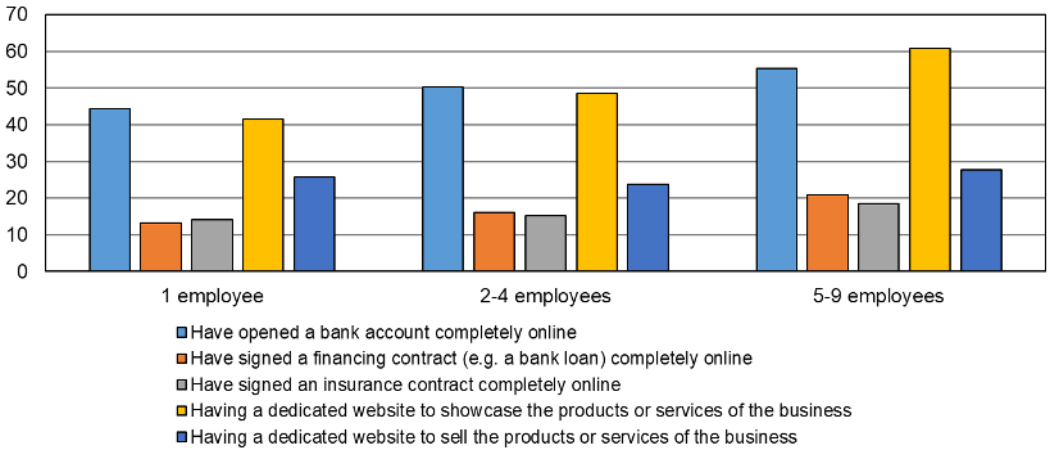
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. Confidence intervals (at alpha = 0.10) of the regression coefficients of a linear model where the dependent variable is the financial literacy score and the independent variables are: gender of the entrepreneur, sector of economic activity (10 sectors), size (number of employees), area (North West, North East, Centre, South and Islands), level of education of the entrepreneur (primary education or no education at all; lower secondary school; upper secondary school; university or postgraduate studies); entrepreneurial experience (10 years or more); age of the entrepreneur; dummy equal to one for the firms belonging to essential sectors sector; juridical form.

Figure 8 – Share of firms engaging in digital activities before the pandemic (percentage values)

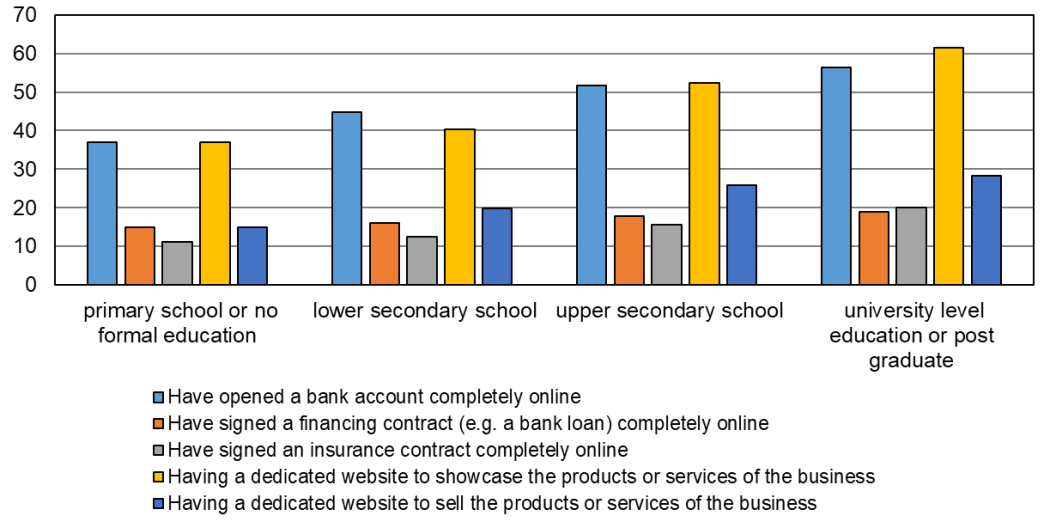
(a) by gender



(b) by number of employees



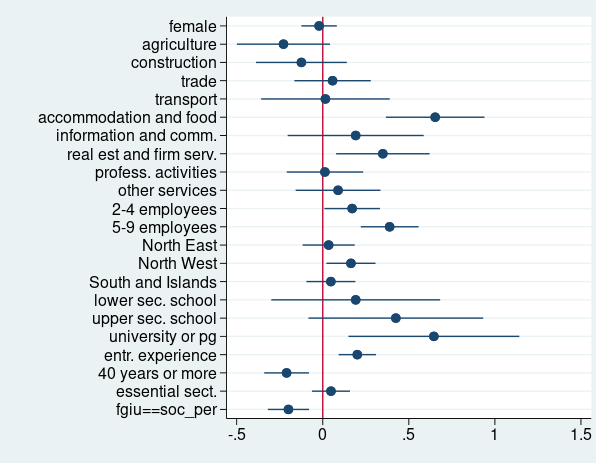
(c) by level of education



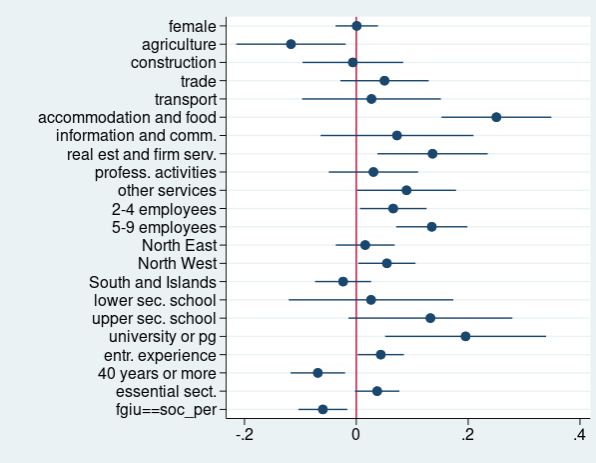
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees.

Figure 9 – Digitalization before the pandemic and firm's characteristics: a multivariate regression approach

(a) digitalization score (0-5)



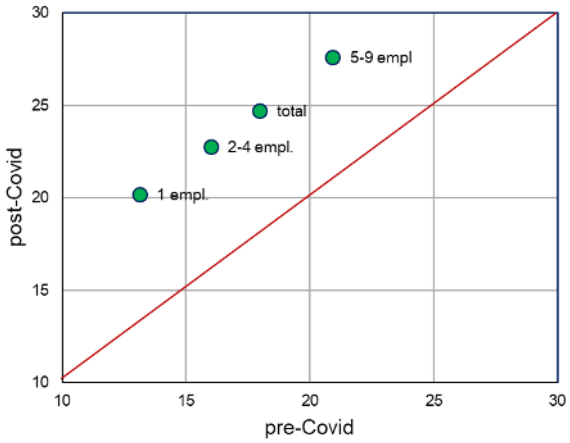
(b) digitalization score (dummy)



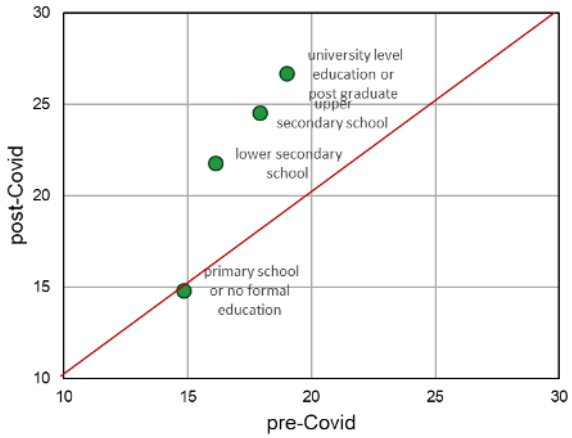
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. Confidence intervals (at alpha = 0.10) of the regression coefficients of a linear model where the dependent variable is the 0-5 digitalization score (panel a) or the binary digitalization score (panel b) and the independent variables are: gender of the entrepreneur, sector of economic activity (10 sectors), size (number of employees), area (North West, North East, Centre, South and Islands), level of education of the entrepreneur (primary education or no education at all; lower secondary school; upper secondary school; university or postgraduate studies); entrepreneurial experience (10 years or more); age of the entrepreneur; dummy equal to one for the firms belonging to essential sectors sector; juridical form.

Figure 10 – Firms that have signed a financing contract completely online (percentage values)

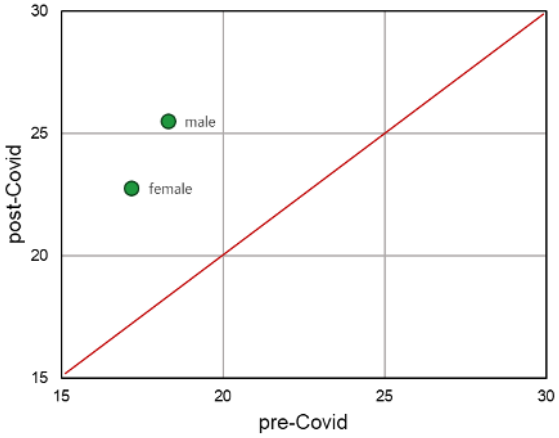
(a) by number of employees



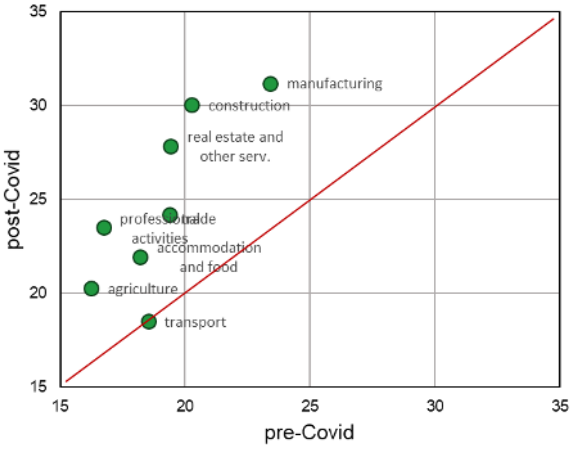
(b) by level of education



(c) by gender



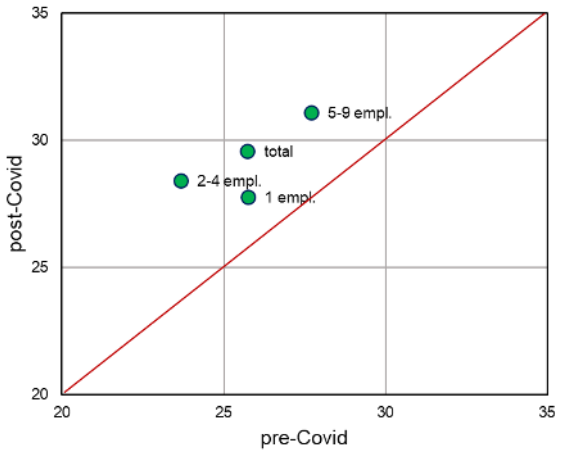
(d) by sector of economic activity



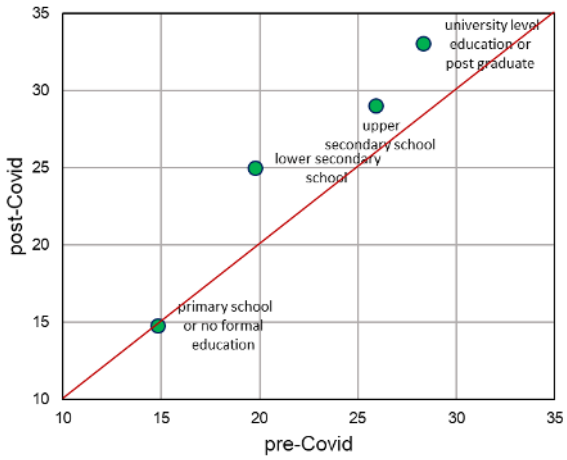
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees.

Figure 11 – Firms having a dedicated website to sell products or services (percentage values)

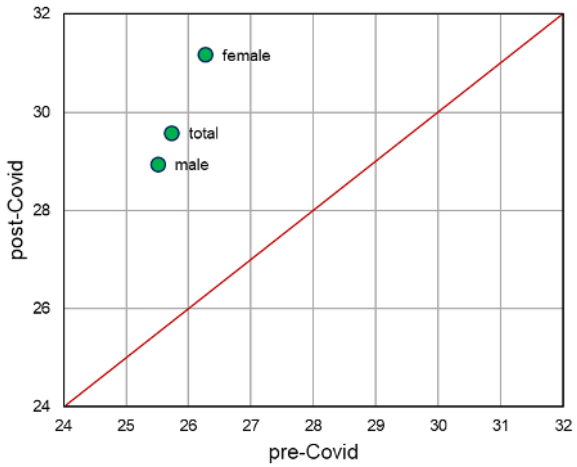
(a) by number of employees



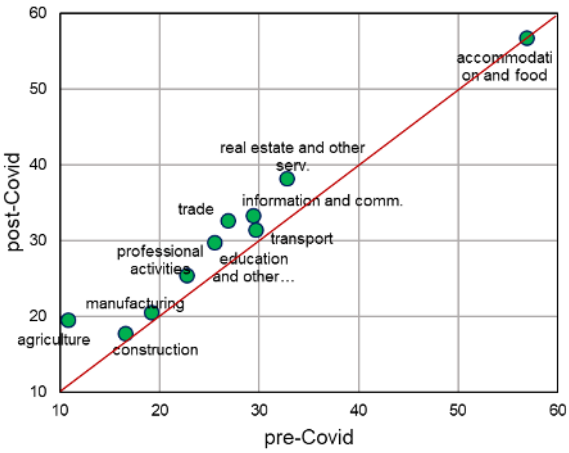
(b) by level of education



(c) by gender

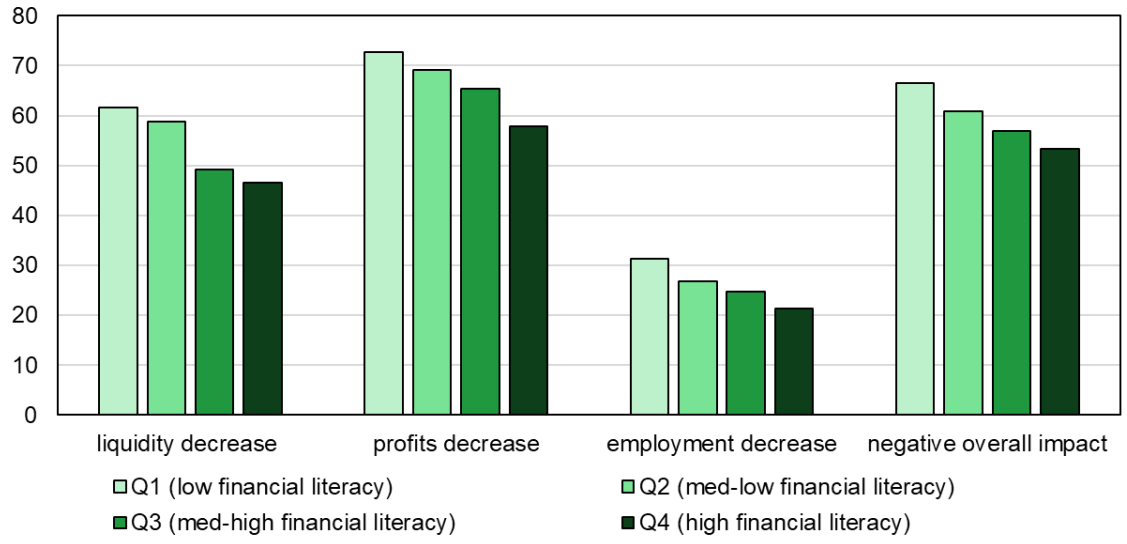


(d) by sector of economic activity



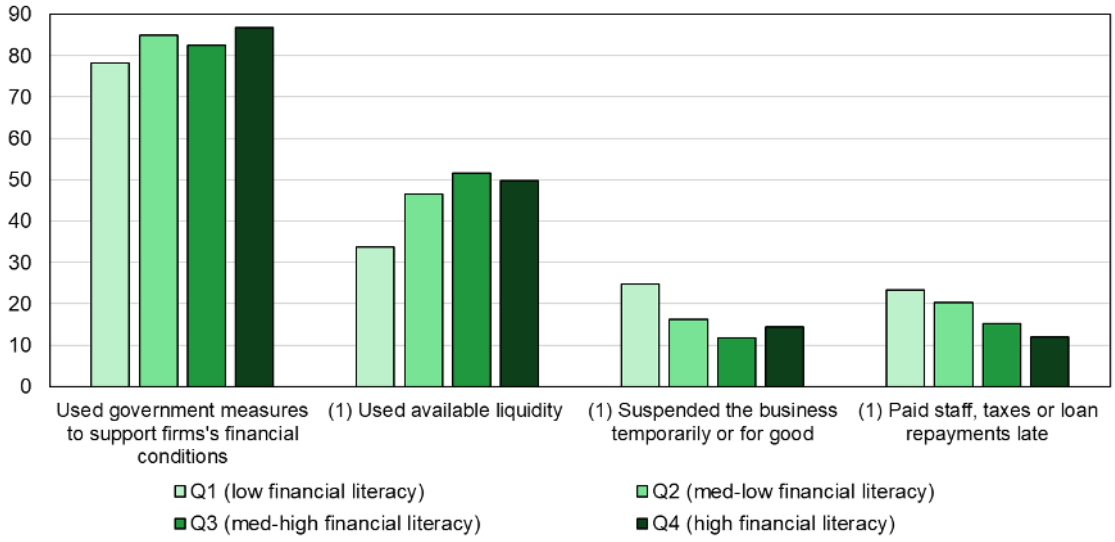
Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees.

Figure 12 – Share of firms that experienced a decrease of liquidity, profits, employment and an overall negative impact of the pandemic by quartile of financial literacy (percentage values)



Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees.

Figure 13 – Share of firms that used government measures to supports firms' financial conditions and strategies put in place by firms facing a liquidity shortage, by quartile of financial literacy (percentage values)



Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. – (1) Subset of 967 non-financial Italian firms with less than 10 employees whose cash inflows during the pandemic were insufficient to cover cash outflows or to pay for expected expenses of the business.

Table 1 – Firm characteristics

	mean	standard deviation	p25	p50	p75
gender					
female	0.29	0.45	0	0	1
male	0.71	0.45	0	1	1
experience	0.58	0.49	0	1	1
age	0.81	0.39	1	1	1
essential sectors	0.63	0.48	0	1	1
sectors of economic activity					
A. agriculture, forestry and fishing	0.07	0.26	0	0	0
C. manufacturing	0.07	0.26	0	0	0
F. construction	0.08	0.27	0	0	0
G. wholesale and retail trade; repair of motor vehicles and motorcycles	0.21	0.41	0	0	0
H. transporting and storage	0.03	0.16	0	0	0
I. accommodation and food service activities	0.07	0.25	0	0	0
J. information and communication	0.03	0.16	0	0	0
PQRS. Education; Human health and other services activities	0.08	0.28	0	0	0
M. professional, scientific and technical activities	0.24	0.42	0	0	0
LN. Real estate activities; Administrative and support service activities	0.13	0.34	0	0	0
firm size (number of employees)					
1 employee	0.10	0.30	0	0	0
2-4 employees	0.44	0.50	0	0	1
5-9 employees	0.46	0.50	0	0	1
firm location					
North-west	0.27	0.45	0	0	1
North-east	0.21	0.40	0	0	0
Centre	0.22	0.41	0	0	0
South and Islands	0.30	0.46	0	0	1
entrepreneur's education					
primary school or no formal education	0.01	0.12	0	0	0
lower secondary school	0.12	0.33	0	0	0
upper secondary school	0.56	0.50	0	1	1
university level education or post graduate	0.31	0.46	0	0	1
juridical form					
limited liability companies	0.64	0.48	0	1	1
partnerships	0.36	0.48	0	0	1

Notes: Sample of 1,998 non-financial Italian firms with less than 10 employees. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise.

Table 2 – Questions about financial knowledge, financial behavior and financial attitudes

	knowledge questions (a)
QK7_1	**Dividends are part of what a business pays to a bank to repay a loan.** 1=True, 0=False, -97=Don't know, -99=Refused
QK7_2	**When a company obtains equity from an investor it gives the investor part of the ownership of the company.** 1=True, 0=False, -97=Don't know, -99=Refused
QK7_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.** 1=True, 0=False, -97=Don't know, -99=Refused
QK7_4	**High inflation means that the cost of living is increasing rapidly.** 1=True, 0=False, -97=Don't know, -99=Refused
QK7_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.** 1=True, 0=False, -97=Don't know, -99=Refused
	behaviour questions
QP2	**You mentioned that you have a current or savings account for your business. Can you tell me which of these statements best represents your situation?** (1) I use the same account for both my household and business finances; (2) I have separate accounts for my household and for my business, but I find it quite difficult to manage household and business finances separately; (3) I manage strictly separate accounts for my household and for my business; (-97) Don't know; (-98) Not applicable (does not have an account); (-99) Refused.
QP5	**Which of the following statements best describes how you made your most recent choice about a financial product or service for the business (e.g. current account, business loan, insurance policy, etc.)?** (1) I considered several options from different financial providers before making my decision; (2) I considered the various options from one financial provider; (3) I didn't consider any other options at all; (4) I looked around but there were no other options to consider; (-97) Don't know; (-98) Not applicable (no product indicated in QP5); (-99) Refused.
QM3	**How do you keep track of the financial records of the business?** (1) In electronic format (e.g. MS Excel or dedicated software) ; (2) In paper form (e.g. noting them in a notebook; keeping receipts and invoices); (3) I keep track of financial records in my head; (4) Someone else does it for me (e.g. an accountant); (5) In another way; (6) I do not usually keep track; (-97) Don't know; (-99) Refused.
QM4	**Have you thought about how you will fund your own retirement or maintain yourself when you will no longer work due to old age?** (1) Yes; (0) No / Not yet; (-97) Don't know; (-99) Refused.
QM6	**Imagine that tomorrow you discover that most of the equipment that you need to operate the business has been stolen (it could be computers, vehicles or other equipment). Which one of these statements best represents what you would do?** (1) I would use money that my business has set aside for emergencies; (2) I would claim insurance on all or part of the equipment; (3) I would take a loan to buy new equipment; (4) I would use some personal or household funds; (5) I would ask family members or friends to lend me money or equipment; (6) I would stop my business temporarily or for good; (7) I don't know, I have never thought about how I would cope; (8) Other: specify [register what]; (-97) Don't know; (-99) Refused.
QM7_1	**I keep secure data and information about the business.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
QM7_2	**I compare the cost of different sources of finance for the business.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
QM7_3	**I forecast the profitability of the business regularly.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
QM7_4	**I adjust my planning according to the changes in economic factors.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
	attitudes (c)
QK2_1	**I set long financial goals for the business and strive to achieve them.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
QK2_2	**I am confident to approach banks and external investors to obtain business finance.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.
QK2_4	**I prefer to follow my instinct rather than make detailed financial plans for my business.** 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree; -97 = Don't know; -99 = Refused.

Notes: The questions are drawn from the questionnaire developed by OECD-INFE, available at : https://www.oecd.org/financial/education/2020-survey-to-measure-msme-financial-literacy.pdf; each question is associated to a code for reference purposes (first column); (a) The financial knowledge score is the sum of correct responses; (b) The financial behaviour score is the count of "financially savvy" behaviours, ranging between 0 and 9; (c) The financial attitudes score is the count of "financially savvy" attitudes, ranging between 0 and 3.

Table 3 – Questions about engagement in digital activities

	Thinking about the period before the COVID-19 pandemic, at the end of 2019, did you have or did you do any of the following things? (QX2)	**… and thinking about now, do you have, or have recently done, any of the following things? (QX3)**
QX(2,3)_1	Have a dedicated website to showcase the products or services of the business. *1=Yes, 0=No, -97=Don't know 98= Not applicable 99=Refused.*	
QX(2,3)_2	Have a dedicated website to sell the products or services of the business. *1=Yes, 0=No, -97=Don't know 98= Not applicable 99=Refused.*	
QX(2,3)_3	Have opened a bank account completely online. *1=Yes, 0=No, -97=Don't know 98= Not applicable 99=Refused.*	
QX(2,3)_4	Have signed a financing contract (e.g. a bank loan) completely online. *1=Yes, 0=No, -97=Don't know 98= Not applicable 99=Refused.*	
QX(2,3)_4	Have signed an insurance contract completely online. *1=Yes, 0=No, -97=Don't know 98= Not applicable 99=Refused.*	

Notes: The questions are drawn from the questionnaire developed by OECD-INFE, available at : https://www.oecd.org/financial/education/2020-survey-to-measure-msme-financial-literacy.pdf; each question is associated to a code for reference purposes (first column).

Table 4 - Financial knowledge, financial behavior and financial attitudes average scores– Financial literacy by firm and entrepreneur characteristics

		financial literacy (1)	financial knowledge (2)	financial behaviour (2)	financial attitudes (2)
gender	male	2.2	0.7	0.8	0.7
	female	2.1	0.7	0.8	0.6
number of employees	1 employee	1.9	0.7	0.7	0.6
	2-4 employees	2.1	0.7	0.8	0.6
	5-9 employees	2.3	0.7	0.8	0.7
sector	A. agriculture, forestry and fishing	2.1	0.7	0.7	0.7
	C. manufacturing	2.0	0.7	0.8	0.6
	F. construction	2.1	0.7	0.8	0.6
	G. wholesale and retail trade; repair of motor vehicles and motorcycles	2.2	0.7	0.8	0.7
	H. transporting and storage	1.9	0.6	0.7	0.6
	I. accommodation and food service activities	2.0	0.7	0.8	0.6
	J. information and communication	2.2	0.8	0.8	0.6
	LN. Real estate activities; Administrative and support service activities	2.1	0.7	0.8	0.7
	M. professional, scientific and technical activities	2.3	0.8	0.8	0.7
	PQRS. Education; Human health and other services activities	2.0	0.7	0.7	0.6
legal form	limited liability companies	2.2	0.7	0.8	0.7
	partnerships	2.0	0.7	0.7	0.6
experience (over 10 years)	no	2.1	0.7	0.8	0.6
	yes	2.2	0.7	0.8	0.7
essential sectors	no	2.1	0.7	0.8	0.6
	yes	2.2	0.7	0.8	0.7
entrepreneur's education	primary school or no formal education (dummy)	1.7	0.5	0.7	0.4
	lower secondary school (dummy)	2.0	0.6	0.7	0.6
	upper secondary school (dummy)	2.1	0.7	0.8	0.6
	university level education or post graduate (dum	2.3	0.8	0.8	0.7
area	North-west	2.2	0.7	0.8	0.7
	North-east	2.2	0.7	0.8	0.7
	Centre	2.1	0.7	0.8	0.6
	South and Islands	2.1	0.7	0.8	0.6
age (over 40)	no	2.1	0.7	0.8	0.6
	yes	2.2	0.7	0.8	0.6
total		2.2	0.7	0.8	0.6

Notes: (1) Weighted financial literacy score, where each of the three components (knowledge, behaviour, attitudes) is given an equal importance. The score ranges from 0 to 3. - (2) The score ranges from 0 to 1.

Table 5 – Relationships between financial literacy and firm/entrepreneur characteristics: OLS regressions

VARIABLES	financial literacy	financial knowledge	financial behaviour	financial attitudes
female	-0.0411	-0.00790	-0.0155*	-0.0177
	(0.0262)	(0.0135)	(0.00897)	(0.0139)
2-4 employees	0.177***	0.0520**	0.0664***	0.0587**
	(0.0502)	(0.0232)	(0.0168)	(0.0235)
5-9 employees	0.269***	0.0601***	0.102***	0.106***
	(0.0490)	(0.0233)	(0.0171)	(0.0258)
A. agriculture, forestry and fishing	0.133**	0.0166	0.0106	0.106**
	(0.0671)	(0.0349)	(0.0215)	(0.0429)
F. construction	0.0218	0.0287	0.00213	-0.00903
	(0.0597)	(0.0290)	(0.0197)	(0.0395)
G. wholesale and retail trade; repair of motor vehicles and motorcycles	0.152***	0.0336	0.0569***	0.0612**
	(0.0527)	(0.0271)	(0.0175)	(0.0305)
H. transporting and storage	-0.137	-0.0977*	-0.0336	-0.00574
	(0.112)	(0.0525)	(0.0333)	(0.0550)
I. accommodation and food service activities	0.0616	0.0160	0.0350	0.0106
	(0.0653)	(0.0328)	(0.0216)	(0.0351)
J. information and communication	0.122	0.0923**	0.0277	0.00170
	(0.0806)	(0.0374)	(0.0315)	(0.0468)
LN. Real estate activities; Administrative and support service activities	0.0556	0.0311	-0.00860	0.0330
	(0.0631)	(0.0290)	(0.0233)	(0.0401)
M. professional, scientific and technical activities	0.136**	0.0560**	0.0235	0.0561*
	(0.0529)	(0.0274)	(0.0172)	(0.0331)
PQRS. Education; Human health and other services activities	0.0327	-0.000637	0.00296	0.0304
	(0.0594)	(0.0295)	(0.0196)	(0.0341)
lower secondary school	0.319**	0.0921	0.0679*	0.159**
	(0.127)	(0.0659)	(0.0361)	(0.0660)
upper secondary school	0.455***	0.167***	0.102***	0.186***
	(0.119)	(0.0633)	(0.0341)	(0.0639)
university level educ or more	0.612***	0.210***	0.145***	0.257***
	(0.122)	(0.0648)	(0.0349)	(0.0636)
experience	0.0576**	0.0343**	0.0116	0.0118
	(0.0287)	(0.0145)	(0.0103)	(0.0130)
age	0.0455	0.0360**	0.0142	-0.00472
	(0.0335)	(0.0174)	(0.0112)	(0.0205)
essential sectors	0.0163	0.00844	0.00833	-0.000521
	(0.0273)	(0.0137)	(0.00898)	(0.0177)
partnerships	-0.119***	-0.0129	-0.0404***	-0.0653***
	(0.0288)	(0.0131)	(0.00977)	(0.0171)
area (4)	yes	yes	yes	yes
Constant	1.348***	0.430***	0.566***	0.351***
	(0.139)	(0.0726)	(0.0406)	(0.0762)
Observations	1998	1998	1998	1998
R-squared	0.115	0.060	0.114	0.065

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise.

Table 6 – Relationships between digital engagement before the pandemic and firm/entrepreneur characteristics: OLS regressions

VARIABLES	digital engagement score (1)	digital engagement binary indicator (2)
female	-0.0204	0.000896
	(0.0612)	(0.0224)
2-4 employees	0.170*	0.0659*
	(0.0986)	(0.0351)
5-9 employees	0.387***	0.135***
	(0.113)	(0.0423)
lower secondary school	0.194	0.0279
	(0.379)	(0.103)
upper secondary school	0.427	0.134
	(0.394)	(0.103)
university level educ or more	0.647*	0.197**
	(0.382)	(0.0990)
experience	0.201***	0.0438
	(0.0673)	(0.0269)
age	-0.210**	-0.0688**
	(0.0823)	(0.0310)
essential sectors	0.0666	0.0412
	(0.0786)	(0.0314)
partnerships	-0.200***	-0.0598**
	(0.0724)	(0.0252)
sectors (10)	yes	yes
area (4)	yes	yes
Constant	0.896*	0.233*
	(0.459)	(0.133)
Observations	1998	1998
R-squared	0.060	0.057

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise. (1) The dependent variable is a score, measured before the pandemic, ranging from 0 to 5. - (2) Linear probability model. The dependent variable is a binary indicator equal to 1 if the digital score measured before the pandemic is greather than 1 and 0 otherwise.

Table 7 – Firm-level dependent variables

	mean	standard deviation	p25	p50	p75	no. of obs
Financial literacy score	2.15	0.57	1.8	2.2	2.6	1998
Financial knowledge score	0.72	0.27	0.6	0.8	1.0	1998
Financial behaviour score	0.78	0.19	0.7	0.8	0.9	1998
Financial attitudes score	0.65	0.31	0.3	0.7	1.0	1998
Digital engagement score (measured before the pandemic)	1.66	1.37	1	1	3	1998
Digital engagement binary indicator (measured before the pandemicy)	0.50	0.50	0	0	1	1998
Binary indicator of digital switch during the pandemic (1)	0.16	0.37	0	0	0	1794
Binary indicator of digital switch during the pandemic (financial digital activities only) (2)	0.11	0.31	0	0	0	1842
Binary indicator of digital switch during the pandemic (commercial digital activities only) (3)	0.09	0.28	0	0	0	1503
Profits decrease during the pandemic (dummy)	0.66	0.47	0	1	1	1998
Liquidity decrease during the pandemic (dummy)	0.54	0.50	0	1	1	1998
Number of employees decrease during the pandemic (dummy)	0.26	0.44	0	0	1	1998
Overall negative impact of the pandemic (dummy)	0.60	0.49	0	1	1	1998
Used government measures during the pandemic (dummy)	0.83	0.37	1	1	1	1998
Used available liquidity to cover cash needs during the pandemic (4)	0.45	0.50	0	0	1	967
Paid staff, taxes or loan repayments late to cover cash needs during the pandemic (4)	0.18	0.39	0	0	0	967
Suspended the business temporarily or for good to cover cash needs during the pandemic (4)	0.17	0.38	0	0	0	967

Notes: (1) Firms with an overall digital engagement score lower than 4 out of 5 before the pandemic.- (2) Firms with an digital engagement score in financial activities lower than 3 out ot 3 before the pandemic. - (3) Firms with an digital engagement score in commercial activities lower than 2 out ot 2 before the pandemic. - (4) Firms that experienced a cash shortage during the pandemic.

Table 8 – Digitalization switch during the pandemic and firm characteristics: OLS regressions

VARIABLES	**Binary indicator of digital switch during the pandemic** (1)	**Binary indicator of digital switch during the pandemic (financial digital activities only)** (2)	**Binary indicator of digital switch during the pandemic (commercial digital activities only)** (3)
FL score	0.0280**	0.0205*	0.0158
	(0.0140)	(0.0116)	(0.0114)
2-4 empl	0.0360	0.0159	0.0370*
	(0.0270)	(0.0242)	(0.0222)
5-9 empl	0.0163	-0.00168	0.0214
	(0.0278)	(0.0242)	(0.0239)
lower secondary school	0.0601	0.0518	-0.0193
	(0.0650)	(0.0469)	(0.0626)
upper secondary school	0.0576	0.0636	-0.0281
	(0.0628)	(0.0456)	(0.0605)
university level educ or more	0.0631	0.0589	-0.00964
	(0.0638)	(0.0469)	(0.0616)
experience	-0.0186	-0.0108	-0.0107
	(0.0220)	(0.0193)	(0.0179)
female	-0.00623	-0.00168	0.00723
	(0.0213)	(0.0174)	(0.0189)
age	-0.0438*	-0.0150	-0.0413*
	(0.0265)	(0.0225)	(0.0228)
essential sectors	-0.00123	-0.0121	0.00713
	(0.0218)	(0.0171)	(0.0173)
partnerships	-0.0382**	-0.0104	-0.0508***
	(0.0191)	(0.0162)	(0.0170)
sectors (10)	yes	yes	yes
area (4)	yes	yes	yes
Constant	0.129	0.0112	0.172**
	(0.0837)	(0.0607)	(0.0761)
Observations	1794	1842	1503
R-squared	0.025	0.021	0.030

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise. (1) Firms with an overall digital engagement score lower than 4 out of 5 before the pandemic.- (2) Firms with an digital engagement score in financial activities lower than 3 out of 3 before the pandemic.- (3) Firms with an digital engagement score in commercial activities lower than 2 out of 2 before the pandemic.

Table 9 – Digitalization switch during the pandemic and firm characteristics – Robustness exercises: OLS regressions

VARIABLES	**digitalization during the pandemic** (1)	**digitalization during the pandemic (financial digital activities only)** (1)	**digitalization during the pandemic (commercial digital activities only)** (1)	**digital switch during the pandemic** (2)	**digital switch during the pandemic (financial digital activities only)** (2)	**digital switch during the pandemic (commercial digital activities only)** (2)
FL_score	0.0505*	0.0364**	0.0142	0.0464**	0.0222	0.0263*
	(0.0268)	(0.0183)	(0.0160)	(0.0213)	(0.0148)	(0.0142)
2-4 employees	0.0778	0.0219	0.0559*	0.0295	0.0120	0.0362
	(0.0508)	(0.0339)	(0.0319)	(0.0430)	(0.0325)	(0.0240)
5-9 employees	0.0429	0.00818	0.0347	0.0120	-0.0142	0.0567**
	(0.0510)	(0.0349)	(0.0328)	(0.0456)	(0.0322)	(0.0287)
lower secondary school	0.0830	0.0526	0.0304	-0.0187	0.0454	-0.0687
	(0.149)	(0.0488)	(0.117)	(0.108)	(0.0683)	(0.0840)
upper secondary school	0.0699	0.0703	-0.000355	-0.0307	0.0125	-0.0606
	(0.146)	(0.0455)	(0.114)	(0.105)	(0.0668)	(0.0821)
university level educ or more	0.0643	0.0630	0.00130	-0.0259	-0.00891	-0.0647
	(0.147)	(0.0483)	(0.114)	(0.109)	(0.0667)	(0.0836)
experience (10 yrs at least)	-0.0433	-0.0269	-0.0164	-0.0476	-0.0218	-0.0319
	(0.0326)	(0.0242)	(0.0220)	(0.0356)	(0.0214)	(0.0235)
female	0.00594	-0.00896	0.0149	-0.00866	-0.0202	0.00956
	(0.0347)	(0.0229)	(0.0215)	(0.0334)	(0.0186)	(0.0235)
age over 40 years	-0.0733*	0.000720	-0.0741***	-0.0351	-0.0280	-0.0372
	(0.0418)	(0.0317)	(0.0261)	(0.0485)	(0.0283)	(0.0303)
essential sectors	-0.0503	-0.0562**	0.00586	0.0508	-0.0144	0.0199
	(0.0347)	(0.0239)	(0.0220)	(0.0381)	(0.0216)	(0.0265)
partnerships	-0.0688**	-0.00797	-0.0608***	-0.0578*	0.0145	-0.0650***
	(0.0333)	(0.0224)	(0.0229)	(0.0321)	(0.0201)	(0.0233)
sectors (10)	yes	yes	yes	yes	yes	yes
area (4)	yes	yes	yes	yes	yes	yes
Constant	0.197	0.0319	0.165	0.0807	0.0479	0.134
	(0.169)	(0.0760)	(0.130)	(0.147)	(0.0814)	(0.0978)
Observations	1998	1998	1998	489	884	911
R-squared	0.022	0.017	0.021	0.059	0.031	0.041

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise.- (1) The dependent variable is the difference in the number of digital activities that the entrepreneur engaged in during the pandemic and that she engaged in before the pandemic. - (2) The dependent variable is a binary variable taking value one if the firms engaged at least in one digital activity during the pandemic and zero otherwise. Sample of firms that did not engage in any (financial, or commercial) digital activity before the pandemic.

Table 10 – Financial literacy and consequences of the pandemic: OLS regressions

VARIABLES	Profits decrease during the pandemic (1)	Liquidity decrease during the pandemic (1)	Number of employees decrease during the pandemic (1)	Overall negative impact of the pandemic (2)
FL score	-0.0570***	-0.0652***	-0.0282	-0.0465**
	(0.0184)	(0.0206)	(0.0189)	(0.0201)
2-4 employees	0.0373	-0.00471	-0.0234	0.0330
	(0.0342)	(0.0397)	(0.0350)	(0.0352)
5-9 employees	-0.0306	-0.0748*	-0.126***	-0.0311
	(0.0350)	(0.0418)	(0.0349)	(0.0364)
lower secondary school	0.0566	0.0539	0.0387	0.0282
	(0.0910)	(0.103)	(0.0984)	(0.0888)
upper secondary school	0.0289	0.0122	-0.00220	-0.0180
	(0.0888)	(0.0975)	(0.0954)	(0.0842)
university level educ or more	-0.0298	-0.00482	-0.0266	-0.0559
	(0.0905)	(0.100)	(0.0961)	(0.0880)
experience	-0.0144	-0.0184	-0.0161	-0.0158
	(0.0239)	(0.0239)	(0.0227)	(0.0242)
female	0.0107	0.0113	-0.0135	-0.0127
	(0.0242)	(0.0272)	(0.0216)	(0.0260)
age	0.0381	0.0458	-0.0195	0.0182
	(0.0290)	(0.0304)	(0.0266)	(0.0288)
essential sectors	-0.144***	-0.0957***	-0.0938***	-0.157***
	(0.0236)	(0.0238)	(0.0212)	(0.0251)
partnerships	-0.0264	-0.000278	-0.0545**	0.00844
	(0.0232)	(0.0231)	(0.0222)	(0.0241)
sectors (10)	yes	yes	yes	yes
area (4)	yes	yes	yes	yes
Constant	0.855***	0.706***	0.493***	0.815***
	(0.110)	(0.124)	(0.118)	(0.112)
Observations	1998	1998	1998	1998
R-squared	0.086	0.072	0.124	0.093

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise. - (1) Linear probability model. The dependent variable is a dummy taking value one if the firm experienced a decrease in profits, liquidity or employment, respectively, during the pandemic. - (2) Linear probability model. The dependent variable is a dummy taking value one if the overall impact of the pandemic was negative.

Table 11 – Financial literacy and tools to navigate the storm: OLS regressions

VARIABLES	Used government measures during the pandemic	Used available liquidity to cover cash needs during the pandemic (1)	Paid staff, taxes or loan repayments late to cover cash needs during the pandemic (1)	Suspended the business temporarily or for good to cover cash needs during the pandemic (1)
FL score	0.0484***	0.127***	-0.0663***	-0.0841***
	(0.0163)	(0.0279)	(0.0246)	(0.0257)
2-4 employees	0.0940***	0.00400	0.0243	-0.0352
	(0.0336)	(0.0511)	(0.0454)	(0.0409)
5-9 employees	0.0960***	0.0117	0.0118	-0.0296
	(0.0346)	(0.0532)	(0.0431)	(0.0412)
lower secondary school	0.214**	0.0230	-0.0708	0.115
	(0.0946)	(0.126)	(0.124)	(0.0792)
upper secondary school	0.240***	0.109	-0.138	0.149*
	(0.0928)	(0.121)	(0.115)	(0.0774)
university level educ or more	0.207**	0.105	-0.148	0.122
	(0.0946)	(0.122)	(0.119)	(0.0790)
experience	0.0520***	-0.00438	0.0172	-0.0449
	(0.0180)	(0.0392)	(0.0298)	(0.0280)
female	0.0363**	-0.0199	-0.0206	-0.0155
	(0.0174)	(0.0351)	(0.0270)	(0.0214)
age over 40 years	-0.0130	0.0611	-0.0503	0.0711**
	(0.0242)	(0.0403)	(0.0367)	(0.0317)
essential sectors	-0.0581***	-0.0172	0.0353	-0.0416
	(0.0172)	(0.0382)	(0.0258)	(0.0314)
partnerships	-0.0314	0.0401	-0.0932***	-0.0592**
	(0.0195)	(0.0402)	(0.0271)	(0.0287)
sectors (10)	yes	yes	yes	yes
area (4)	yes	yes	yes	yes
Constant	0.327***	0.0543	0.419***	0.285**
	(0.112)	(0.142)	(0.137)	(0.109)
Observations	1998	967	967	967
R-squared	0.062	0.038	0.054	0.073

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Linear probability model. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise. - (1) Sample of firms that experienced a cash shortage during the pandemic.

Table 12 – Digitalization before the pandemic and consequences of the pandemic: OLS regressions

VARIABLES	Profits decrease during the pandemic (1)	Liquidity decrease during the pandemic (1)	Number of employees decrease during the pandemic (1)	Overall negative impact of the pandemic (2)
digit score before the pandemic	0.0242	0.0300	0.0356	0.0353
digit score before the pandemic interacted with:	(0.0361)	(0.0381)	(0.0370)	(0.0376)
manufacturing	*-0.0408*	*-0.0269*	*-0.0145*	*-0.0456*
	(0.0422)	*(0.0442)*	*(0.0424)*	*(0.0441)*
construction	*-0.0609*	*-0.0430*	*-0.0548*	*-0.0376*
	(0.0428)	*(0.0449)*	*(0.0420)*	*(0.0433)*
wholesale and retail trade; repair of motor vehicles	*-0.0172*	*-0.0607*	*-0.0567*	*-0.0715**
and motorcycles	*(0.0376)*	*(0.0389)*	*(0.0362)*	*(0.0391)*
transporting and storage	*0.0170*	*0.0389*	*-0.0690*	*0.00354*
	(0.0449)	*(0.0518)*	*(0.0550)*	*(0.0477)*
accommodation and food service activities	*-0.000684*	*-0.0308*	*-0.0326*	*-0.0170*
	(0.0371)	*(0.0389)*	*(0.0421)*	*(0.0387)*
information and communication	*-0.0259*	*-0.0400*	*-0.0621*	*-0.0661*
	(0.0576)	*(0.0595)*	*(0.0385)*	*(0.0553)*
real estate activities; Administrative and support	*0.0447*	*-0.0117*	*-0.00133*	*0.0523*
service activities	*(0.0436)*	*(0.0510)*	*(0.0460)*	*(0.0430)*
professional, scientific and technical activities	*-0.0234*	*-0.0173*	*-0.0340*	*-0.0292*
	(0.0357)	*(0.0381)*	*(0.0358)*	*(0.0379)*
Education; Human health and social work	*-0.0187*	*0.00430*	*-0.0107*	*-0.00710*
activities; Arts, entertainment and recreation;	*(0.0395)*	*(0.0423)*	*(0.0398)*	*(0.0414)*
essential sectors	-0.149***	-0.125***	-0.136***	-0.196***
	(0.0372)	(0.0388)	(0.0364)	(0.0385)
essential sectors*digit score before the pandemic	0.00566	0.0152	0.0245	0.0200
	(0.0173)	(0.0177)	(0.0170)	(0.0178)
FL score	-0.0623***	-0.0686***	-0.0342*	-0.0547***
	(0.0184)	(0.0207)	(0.0189)	(0.0201)
entrepreneur and firm characteristics	yes	yes	yes	yes
sectors (10)	yes	yes	yes	yes
area (4)	yes	yes	yes	yes
Constant	0.846***	0.694***	0.493***	0.820***
	(0.116)	(0.133)	(0.129)	(0.123)
Observations	1998	1998	1998	1998
R-squared	0.092	0.079	0.132	0.107

Notes: Clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Experience is a dummy equal to one if the entrepreneur has at least ten years of experience and zero otherwise. Age is a dummy equal to one if the entrepreneur is at least 40 years old. Essential sector is a dummy equal to one for the firms belonging to essential sectors, which were exempted from the lockdown measures enacted in Italy in spring 2020, and zero otherwise. - (1) Linear probability model. The dependent variable is a dummy taking value one if the firm experienced a decrease in profits, liquidity or employment, respectively, during the pandemic. - (2) Linear probability model. The dependent variable is a dummy taking value one if the overall impact of the pandemic was negative.