RESEARCH PAPER

Women-led Firms and Credit Access. A Gendered Story?

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Abstract

This work focuses on credit access and demand in Italian firms using the RIL dataset, a sample representative of Italian firms, for the year 2015. We investigate whether the gender of the firm's decision-maker plays a role in requesting and obtaining a loan. Our results suggest that women are significantly less likely to ask for credit, while no significant differences in credit approval are found between the two genders. Moreover, the gender gap disappears for more educated women, as well as for firms in the north of the country.

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1 Introduction

> *"When I was concluding my studies in Law at university, I had an interview in a law firm in France. It went well, but at the end one of the interviewers told me that I would never become a partner. 'Why?' I asked. 'Because you are a woman, they replied'",* said Christine Lagarde, current President of the European Central Bank. *"[…] Times have been changed, but women still have many challenges to face. 'What was true in 1981 is unfortunately still true today […]'"*.[1]

Christine Lagarde's words strongly bring to mind an inequality that still afflicts our society. The gender gap is widespread all over the world, even if huge differences emerge among countries. Fortunately, many steps have been taken to reduce the distance between women and men in health, education, economics and politics, but to date, no country has yet achieved full gender parity. In 2019, the average Global Gender Gap score stood at 68%. This means that the remaining gap is 32%.

Among all the research fields that could be investigated to study the gender gap, we focus our attention on entrepreneurship and credit access and availability. Current data generally report a fairly common occurrence: female entrepreneurs are less likely to resort to external funds (Aspray and Cohoon 2007; Guzman and Kacperczyk 2019), including credit (Cole and Mehran 2018).

What could be the possible reasons for such a finding? These could lie on the demand side as well as on the supply side. In fact, on the one hand, women could simply ask for credit less frequently than men. But, on the other hand, if the supply channel is dominating, women would receive a rejection more often even though they do not differ from their male peers in their socioeconomic features or in their application rate. In a nutshell: do women receive less credit because they ask less frequently or because of their gender? Since both factors may play a role in explaining the phenomenon, it is crucial—from a policy point of view – to disentangle demand and supply side factors. Only by understanding the root causes of women's lower recourse to credit, in all its nuances, will it be possible to plan and implement effective corrective actions.

Our work aims to significantly contribute to the existing literature on the relationship between women and credit, using a unique dataset: the sample of the Employer and Employee Survey 2015 (Rilevazione su Imprese e Lavoro—RIL) conducted by the National Institute for the Analysis of Public Policies (INAPP—previously ISFOL).[2] The RIL is a nationally representative sample of over 29,000 partnerships and limited companies operating in the non-agricultural private sector in Italy. It is worth noting that our data structure allows us to properly address the issue of gender differences in credit access, analysing an ample and diversified sample of firms, some of which have applied for credit and some of which have not. Contrary to other papers that deal with gender bias and credit rationing using only a selection of male and female firms that asked for credit (Blanchflower et al. 2003; Bellucci et al. 2010), our sample helps us to better manage selection issues and disentangle the effect of the demand side factors

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[1] 'What Comes Next?' Commencement address by Christine Lagarde – Chestertown, Maryland – 20th May 2017. Available at https://www.imf.org/en/News/Articles/2017/05/20/sp052017-what-comes-next-commencement-address-lagarde

[2] More information on the dataset is given in Sect. 3.

and their supply side counterparts. In order to clearly identify which channel is at work in the credit access for women-led firms, we use two variables named 'credit demand' and 'credit approval', built on the basis of the answers of the 'decision maker' survey respondents. To the best of our knowledge, we are the first to use a sample that is fully representative of all firms, not only micro and small, to disentangle the two channels. We hence fill an important gap in the literature.

Aside from the merits of the available dataset, the interest of applying the analysis to the Italian case lies in the strong gender gap that still afflicts the country, making it a perfect environment in which to study the features of gender-related phenomena. Reverting to the aforementioned Global Gender Score, the top countries stand at 80%, while Italy lags behind at 63%, facing marked gender inequality particularly in the domains of power, time and work, where it has the lowest score of all EU member states.

The use of a dataset of Italian firms also offers the opportunity to analyse different cultural attitudes towards gender, given the heterogeneity of the country across regions, with the North exhibiting economic performances more similar to Northern Europe than the rest of Italy. We hence expect lower gender differences in firms located in the north of the country.

The country as a whole, with a low gender equality index, could represent fertile ground for potential discrimination in the supply channel. Instead, our results show that Italian firms led by women receive less credit because they sought it out less frequently than men, and not because they are rejected more often. In other words, only the demand channel is significant, while the supply channel does not exhibit any power in practically altering the outcome of the loan application. This result is in line with the finding of Ongena and Popov (2016) and Cowling et al. (2019) but is reinforced by the representativeness of the sample.

Self-exclusion is, according to our results, the main reason why female entrepreneurs experience less access to credit, and not unfair conduct by the banking system. From a policy standpoint, the implications are neat and suggest that interventions should be targeted at entrepreneurs rather than bank officers to reduce the credit gaps.

A need clearly emerges to pursue financial education campaigns and policies to enhance female entrepreneurship, as well as training interventions designed to strengthen soft skills and women's self-confidence. Recalling Ms. Lagarde's words, women should learn how to overcome the fear of being bold and knock-on new doors along their journey.

The paper is structured as follows: in Sect. 2, we review the specific literature on the topic of gender discrimination in credit access. In Sect. 3, we present the database, the specific features of the sample and we provide the main descriptive statistics. Section 4 analyses the specification model, the empirical results and some extensions, as well as robustness checks. Finally, Sect. 5 draws conclusions, comments and the policy implications of our results.

2 Conceptual Framework and Literature Review

Small and medium businesses face more difficulties in accessing credit than larger firms. There is reasonably strong evidence supporting this statement and a rich literature exploring various factors underpinning these difficulties, such as the lack of transparency, lack of valuable collateral, higher riskiness and lower resilience in times of crisis (Berger and Udell 1995, 2002, 2006; Ferrando et al. 2012; Popov and Udell 2012; Cowan et al. 2015). More recently, the research focus has been moving to other factors that could have an impact on Small and Medium Enterprises' (hereafter SME) access to credit, such as culture and ethnicity (Carter et al. 2015; Mishra and Tripathi 2017; Jurik et al. 2019, Li et al. 2020), religion (Cao et al. 2019; Matto and Niskanen 2019) and the gender of the decision-maker. Regarding gender, a few papers have explored whether SMEs led by women access credit on an equal footing as those led by men, both in terms of volume and cost (Mascia and Rossi 2017; Moro et al. 2017; Galli et al. 2020). The evidence remains somewhat controversial, even though a considerable number of papers show that women-led SMEs tend to face extra difficulties in accessing bank loans (Mascia and Rossi 2017). The issue is complex, and gender may play a role at various levels and from different viewpoints.

First of all, in order to receive credit, it is necessary to apply for it. There is evidence that women apply for loans less often than men do, and similar evidence emerges when comparing women-led SMEs with men-led ones. This lesser usage of credit would be compensated for by a wider reliance on proprietary funds and trade credit (Coleman 2000; Ongena and Popov 2016; Moro et al. 2017; Galli et al. 2020; Cowling et al. 2012). Leaving the mainstream literature, Stefani and Vacca (2013) maintain that the evidence of a lower application rate by women-led SMEs does not hold true when controlling more attentively for firm-specific features.

In the next step of the process, after having applied, the borrower can only receive a loan if the application is not rejected. There is some evidence that women-led firms are rejected more often than men-led firms do, even though the empirical results are more controversial regarding this point of view (Asiedu et al. 2012; Bellucci et al. 2010; Cowling et al. 2019; Galli et al. 2020; Cesaroni et al. 2013; Blanchflower et al. 2003; Asiedu et al. 2012; Cavalluzzo and Cavalluzzo 1998; Stefani and Vacca 2013; Ongena and Popov 2016; Aristei and Gallo 2016).

A final level of analysis concerns the cost of credit, which is not addressed in this paper due to unavailable data. The evidence of gender-related discrimination concerning the economic conditions of credit when granted is somewhat controversial. Muravyev et al. (2009) found evidence that women-led firms were less likely to obtain credit and paid a higher interest rate when their loan application was approved. Alesina et al. (2013), using a database of Italian companies, found evidence that micro-companies managed by women paid more for overdraft facilities. The higher cost of credit still holds true when controlling for the level of risk and for specific features of local credit markets. Mascia and Rossi (2017) not only found worse credit conditions for women-led SMEs in Europe, but also highlighted a worsening of the cost of credit in the case of a leadership change from men to women. Other papers, on the contrary,

Table 1 Women-led SME firms and access to bank credit – Main references

Authors, year of publication	Lower demand	Higher rejection	Higher cost
Cavalluzzo and Cavalluzzo (1998)	No	No	No
Coleman (2000)	Yes	No	Yes
Blanchflower et al. (2003)	N/A	No	No
Alesina et al. (2013)	N/A	N/A	Yes
Muravyev et al. (2009)	N/A	Yes	Yes
Bellucci et al. (2010)	N/A	Yes	No
Asiedu et al. (2012)	N/A	Yes	Yes
Cowling et al. (2012)	Yes	No	N/A
Cesaroni et al. (2013)	N/A	Yes	N/A
Stefani and Vacca (2013)	No	No	N/A
Ongena and Popov (2016)	Yes	No	No
Mascia and Rossi (2017)	N/A	N/A	Yes
Moro et al. (2017)	Yes	No	N/A
Cowling et al. (2019)	Yes	No	N/A
Galli et al. (2020)	Yes	No	N/A

N/A stands for "not applicable"

maintain that the economic terms applied to credit are not correlated to gender (Cavalluzzo and Cavalluzzo 1998; Blanchflower et al. 2003; Bellucci et al. 2010; Ongena and Popov 2016).

To have a clearer framework, Table 1 synoptically summarises the literature on the topic in relation to the three issues discussed. For each paper, we indicate whether a particular aspect is addressed and whether evidence of discrimination against women-led firms emerges.

Before moving on to the details of our analysis, it is vital to clarify the potential root causes of the previously described gender-related differences in access to credit. In fact, these potential explanations are the basis for the controls we include in our models. In particular, it is important to distinguish supply-side factors from demand-side factors.

Looking at the supply side, the issue may arise from a reluctance of banks and financial intermediaries to finance SMEs run by women, assuming a similar magnitude of credit demand. Due to cultural reasons and gender bias, bankers could trust these companies less than those in which the reins are in the hands of men and consequently could reject a higher percentage of applications and apply worse economic conditions

and more stringent contractual clauses, including the request for more collateral. Bellucci et al. (2010) reveal that female entrepreneurs face more difficulties in obtaining credit and this evidence holds true when controlling for a rich set of information on the firm and for unobservable individual factors. Aristei and Gallo (2016), in their empirical analysis over a large set of transitional countries, confirm that differences in credit rationing probability against women-led SMEs are not fully explained by firms' observed features or the institutional context, but can be interpreted as being related to gender-based discrimination in credit markets.

Alternatively, the supply side constraint could be related to the prevalent features of the small firms run by women. Descriptive evidence demonstrates that women-led companies tend to be smaller and are concentrated in commercial and service sectors. The reluctance of bankers would then derive from the higher perceived financial and economic riskiness of the companies run by women and not from a lack of trust in their leader. If this is the case, the evidence of discrimination should disappear when controlling for firm-specific features, with particular reference to the size of the firm and the business sector.

Investigating the demand side, the phenomenon may purely originate from a lower request for credit coming from women-led firms, assuming neutrality from banks and financial intermediaries in their underwriting policies.

This lower level of credit demand could originate from women's lack of self-confidence. This, in turn, would manifest through self-selection and an opt-out from loan application processes. In other words, women would act as discouraged borrowers, not asking for loans because they are convinced they would be denied if they did so, even when this is not really the case. This reluctance could vary with the education level of the decision-maker.

Alternatively, the lower level of credit demand could originate from women's risk aversion, which would limit the use of leverage and encourage a wider reliance on self-financing. Numerous papers analyse this aspect and evidence that women tend to be more prudent in both their managerial behaviour and risk-taking strategies (Powell and Ansic 1997; Byrnes et al. 1999; Barber and Odean 2001; Eckel and Grossman 2008; Croson and Gneezy 2009; Hsieh et al. 2017). Interestingly, Bellucci et al. (2010) identified that women are more prudent not only when requesting loans but also when granting loans: in fact, female employees in banks display a more cautious underwriting attitude compared to their male colleagues, especially when analysing funding requests coming from start-ups and young firms.

Women often exhibit more prudent behaviour not only in their financial decisions but also in their entrepreneurial intentions. Dawson and Henley (2015) found that, due to higher risk aversion, young female students in Europe are less interested in starting up a new business compared to their male classmates, thus showing lower entrepreneurial spirit. Yacus et al. (2019) explore financial strategies in high-growth firms and recognised that those run by women are more likely to use equity funding instead of debt financing. McGowan et al. (2015) maintain that women's business ambitions are frustrated by a mix of social and human capital factors, namely their business and personal network combined with their socio-demographic characteristics, skills and knowledge. On the contrary, Meoli et al. (2020) failed to discover any specific

gender impact on entrepreneurial intentions, but did find a more generic potentially discouraging effect related to environmental influences.

Our paper aims to disentangle demand factors (women applying less often) from supply factors (women being refused more often). Since our sample is fully representative of all Italian firms, it allows us to break down data by several dimensions such as firm size and age, regional location, ownership and governance structure and education of the decision maker. By doing so, we can better control whether the opt-out phenomenon is still discernible in different types of firms.

From the point of view of specific personal features of the decision-maker, we test the interaction between gender and education—used as a proxy of financial literacy[3]—on the likelihood of applying for a loan. We expect the culture-determined reluctance towards loan applications to be negatively correlated to education.

We check whether belonging to a multinational group affects women-led firms' approach to credit. On the one hand, the exposure to an international environment could lower any culturally inherited barriers and enhance women's willingness to request bank financing. On the other hand, being aware that gender bias is higher in Southern Mediterranean countries, such as Italy, female managers could be more reluctant to approach their local banking system and instead rely on intra-group transfers to benefit from better financing conditions and easier access to funding.

We also control for other features of the firms managed by women that may encourage or discourage the demand for loans by affecting their risk profile and need for bank capital. A list of the regressors and their explanations is provided in Table A7. Important aspects to consider in this regard are the age of the company, the sector and the profitability. Finally, we also include regional dummies to capture any local differences in credit offers, macroeconomic environment and intensity of gender bias.

Finally, through the implementation of a rigorous Heckman test we aim to exclude a potential selection bias whereby women-led firms request fewer loans and/or are denied credit more frequently because they are intrinsically riskier. The test we perform and the way we perform it distinguish our work from the extant literature, reinforcing the conclusions that we reach.

3 Data and Methodology

3.1 Data and Descriptive Statistics

Our empirical analysis is performed using data drawn from the firm level sample of the Employer and Employee Survey (Rilevazione su Imprese e Lavoro—RIL).[4] The survey was conducted by the National Institute for the Analysis of Public Policies (INAPP—previously ISFOL) in 2015. The RIL sample is representative at the national level and covers over 29,000 partnerships and limited companies operating in the non-agricultural private sector in Italy.

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[3] The importance of financial literacy in being more successful in obtaining credit has been assessed in the UK with reference to small firms (Hussain et al., 2018).

[4] The dataset was downloaded from INAPP website, after sending a request with the research proposal.

The RIL dataset provides rich detail on firm features, which are essential to our analysis, containing information on the firm structure, as well as on the features of the firm leader. Regarding the information given at the firm level, the survey supplied the number of employees, the revenue level, whether the firm belonged to a group and other workplace characteristics. It also includes firm decision-makers' demographics, such as the level of education, as well as age brackets and gender. For our purpose, the RIL has the advantage of including the characteristics of the person responsible for the firm, in addition to a number of investment channel strategies, such as having requested credit to fund investments; the key variable of our analysis. Regarding the sample selection, we only consider 'active' firms, meaning that we exclude wound-up or bankrupt firms, giving a final sample of 29,789 observations.

As mentioned in the introduction, this dataset allows us to concentrate our attention not only on small and medium firms but also on large ones, facilitating the observation of the distribution of firm size and age, highlighting (potential) gender differences.

Firm size is measured in terms of employees to categorise enterprises. Enterprises qualified as small, medium and large as follows:

- if a firm employs fewer than 50 persons, it falls into the small category;
- if a firm employs fewer than 250 persons but more than 50 persons, the firm falls into the medium-sized category;
- if a firm employs more than 250 persons, it falls into the large-sized category.

In our sample, women are decision-makers mainly in small or medium firms, managing around 21% and 7% of the total SMEs in our sample, respectively, as described in Table 2. Among large firms, the majority are led by men, limiting women-led large enterprises to less than 6% of the entire sample.

Such a marked gender difference slightly dims if we examine the age of the firm (Table 3). Female leadership counted for an average of 20% in all age categories. More precisely, both 'young' firms and 'medium aged' firms, meaning firms with less than 15 years and firms with between 15 and 30 years of activity, exhibit almost the same percentage of female decision-makers. This share drops slightly in older firms. Overall, firm distribution by age does not highlight a significant gender gap among firm ages; indeed, women are obviously under-represented as enterprise decision-makers, but their weight is almost constant despite the length of time the business has been running.

Table 2 Firm size and gender of decision-maker

Firm size	Male leadership	Female leadership
Small firm	78.90	21.10
Medium firm	92.84	7.16
Large firm	93.69	6.31

Source: Own elaboration on RIL data. Weighted summary statistics. Total number of firms: 23,218 (18,379 are men led and 4839 are women led). In detail, there are 22,800 small firms, 365 medium firms and 53 large firms. Cells indicate the percentage of firms, for each category, where the leader is a man (first column) versus a woman (second column)

Table 3 Firm age brackets and gender of decision-maker

Firm age brackets	Man led firm (%)	Woman led firm (%)
Firm age < 15 years	78.69	21.31
Firm age > 15 and < 30 years	76.70	23.30
Firm age > 30 years	84.29	15.71

Source: Own elaboration on RIL data. Weighted summary statistics. Total number of firms: 23,218 (18,379 are men led and 4839 are women led). In detail, there are 7307 firms whose age of activity lies below 15 years, 10,313 whose age of activity lies between 15 and 30 years, and 5598 whose age of activity is above 30 years

We then explored gender differences in leadership across regions, since regional economic, social and cultural disparities in Italy have been deeply rooted in the past. Table 4 presents data both in terms of macro-areas—North West, North East, Centre, South and Islands—and regions. On average, women-led firms are distributed homogeneously across the national territory, equal to a mean value of 21%, with the only exception being the South area in which the percentage decreases to around 18%. Differences emerge at the regional level. Women lead more businesses in two Northern regions, Valle D'Aosta and Trentino Alto Adige, which are the only zones where the percentage exceeded 30%. On the contrary, Campania and Marche, located in the Centre of Italy, exhibit the lowest share of female firms, comprising over 10%.

To give a better representation of the heterogeneity of behaviour across macro areas in Italy, we present a geographical illustration of the disparities across regions with the most relevant economic indicators, as well as our dependent variables: access to credit and the amount obtained highlighting the regional differences of the country. The data show that, on average, in the South area decision-makers ask for less and consequently get less (Fig. 1[5]) credit. A similar pattern can be detected with reference to the GDP per capita in 2015 (Fig. 2) of the Italian regions. Critical economic differences emerge between the Northern and Southern regions and these differences closely mirror the regional distribution of credit demand and approval. Figure 2 also maps women's employment rate over the Italian territory and once again the image shows a strong gap between the Northern and Southern regions, suggesting socio-cultural disparities go hand-in-hand with the different degree of economic development. Given the strong disparities in economic development across the macro areas, we also run estimates separately for each of them.

We further investigate gender differences in leadership, looking at women's educational level, which we use as a proxy of financial literacy. We believe that the higher the educational level, the more similar to men the women's behaviour in managing firms should be. Table 5 shows that as long as the education level increases, moving from middle/elementary school to university or higher, the percentage of women-led firms also increases.

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[5] All figures are reported in Appendix A.2.

Table 4 Gender differences in leadership across Italian regions

Region	Man led firm (%)	Woman led firm (%)
Piemonte	79.99	20.01
Valle D'Aosta	65.11	34.89
Lombardia	77.96	22.04
Liguria	75.22	24.78
North-West macro area	78.10	21.90
Trentino Alto Adige	69.68	30.32
Veneto	82.87	17.13
Friuli Venezia Giulia	76.07	23.93
Emilia Romagna	76.73	23.27
North-East macro area	78.67	21.33
Toscana	78.44	21.56
Umbria	76.57	23.43
Marche	86.84	13.16
Lazio	79.04	20.96
Abruzzo	78.75	21.25
Centre macro area	79.72	20.28
Molise	83.71	16.29
Campania	87.28	12.72
Puglia	78.14	21.86
Basilicata	78.02	21.98
Calabria	76.04	23.96
South macro area	82.08	17.92
Sicilia	78.78	21.22
Sardegna	74.64	25.36
Islands macro area	77.55	22.45

Source: Own elaboration on RIL data. Weighted summary statistics. Total number of firms: 23,218 (18,379 are men led and 4,839 are women led). In details, there are 7440 firms in the North-West (1,624 in Piemonte, 51 in Valle D'Aosta, 5168 in Lombardia, 597 in Liguria), 5443 in the North-East (455 in Trentino Alto Adige, 2300 in Veneto, 490 in Friuli Venezia Giulia, 2,198 in Emilia Romagna), 5,959 in the Centre (1986 in Toscana, 317 in Umbria, 732 in Marche, 2,487 in Lazio, 437 in Abruzzo), 2904 in the South (85 in Molise, 1431 in Campania, 968 in Puglia, 118 in Basilicata, 302 in Calabria), and 1472 in the Islands (1,034 in Sicilia, 438 in Sardegna)

Tables A8 and A9, in Appendix A, report the descriptive statistics; in the second table, we split the sample differentiating whether the decision-maker is a woman or a man so to highlight potential differences. Starting from the key variables on gender bias and credit demand, 16% of the sample firms requested credit, with a fairly successful acceptance rate equal to 87%. As far as the manager's gender is concerned, women run a small minority of firms; only 13% of the businesses in the sample. Turning to
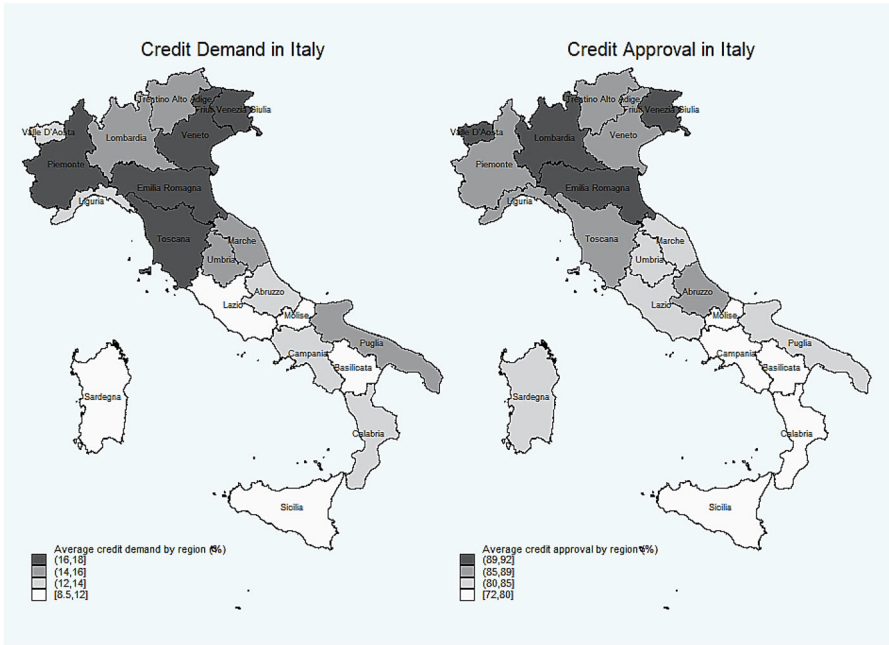
Fig. 1 Map of credit demand and credit approval in Italy. Notes: own elaboration on RIL data (2015)
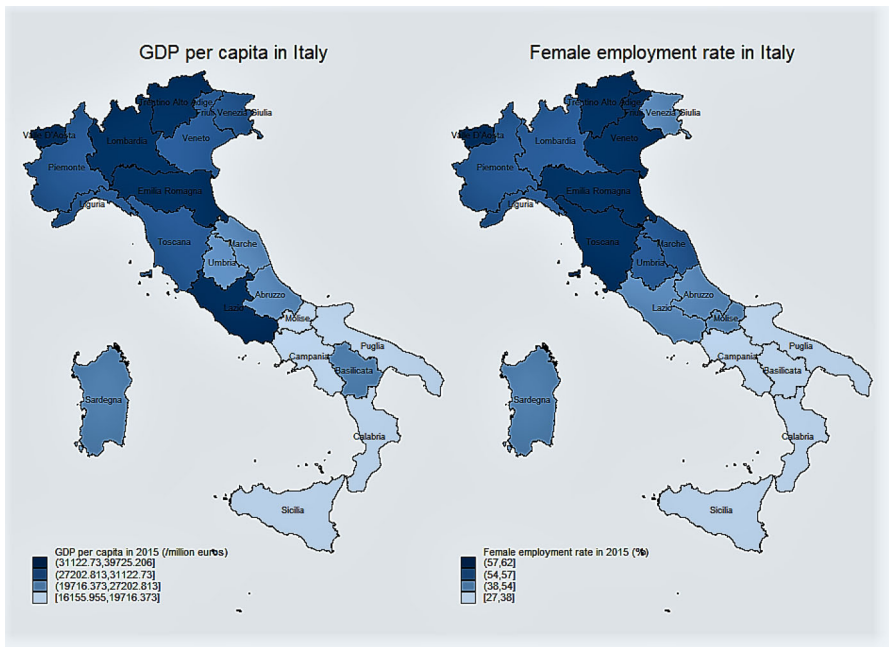

Fig. 2 Map of Italian GDP per capita and female employment rate in 2015. Notes: own elaboration on ISTAT data (2015). Gross Domestic Product at current market prices per inhabitant. 2015, current values in euro. Data are in million euros

Table 5 Gender differences in leadership by education

Education level	Man led firm (%)	Woman led firm (%)
University or higher	77.32	22.68
High school	79.51	20.49
Middle/Elementary School	80.20	19.80

Source: Own elaboration on RIL data. Weighted summary statistics. Total number of firms: 23,218 (18,379 are men led and 4839 are women led). In detail, there are 5396 firms whose decision-maker has an education equal to or higher than university level, 12,644 firms whose decision-maker has an education equal to high-school level and 5178 firms whose decision-maker has an education equal to middle/elementary school level

the firm characteristics, such as size, sector of business and geographical locations in Italy, it is noteworthy that Northern Italy is predominant.

In our sample, the average number of employees is 70, but the number ranges from zero to over 140,000, while the average firm revenue is around 37 million euros but climbs to a maximum of 191 trillion euros. Therefore, our analysis embraces all types of enterprises, spanning micro to large companies. Dimensions are clearly related to firm age, an average of 26 years old, suggesting that our sample reflects the credit needs and attitudes of more mature businesses. Focusing on the organisational structure, we look at whether a company belongs to a group or is independent. In line with the expectations, 86% of the sample is independent, while only 10% belong to a national group and 3% to a foreign one. Regarding the sector, construction and commerce is the largest—13% of firms—while all other sectors have almost equal weightings.

Moving to the main firm leader's characteristics, they can be summarised as follows. The average age is quite mature: almost 30% of entrepreneurs in the sample are more than 60 years old, while only 6% are less than 40. Consequently, more than half of business managers are concentrated around middle age. Such an age distribution is reflected in the education level. Seven out of ten entrepreneurs have at least a high school diploma, even if only three out of ten achieved a university degree or higher qualification. On the contrary, less-educated managers, i.e., middle/elementary school education level, represent only 20% of the sample.

Figure 3 reports information on credit demand and credit approval for men and women. Hence, the left side of Fig. 3 gives a picture of the relationship between credit attitude and gender. It shows that female entrepreneurs tend to ask for credit much less than their male peers. The younger the age of the firm, the weaker the demand for credit and the larger the gap between women and men. However, after many years of experience, growing a long credit and business history (more than 70 years in some cases), this credit gender relationship reverses its trend. Such evidence might suggest that women need time to increase their level of confidence, overcome their fears and believe in their creditworthiness. Figure 4 reports information on the age categories and gender of the main respondents of the firms. Despite the fact that only 13% of the entrepreneurs in the sample are women, it is interesting to note that the percentage
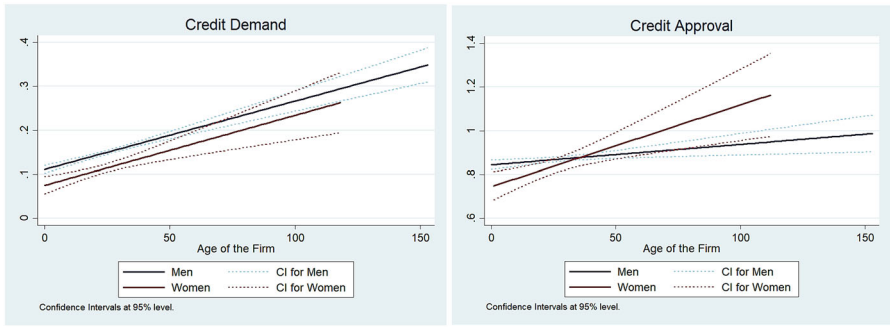
Fig. 3 Credit demand and approval. Notes: own elaboration on RIL data (2015)
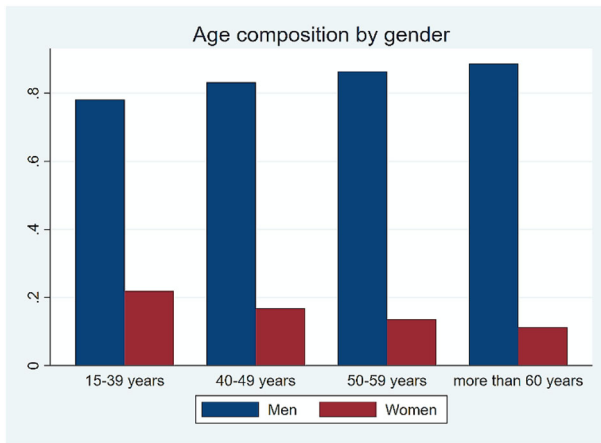
Fig. 4 Age composition by gender. Notes: own elaboration on RIL data (2015)

of male entrepreneurs increases as they get older, while the percentage of female entrepreneurs decreases. Therefore, our findings show that our female subsample is proportionally younger than the male one.

3.2 Empirical Strategy

The empirical strategy focuses on the drivers that might affect credit demand and credit approval; to do so, we have two different dichotomous dependent variables: 1) credit demand for investment, expressed as a binary variable that takes a value of one if there is a loan application during 2014, and zero otherwise; and 2) credit approval, a binary variable assuming a value of one if credit demand for investment is fully approved:

$$Credit\,Demand_f = \beta_0 + \beta_1 female_f + \beta_2 X_f + \epsilon_f, \tag{1}$$

$$CreditApproval_f = \theta_0 + \theta_1 female_f + \theta_2 X_f + \mu_f, \text{observedifCreditDemand} = 1,$$
(2)

where X is a set of regressors at the firm level, while other regressors are at the individual level, referring to the person who is responsible for making decisions, such as being female and possessing an education; these relate to the person responsible for the firm (manager, owner, or CEO).[6] The credit demand dependent variable is equal to one if the firm asked for credit to fund an investment. If the credit is given (in full), it is considered to be a credit success.[7] We estimate Eqs. 1) and 2) using a Probit model, with error terms clustered at the industry level,[8] given the binary nature of the variables of interest. As previously stated, the explanatory variables include the dummy variable female (the gender of the decision-maker of the firm), as well as the vector X for firm-specific variables, variables characterising the decision-maker of the firm and gender (as specified in the question described in the introduction).

The explanatory variables we use are listed as follows. We first start with the variables related to the decision-maker:

- *female*, the key variable which is equal to one if the gender of the decision-maker is female;
- dummy variables that captured the *age* of the decision-maker, which is given in a category in the dataset;
- *university or higher*: a dummy variable equal to one if the decision-maker has at least a degree. The educational level of the decision-maker is a variable of pivotal interest. We expect that higher education should be able to remove, or at least dilute, any obstacles to access the credit market;
- *owner*, a dummy variable equal to one if the decision-maker also owns the firm;
- *manager outside the firm*: a dummy variable equal to one if the manager does not own any part of the firm.

We then proceed to add the variables associated with the firm characteristics, which are subsequently listed:

- the *age of the firm* and its squared value. This variable should capture a different 'stability' and degree of being renowned by the local community, including its financial sector. As time passes, firms normally expand their network such as chambers of commerce, trade partners and financial intermediaries, therefore increasing their

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[6] For each firm, we asked who the responsible person was (i.e., who makes the strategic decisions). The possible answers were: 1) the owner/the family owner or CEO; 2) manager chosen within the firm; or 3) manager chosen outside the firm.

[7] In more detail, the questions exploited for our analysis were the following:

- In 2014, did your firm make a request for credit for investment? (with a binary response Yes/No as a possible answer);
- What has been the outcome of the request for credit for investment? (In this case, the interviewee has the possibility of answering 'Fully approved', 'Partially approved' or 'Not approved'.).

[8] We decided to cluster at industry level, which is the thinnest dimension available. We also tried alternative clustering, such as region, as suggested, results are almost identical.

visibility and reputation. Hence, we expect a positive impact of the age of the firm on the probability of obtaining credit;

- the size of the firm, proxied by the *revenues* (in log). The decision for credit is likely to be determined by how rooted the firm is in the local community. Larger firms could be better equipped to ask for credit and considered more solid and less risky in the financial market;
- a dummy variable equal to one if the firm is part of a *national group* and another dummy assuming a value of one if the firm belongs to a *foreign group*. Moving from an individual dimension to a collective one can lighten the weight of individuals and smooth out potential cultural discrimination. At the same time, belonging to a group can offer alternative funding sources to domestic bank credit.

Furthermore, we also control for several structural features of the firm, such as sector dummies and dummies for its legal status. Finally, we include regional dummies to capture any local differences in credit offers, macroeconomic environment and intensity of gender bias. One issue of concern could be the endogeneity feature of the female variable. A selection bias might have led to the leading position by making it possible to have an upward bias in the estimated coefficient. Controlling for the features of the goodness of the firms might partially alleviate this problem.

4 Empirical Results

4.1 Main Results

Probit regression results (marginal effects) are reported in Table 6. Turning to the main variable of interest, the gender of the firm leader, we find its significance exists only for credit demand (coefficient statistically significant at the 1% level) but no significant effect for credit approval; in particular, women-led firms have two percentage points lower probability of asking for credit than male-led ones. With respect to age, it is interesting to note that younger decision-makers, those of an age ranging between 15 to 39 years old, apply more compared to more experienced decision-makers; however, younger individuals have less chance of getting a loan application approved (almost six percentage points lower probability), likely due to the fact that they might be considered 'new' and still have to gain sufficient visibility and credibility in the financial market.

Indeed, demographic characteristics explain the credit demand, however, the gender effect remains significant, contrary to the findings of Stefani and Vacca (2013). This evidence suggests that the opt-out phenomenon is less intense in the younger decision-maker bracket than in the over-50 one. Several explanations can be offered in order to account for this differing behaviour. As previously pointed out, more experienced decision-makers might appear more credible to a financial institution. However, the higher denial rate associated with younger applicants may reflect either a gender bias or a riskier profile due to the young age of both the entrepreneur and the enterprise (Jovanovic 1982; Levenson and Willard 2000).[9]

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[9] One might argue that adding a continuous variable with binary outcomes could heavily drive the results in some way; however, we performed the regression using some categorical dummies for the age of the firm (which was continuous), but the results did not differ from previous ones.

Table 6 Credit Demand and Approval

	Credit demand	Credit approval
Decision-maker characteristics [+++]		
Female	− 0.0238***	− 0.0206
	(0.0065)	(0.0198)
15–39 years	0.0439***	− 0.0580***
	(0.0082)	(0.0201)
40–49 years	0.0213*	− 0.0026
	(0.0111)	(0.0127)
50–59 years	0.0086	− 0.0125
	(0.0101)	(0.0131)
University or higher	− 0.0014	− 0.0107
	(0.0073)	(0.0136)
Owner	0.0510***	− 0.0047
	(0.0063)	(0.0150)
Manager outside the firm	− 0.0070	− 0.0878*
	(0.0115)	(0.0526)
Firm characteristics		
Firm age	− 0.0004*	0.0001
	(0.0002)	(0.0007)
Firm age^2	0.0059*	− 0.0011
	(0.0034)	(0.0087)
Revenues (log)	0.0289***	0.0123***
	(0.0014)	(0.0023)
Does the firm belong to a group?[+++]		
National group	0.0148*	0.0059
	(0.0080)	(0.0126)
Foreign group	− 0.0930***	0.0078
	(0.0094)	(0.0364)
N	23,218	3679
Legal status dummies	Yes	Yes
Regional DUMMIES	Yes	Yes
Industry dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, whether the firm does not belong to any group. Molise represents the baseline region for credit demand and credit approval models. *$p<0.10$, **$p<0.05$, ***$p<0.01$. [+++]Dummy variables

Regarding education, we expect the culture-determined reluctance towards a loan application to be negatively correlated with education. However, in line with the results obtained by Campanella and Serino (2019), education turned out to not be significant in determining either credit demand or credit approval.

Looking at the firm characteristics, credit demand and credit approval are significantly conditioned by firm performance, as well as firm 'seniority'. Firms with positive and larger revenues have around three percentage points higher probability of asking for credit and a 1% higher probability of being approved. The age of the firm has a strong non-linear, convex effect; the minimum being reached at almost six months. The older the firm, the higher the chance more credit is asked for, in line with our expectations. Nevertheless, the age of the firm does not seem to be a determining factor in making the application successful. Indeed, there is not a clear-cut effect between firm age and survival (Rossi 2016). As for firm revenues, they work positively for both dimensions: credit demand and approval.

Interestingly, being part of a foreign group reduces the probability of applying for a loan by 9%, suggesting that intra-group financing is preferable in order to avoid perceived credit rationing driven by cultural bias or higher interest rate conditions.

Given that credit could be (i) partially approved, (ii) totally approved or (iii) not approved at all, we also performed an Ordered Probit specification to control for the different degrees of approval.[10, 11] The results do not show significant evidence that female decision-makers are discriminated against in obtaining either partial or full credit.[12]

As anticipated in the previous section, one possible concern in our analysis is the selection issue. Obtaining credit follows having asked for it, hence, the probability of succeeding in obtaining credit is estimated for the subsample of those firms that applied for a loan. The selection of the sample is far from random, and it is reasonable to suppose that this feature could affect the final results. Put simply, it could be that only good debtors ask for credit. To allow for the possibility that selection issues affect the estimates, we also estimate our model using a Heckman technique (the so-called Heckman Probit, which takes into account the dichotomous nature of the main dependent variable).[13] The Heckman model facilitates the consideration of the conditionality of credit approval, which could be correlated with characteristics that

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[10] To do this, we created a three-category variable taking a value of one if the credit had not been approved, a value of two if the credit had been partially approved and a value of three if the credit had been fully approved.

[11] Results are not shown but available upon request.

[12] We also considered the case of having a dummy variable as a dependent variable, taking a value equal to one for credit success when the credit is either fully or partially approved. In this case, the results remained the same.

[13] This model is described by a Heckman type of model, where the credit demand variable acts as a selection variable. Given that credit approval is observed only if credit is demanded, the expected value of the (censored) credit approval variable is hence equal to.

$$(\beta_0 + \beta_1 Female + \beta_2 X) + \rho\phi(\Theta_0 + \Theta_1 Female + \Theta_2 X)/\phi(\Theta_0 + \Theta_1 Female + \Theta_2 X)$$

If the correlation coefficient, ρ, is not significant, ordinary least square regression does not contain any bias. The Heckman model will provide the correlation coefficient estimate.

also determine credit demand. For this reason, despite the fact that the non-linearity of the model does not require additional identification variables, we want to use a general measure of credit availability that does not correlate with credit approval but instead with credit demand only.

The reason behind the potential endogeneity of credit demand relies on the likelihood that only good firms apply for credit and hence have a larger effect in getting it. The predicted probability of obtaining credit would hence be affected by this selection problem, showing an upward bias. If the two equations are estimated jointly, instead, the presence of a correlation between the two equations would be purged out by the model, allowing the expected outcome of credit to be unconditional. In line with the previous literature on credit constraints in the Italian context (Rossi and Trucchi 2016), we use a variable capturing the general availability of credit as an exclusion restriction variable, which we proxy with the number of bank branches in Italian regions. To accomplish this, we merge the RIL data to a dataset that contains information about the number of bank branches by region. We believe that the branch density, an index reporting the concentration of banks by region,[14] is strongly significant in the selection equation (and has no predictive power in the main equation). Results, reported in Table A10, are similar to the results not correcting for selectivity and show no evidence of selection at work. The correlation coefficient, ρ, is not significantly different from zero. We are aware that branch density could also present some drawbacks, being itself endogenous. Branch density is correlated with the dynamism of an environment, as well as its potential, hence not being completely exogenous to the probability of approval. In addition, the level of aggregation of branch density (at the regional level) is unable to grasp the credit supply the firm realistically faces, and a more disaggregated level is needed.

As discussed, firm-related features could also interact with the characteristics of the decision-maker. The rationale behind this is that the relationship between the main person responsible and the credit approach in a firm could be diluted, thus obscuring the association between the credit decision and the responsible person. Hence, in the following subsection, we take into consideration different dimensions that could affect credit demand and approval.

4.2 Gender and Education

Firstly, an important dimension that needs to be analysed more deeply concerns the level of education of the decision-maker; it could be reasonable to think that no differences in behaviour between men and women should be found when the investment in human capital accumulation has been high. Our approach is similar in spirit to that of Ghignoni et al. (2018) who, using the same dataset, found that firm leaders who are more educated are also associated with fewer temporary jobs in the firm they led. For this reason, we perform our analysis including an interaction term between the gender of the decision-maker and level of education. Noteworthy results, as reported in Table A11, are derived from this analysis. As expected, firms led by women with a higher

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[14] To avoid problems of multicollinearity, we did not add regional dummies as controls, but we substituted them with macro-area dummies (North, Centre, South).

educational level, such as a degree, operate in the same way as male-led ones – the negative coefficient of being a woman is completely offset by the coefficient of the interaction term between holding a degree and being a female decision-maker. This result is highly interesting as it indicates no gender difference in behaviour for more educated leaders.

4.3 Additional Results

Another possible concern could be related to the fact that there might be differences when there is only one individual exerting direct control on a firm compared with a firm run by a CEO with a large board behind them. Thus, we add a governance dimension into the model by splitting the firms between single owners vs. multiple family or non-family owners.[15] Results, reported in Table A12, illustrate that, even if the coefficient related to the gender dimension in firms managed by a family appears to be statistically significant at the 10% level, the defensive behaviour of women became more evident when the firm is not owned by her family (the related coefficient is three times greater than the previous one and statistically significant at the 1% level). Along this line, as highlighted in the literature review, when looking at credit demand for investment, this can be related to certain personal features of the decision-maker such as risk aversion. Indeed, evidence suggests that women tend to exhibit more prudent behaviour in financial decisions (Byrnes et al. 1999; Bellucci et al. 2010).[16],[17]

We then turned our attention to other variables that could have an impact on our outcomes and could be related to decision-maker characteristics. Hence, in Table A13, we include interaction terms between the gender of the decision-maker and firm size as a control.[18] The interaction of gender and firm size is of potential impact. In small firms, the role of the decision-maker is likely to be pivotal (as they are the only person to make decisions). On the other hand, in medium and large firms we expect a more diluted impact of the individual variables characterising the decision-maker.[19] Even if the interaction with the 'female' effect does not highlight any differences among firm size, it is interesting to note the negative impact related to the gender of the decision-maker, and it appears that medium firms apply for more credit (almost six percentage

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[15] We used the question 'Who owns the majority share of the ownership or the direct control of the company?' combined with being the responsible person of the firm.

[16] If women are demanding less credit simply because they are more risk averse and we were not able to account for this until now, results should not be robust when this variable is included in the model. Adding a measure of risk aversion in our model does not alter our results according to which female managers systematically asked for credit less often.

[17] This variable was constructed using the following question: 'Imagine that you are offered a lottery ticket where you have a one in two chance of winning a sum equal to your annual net income. Would you be willing to give the ticket in exchange for 5% of your annual net income, 10% of it, 25% of it, 50% of it or 80% of it?'.

[18] This variable was constructed as a three-category variable, which takes a value of one if the firm is small, a value of two if the firm is medium and a value of three if the firm is large. We then considered the interaction between the gender of the decision-maker and individual size dummies.

[19] We also ran other specifications of our model without firms that had opted for layoffs (defined in Italy as 'Cassa Integrazione Guadagni'), reduction in terms of employee numbers, etc., without affecting the final results.

points higher probability than small firms), as well as large firms, which ask for more credit but slightly less than medium ones.[20]

Similarly, it may be that other features could play a role in affecting credit for investment decisions so, aiming at capturing any differences related to how rooted the firm is in the local community, we exploit the age of the firm.[21] Results are reported in Table A14; it appears that women-led firms whose age of activity lay between 15 and 30 years demand less credit compared to younger ones that are probably less well known by the local community.

Furthermore, we investigate whether the regional dimension could shape, in different ways, our variables of interest: credit demand and approval. Italy is indeed a country with strong economic differences between the Northern and Southern regions. In Table A15, it appears that firms in Northern regions have more chance of getting approved for a loan, while those in Southern regions seem to be less likely to apply for bank credit, perhaps opting for other types of funding for investments. Looking at the interaction with the gender of the decision-maker, women-led firms in Northern regions demand more credit compared to regions within the centre of Italy. The detrimental effect of female leaders demanding credit is thus offset in Northern Italian regions where females leading a firm do not show substantial differences from their male peers. This evidence recalls Mascia (2018) when comparing Southern and Northern European start-ups.

5 Concluding Remarks

The evidence drawn upon in this work helps shape the policies that support women in facilitating their access to the credit market (Coleman et al. 2018). Our results reveal an asymmetry in the gender dimension in the credit market. A gender bias is found only in demanding credit, with women asking for credit less often in their business, while we find no evidence on their success rate in being funded. This result is in line with the main findings in the literature (Coleman 2000; Ongena and Popov 2016). These results hold after controlling for different structural features of the firm. A gender-detrimental effect is identified at a significant level only for credit demand and not for credit approval. The role of education is quite relevant since it appears that there are no differences in behaviour between men and women when the firm is led by a highly educated decision-maker.

From a policy standpoint, this result is of clear relevance. Women lack policies supporting them in approaching the credit market. By demanding less credit, women may risk slowing down the development of the company and the loss of profitable

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[20] Results show that the gender effect is non-significant for larger firms. However, we agree that also the other coefficients could change due to the different size and therefore we perform a separate regression for larger firms, which we show at the bottom of this document. Results are not reported but available upon request.

[21] Since the age of the firm is a continuous variable, we split it into three main classes in order to include the interaction term; in particular, we differentiated between firms younger than 15 years, between 15 and 30 years and firms whose age was over 30 years.

business opportunities. Women may thus need specific incentives to overcome their reluctance to apply for loans and increase indebtedness.

According to our results, increasing funding opportunities per se could be ineffective for women-led SMEs in particular. Instead, consultancy services aimed at evaluating an optimal degree of leverage and pre-scoring systems indicating, through an auto-valuation, the potential to receive funding may work better, helping to overcome psychological and cultural barriers that limit loan applications.

One reason why women are more distant to financial markets could be their difficulty in finding collateral or the higher price they have to pay, as suggested by Coleman (2000) and Klapper and Parker (2011). Another plausible explanation is that they are less financially literate and therefore less inclined to search for more funds outside self-financing. As a result, one of the factors we would like to stress, which is left for future research agendas, is whether the gender gap in financial literacy could also be responsible for the less intense access to external capital, including the demand for credit (Hasler and Lusardi 2017, Ughetto et al. 2020 and Oggero et al. 2019).

Further research is needed in this area to shape appropriate policies, which will ultimately level the playing field. Indeed, facilitating the demand for credit seems to be the more promising policy to implement. Once credit is demanded, the chances of receiving it do not differ between genders.

Appendix A: Description of Variables and Descriptive Statistics

See Tables A7, A8 and A9.

Appendix B: Regression Tables

See Tables A10, A11, A12 , A13 , A14 and A15 .

Table A7 Description of Variables

Name of the variable	Description of variables
Credit demand	The firm asked for a loan to finance an investment
Credit approval	The credit loan demand has been fully approved
Decision-maker characteristics	
Owner	The owner of the firm is the decision-maker
Manager outside the firm	The firm decision-maker of the firm is external
Manager inside the firm	The firm decision-maker of the firm is internal
Female	Gender of the decision-maker of the firm is female
15–39 years	Age of the decision-maker ranges from 15 and 39 years
40–49 years	Age of the decision-maker ranges from 40 and 49 years

Table A7 (continued)

Name of the variable	Description of variables
50–59 years	Age of the decision-maker ranges from 50 and 59 years
More than 60 years	Age of the decision-maker greater than 60 years
University or higher	University (or higher) level of education of the decision-maker
High school	High school level of education of the decision-maker
Middle/Elementary school	Middle/Elementary school level of education of the decision-maker
Firm characteristics	
Firm age	Age of the Firm (in years)
Employees	Number of Employees
Revenues	Amount of revenues
Revenues(log)	Amount of revenues expressed in logarithmic form
North	The region where the firm is located is in the North of Italy
Centre	The region where the firm is located is in the Centre of Italy
South	The region where the firm is located is in the South of Italy
Person/family major share	One person/One family owns the major share of the firm
Cassa integrazione	The firm opts for layoffs
Reduction employees	The firm opts for a reduction of employees
National group	The firm belongs to a national group
Foreign group	The firm belongs to a foreign group
No group	The firm does not belong to any group

Table 8A Descriptive Statistics

	Mean	SD	Min	Max	*N*
Credit demand	0.16				23,218
Credit approval	0.87				3690
Decision-maker characteristics[+++]					
Female	0.14				23,218
15–39 years	0.06				23,218
40–49 years	0.26				23,218
50–59 years	0.36				23,218

Table 8A (continued)

	Mean	SD	Min	Max	N
More than 60 years	0.31				23,218
University or higher	0.28				23,218
High school	0.52				23,218
Middle/elementary school	0.20				23,218
Owner	0.87				23,218
Manager outside the firm	0.04				23,218
Manager inside the firm	0.08				23,218
Firm characteristics					
Firm age	26.26	14.75	0	153	23,218
Small firm[+++]	0.80				23,218
Medium firm[+++]	0.15				23,218
Large firm[+++]	0.04				23,218
Revenues[§]	33.56	1348.11	0	191,491	23,218
Revenues(log)	14.19	2.17	0	26	23,218
North[+++]	0.53				23,218
Centre[+++]	0.21				23,218
South[+++]	0.26				23,218
Person/family major share[+++]	0.47				23,213
Does the firm belong to a group?[+++]					
National group	0.10				23,218
Foreign group	0.03				23,218
No group	0.86				23,218
Regions[+++]					
Piemonte	0.07				23,218
Valle D'Aosta	0.02				23,218
Lombardia	0.15				23,218
Liguria	0.04				23,218
North-West macro area	0.27				23,218
Trentino Alto Adige	0.05				23,218
Veneto	0.09				23,218
Friuli Venezia Giulia	0.04				23,218
Emilia Romagna	0.08				23,218
North-East macro area	0.26				23,218
Toscana	0.07				23,218
Umbria	0.04				23,218
Marche	0.05				23,218
Lazio	0.06				23,218
Abruzzo	0.04				23,218

Table 8A (continued)

	Mean	SD	Min	Max	N
Centre macro area	0.21				23,218
Molise	0.02				23,218
Campania	0.05				23,218
Puglia	0.04				23,218
Basilicata	0.02				23,218
Calabria	0.02				23,218
South macro area	0.19				23,218
Sicilia	0.04				23,218
Sardegna	0.03				23,218
Islands macro area	0.07				23,218

[+++]Dummy variables. Being dummy variables, standard deviations, minimum and maximum values are not reported
[§]Revenues are expressed in thousands of thousands of Euro

Table A9 Descriptive Statistics by Gender of Decision-Maker

	Female		Male	
	Mean	SD	Mean	SD
Credit Demand	0.12		0.17	
Credit Approval	0.85		0.87	
Decision-maker characteristics[+++]				
15–39 years	0.10		0.06	
40–49 years	0.30		0.25	
50–59 years	0.36		0.37	
More than 60 years	0.24		0.32	
University or higher	0.28		0.28	
High school	0.56		0.52	
Middle/elementary school	0.17		0.21	
Owner	0.92		0.87	
Manager outside the firm	0.02		0.05	
Manager inside the firm	0.06		0.09	
Firm characteristics				
Firm age	24.41	13.38	26.56	14.93
Small firm[+++]	0.89		0.79	
Medium firm[+++]	0.10		0.16	
Large firm[+++]	0.02		0.04	
Revenues[§]	13.25	176.14	36.78	1449.49
Revenues(log)	13.52	1.99	14.29	2.18

Table A9 (continued)

	Female		Male	
	Mean	SD	Mean	SD
North[+++]	0.51		0.53	
Centre[+++]	0.22		0.21	
South[+++]	0.26		0.26	
Person/Family major share[+++]	0.55		0.46	
Does the firm belong to a group?[+++]				
National group	0.06		0.11	
Foreign group	0.01		0.03	
No group	0.92		0.86	

[+++]Dummy variables. Being dummy variables, standard deviations, minimum and maximum values are not reported

[§]Revenues are expressed in thousands of thousands of Euro

Table A10 Heckman Probit

	Credit demand: selection equation	Credit approval: final outcome
Decision-maker characteristics[+++]		
Female	− 0.1121***	0.0092
	(0.0321)	(0.0605)
15–39 years	0.1767***	− 0.3098***
	(0.0311)	(0.0550)
40–49 years	0.0898*	− 0.0615
	(0.0481)	(0.0404)
50–59 years	0.0361	− 0.0708
	(0.0462)	(0.0515)
University or higher	− 0.0041	− 0.0285
	(0.0328)	(0.0616)
Owner	0.2558***	− 0.1877***
	(0.0337)	(0.0650)
Manager outside the firm	− 0.0307	− 0.2624*

Table A10 (continued)

	Credit demand: selection equation	Credit approval: final outcome
	(0.0523)	(0.1549)
Firm characteristics		
Firm age	− 0.0019*	0.0009
	(0.0011)	(0.0026)
Firm age^2	0.0249	− 0.0119
	(0.0152)	(0.0328)
Branches region index	0.0242**	
	(0.0097)	
Revenues(log)	0.1286***	− 0.0369
	(0.0064)	(0.0289)
North [+++]	0.0448	0.2011**
	(0.0487)	(0.0804)
Centre [+++]	0.0395	0.1185**
	(0.0490)	(0.0573)
Does the firm belong to a group? [+++]		
National group	0.0653*	− 0.0002
	(0.0344)	(0.0590)
Foreign group	− 0.5750***	0.3748***
	(0.0878)	(0.1183)
Legal Status dummies	Yes	Yes
Industry dummies	Yes	Yes
N	23,202	
Censored N	19,512	
Uncensored N	3690	
Log Pseudo-Likelihood	− 10,200.22	
ρ	− 0.8632	
	0.2077	

Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, whether the firm is located in south of Italy, whether the firm does not belong to any group. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. [+++] Dummy variables

Table A11 Credit Demand and Approval – Gender and Educational Level

	Credit Demand	Credit Approval
Decision− maker characteristics[+++]		
Female	− 0.0321***	− 0.0519**
	(0.0081)	(0.0264)
15–39 years	0.0433***	− 0.0588***
	(0.0083)	(0.0204)
40–49 years	0.0211*	− 0.0030
	(0.0112)	(0.0122)
50–59 years	0.0087	− 0.0117
	(0.0101)	(0.0132)
University or higher	− 0.0054	− 0.0219*
	(0.0069)	(0.0123)
Female*University or higher	0.0332**	0.0676***
	(0.0130)	(0.0204)
Owner	0.0507***	− 0.0056
	(0.0062)	(0.0152)
Manager outside the firm	− 0.0064	− 0.0856
	(0.0115)	(0.0523)
Firm characteristics		
Firm Age	− 0.0004*	0.0002
	(0.0002)	(0.0007)
Firm Age^2	0.0061*	− 0.0013
	(0.0033)	(0.0086)
Revenues(log)	0.0289***	0.0122***
	(0.0014)	(0.0023)
Does the firm belong to a group? [+++]		
National group	0.0149*	0.0069
	(0.0081)	(0.0128)
Foreign group	− 0.0927***	0.0092
	(0.0095)	(0.0367)
N	23,218	3679
Legal Status Dummies	Yes	Yes
Regional Dummies	Yes	Yes
Industry Dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, female*high school or lower, whether the decision-maker is a manager inside the firm, whether the firm does not belong to any group. Molise represents the baseline region for credit demand and credit approval models. *$p <$ 0.10, **$p < 0.05$, ***$p < 0.01$. [+++]Dummy variables

Table A12 Credit Demand—Measure of governance

	One person/family Credit demand	Multiple families or non-family owners Credit demand
Female	− 0.0132*	− 0.0403***
	(0.0074)	(0.0118)
15–39 years	0.0577***	0.0312**
	(0.0135)	(0.0136)
40–49 years	0.0188	0.0236**
	(0.0158)	(0.0102)
50–59 years	0.0278***	− 0.0040
	(0.0107)	(0.0133)
University or higher	− 0.0099	0.0106
	(0.0070)	(0.0107)
Firm characteristics		
Firm Age	− 0.0012**	− 0.0010**
	(0.0005)	(0.0004)
Firm Age^2	0.0164***	0.0140***
	(0.0049)	(0.0048)
Revenues(log)	0.0346***	0.0313***
	(0.0024)	(0.0018)
National group	0.0551**	0.0024
	(0.0214)	(0.0119)
Foreign group	0.0461	− 0.0785***
	(0.0850)	(0.0234)
N	10,469	9638
Legal Status Dummies	Yes	Yes
Regional Dummies	Yes	Yes
Industry Dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, whether the firm does not belong to any group. Molise represents the baseline region for credit demand for both specifications. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. + + + Dummy variables

Table A13 Credit Demand and Approval – Gender and Firm Size

	Credit Demand	Credit Approval
Decision-maker characteristics[+++]		
Female	− 0.0220***	− 0.0311
	(0.0069)	(0.0240)
15–39 years	0.0443***	− 0.0576***
	(0.0079)	(0.0201)
40–49 years	0.0206*	− 0.0022
	(0.0112)	(0.0129)
50–59 years	0.0080	− 0.0122
	(0.0102)	(0.0129)
University or higher	− 0.0021	− 0.0104
	(0.0073)	(0.0137)
Owner	0.0520***	− 0.0056
	(0.0063)	(0.0148)
Manager outside the firm	− 0.0069	− 0.0865*
	(0.0115)	(0.0521)
Firm characteristics		
Medium Firm [+++]	0.0620***	− 0.0189
	(0.0098)	(0.0127)
Large Firm [+++]	0.0365**	− 0.0271
	(0.0169)	(0.0211)
Female*Medium Firm [+++]	− 0.0077	0.0475
	(0.0172)	(0.0290)
Female*Large Firm [+++]	0.0012	− 0.0240
	(0.0370)	(0.0900)
Firm Age	− 0.0004*	0.0001
	(0.0003)	(0.0007)
Firm Age^2	0.0057*	− 0.0012
	(0.0034)	(0.0084)
Revenues(log)	0.0247***	0.0140***
	(0.0016)	(0.0027)
Does the firm belong to a group? [+++]		
National group	0.0097	0.0088
	(0.0078)	(0.0125)
Foreign group	− 0.0961***	0.0119
	(0.0092)	(0.0361)

Table A13 (continued)

	Credit Demand	Credit Approval
N	23,218	3679
Legal status dummies	Yes	Yes
Regional dummies	Yes	Yes
Industry dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses

Baseline variables are given by: male, small firm, female*small firm, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, whether the firm does not belong to any group. Valle d'Aosta and Molise represent the baseline regions for credit demand and credit approval models, respectively. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$. [+++]Dummy variables

Table A14 Credit Demand and Approval—Gender and Firm Age

	Credit demand	Credit approval
Decision-maker characteristics[+++]		
Female	− 0.0121	− 0.0480
	(0.0116)	(0.0360)
15–39 years	0.0440***	− 0.0569***
	(0.0086)	(0.0199)
40–49 years	0.0215*	− 0.0035
	(0.0112)	(0.0130)
50–59 years	0.0088	− 0.0142
	(0.0100)	(0.0139)
University or higher	− 0.0011	− 0.0090
	(0.0073)	(0.0137)
Owner	0.0508***	− 0.0043
	(0.0063)	(0.0152)
Manager outside the firm	− 0.0065	− 0.0869
	(0.0116)	(0.0531)
Firm characteristics		
Firm Age 15–30 years	− 0.0007	0.0089
	(0.0069)	(0.0133)
Firm Age above 30 years	− 0.0028	− 0.0055
	(0.0061)	(0.0149)
Female*Firm Age 15–30 years	− 0.0294**	0.0334
	(0.0129)	(0.0303)

Table A14 (continued)

	Credit demand	Credit approval
Female*Firm Age above 30 years	0.0001	0.0294
	(0.0113)	(0.0319)
Revenues(log)	0.0289***	0.0124***
	(0.0014)	(0.0023)
Does the firm belong to a group?[+++]		
National group	0.0151*	0.0049
	(0.0082)	(0.0130)
Foreign group	− 0.0927***	0.0069
	(0.0096)	(0.0365)
N	23,218	3679
Legal Status Dummies	Yes	Yes
Regional Dummies	Yes	Yes
Industry Dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, age of the firm below 15 years, female*firm age below 15 years, whether the firm does not belong to any group. Molise and Valle d'Aosta represent the baseline regions for credit demand and credit approval models, respectively. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. [+++]Dummy variables

Table A15 Credit Demand and Approval—Gender and Macro-Areas

	Credit demand	Credit approval
Decision-maker characteristics [+++]		
Female	− 0.0454***	0.0037
	(0.0116)	(0.0455)
15–39 years	0.0435***	− 0.0627***
	(0.0079)	(0.0220)
40–49 years	0.0218*	− 0.0014
	(0.0113)	(0.0130)
50–59 years	0.0090	− 0.0121
	(0.0102)	(0.0134)
University or higher	− 0.0018	− 0.0100
	(0.0073)	(0.0130)
Owner	0.0507***	− 0.0100
	(0.0061)	(0.0137)
Manager outside the firm	− 0.0075	− 0.0947*

Table A15 (continued)

	Credit demand	Credit approval
	(0.0116)	(0.0536)
Firm characteristics		
North	0.0024	0.0305**
	(0.0079)	(0.0124)
South	− 0.0239***	− 0.0553***
	(0.0089)	(0.0178)
Female*North	0.0367**	− 0.0322
	(0.0165)	(0.0626)
Female*South	0.0257	− 0.0133
	(0.0236)	(0.0443)
Firm Age	− 0.0004	0.0001
	(0.0002)	(0.0007)
Firm Age^2	0.0053	− 0.0007
	(0.0034)	(0.0087)
Revenues(log)	0.0288***	0.0120***
	(0.0013)	(0.0023)
Does the firm belong to a group? [+++]		
National group	0.0161**	0.0062
	(0.0081)	(0.0132)
Foreign group	− 0.0943***	0.0067
	(0.0094)	(0.0356)
N	23,218	3679
Legal Status Dummies	Yes	Yes
Industry Dummies	Yes	Yes

Probit estimation model. Marginal effects reported. Standard errors clustered at industry level in parentheses. Baseline variables are given by: male, age of decision-maker greater than 60 years, high school or lower educational level of decision-maker, whether the decision-maker is a manager inside the firm, whether the firm is located in the centre of Italy, female*centre, whether the firm does not belong to any group. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$. [+++]Dummy variables

References

Alesina AF, Lotti F, Mistrulli PE (2013) Do women pay more for credit? Evidence from Italy. J Eur Econ Assoc 11(suppl 1):45–66

Aristei D, Gallo M (2016) Does gender matter for firms' access to credit? Evidence from international data. Finance Res Lett 18(2016):67–75

Asiedu E, Freeman JA, Nti-Addae A (2012) Access to credit by small businesses: How relevant are race, ethnicity, and gender? Am Econ Rev 102(3):532–537

Aspray W and Cohoon JM (2007) Access to financial capital: A review of the research literature on women's entrepreneurship in the information technology field. Entrepreneurial report series, no. 3. *National Center for Women & Information Technology.*

Barber BM, Odean T (2001) Boys will be boys: Gender, overconfidence, and common stock investment. Q J Econ 116(1):261–292

Bellucci A, Borisov A, Zazzaro A (2010) Does gender matter in bank–firm relationship? Evidence from small business lending. J Bank Finance 34(12):2968–2984

Berger AN, Udell GF (1995) Relationship lending and the lines of credit in small firm finance. J Bus 68:351–381

Berger AN, Udell GF (2002) Small business credit availability and relationship lending: The importance of bank organizational structure. Econ J 112:F32–F53

Berger AN, Udell GF (2006) A more complete conceptual framework for SMEs finance. J Bank Finance 30:2945–2966

Blanchflower DG, Levine PB, Zimmerman DJ (2003) Discrimination in the small-business credit market. Rev Econ Stat 85(4):930–943

Byrnes JP, Miller DC, Schafer WD (1999) Gender differences in risk taking: a meta-analysis. Psychol Bull 125(3):367

Campanella F, Serino L (2019) Do personal characteristics of manager affect Smes' Access to Bank Loan? Int J Econ Bus Finance 6(2):1–14

Cao C, Chan KC, Hou W, Jia F (2019) Does religion matter to informal finance? Evidence from trade credit in China. Reg Stud 53(10):1410–1420

Carter S, Mwaura S, Ram M, Trehan K, Jones T (2015) Barriers to ethnic minority and women's enterprise: existing evidence, policy tensions and unsettled questions. Int Small Bus J 33(1):49–69

Cavalluzzo KS, Cavalluzzo LC (1998) Market structure and discrimination: the case of small businesses. J Money Credit Bank 30(4):771–792

Cesaroni FM, Lotti F and Mistrulli PE (2013) Female firms and banks lending behaviour: What happened during the great recession? Bank of Italy Occasional Paper No. 177.

Cole RA and Mehran H (2018) Gender and the availability of credit to privately held firms: Evidence from the surveys of small business finances. FRB of New York Staff Report No. 383.

Coleman S (2000) Access to capital and terms of credit: a comparison of men and women. J Small Bus Manag 38:37–52

Coleman S, Henry C, Orser B, Foss L, Welter F (2018) Policy support for women entrepreneurs' access to financial capital: evidence from Canada, Germany, Ireland, Norway, and the United States. J Small Bus Manag 57(suppl 2):296–322

Cowan K, Drexler A, Yanez A (2015) The effect of credit guarantees on credit availability and delinquency rates. J Bank Finance 59:98–110

Cowling M, Liu W, Ledger A (2012) Small business financing in the UK before and during the current financial crisis. Int Small Bus J 30(7):778–780

Cowling M, Marlow S, Liu W (2019) Gender and bank lending after the global financial crisis: are women entrepreneurs safer bets? Small Bus Econ 55:853–880

Croson R, Gneezy U (2009) Gender differences in preferences. J Econ Lit 47(2):448–474

Dawson C, Henley A (2015) Gender, risk, and venture creation intentions. J Small Bus Manag 53(2):501–515

Eckel CC, Grossman PJ (2008) Men, women and risk aversion: experimental evidence. Handb Exp Econ Results 1:1061–1073

Ferrando A, Popov A, Udell GF (2012) Sovereign stress and SMEs access to finance. Evidence from ECB's SAFE Survey. J Bank Finance 81:65–80

Galli E, Mascia DV, Rossi S (2020) Bank lending constraints for women-led SMEs: self-restraint or lender bias? Eur Financ Manag 26(4):1147–1188

Ghignoni E, Croce G, Ricci A (2018) Fixed term contracts and employers' human capital: the role of educational spillovers. Pap Reg Sci 97(2):301–322

Guzman J, Kacperczyk AO (2019) Gender gap in entrepreneurship. Res Policy 48(7):1666–1680

Hasler A and Lusardi A (2017) The gender gap in financial literacy: A global perspective. Global Financial Literacy Excellence Center, The George Washington University School of Business

Hsieh C, Parker SC, van Praag CM (2017) Risk, balanced skills and entrepreneurship. Small Bus Econ 48(2):287–302

Jovanovic B (1982) Selection and the evolution of industry. Econometrica 50(3):649–670

Jurik NC, Křížková A, Pospíšilová M, Cavender G (2019) Blending, credit, context: doing business, family and gender in Czech and US copreneurships. Int Small Bus J 37(4):317–342

Klapper LF, Parker SC (2011) Gender and the business environment for new firm creation. World Bank Res Obs 26(2):237–257

Levenson AR, Willard KL (2000) Do firms get the financing they want? Measuring credit rationing experienced by small businesses in the US. Small Bus Econ 14(2):83–94

Li W, Xu X, Long Z (2020) Confucian culture and trade credit: evidence from Chinese listed companies. Res Int Bus Finance 53:101232. https://doi.org/10.1016/j.ribaf.2020.101232

Mascia DV, Rossi S (2017) Is there a gender effect on the cost of bank financing? J Financ Stab 31:136–153

Mascia DV (2018) Young enterprises and bank credit denials. Asian Development Bank Institute (ADBI) Working Paper No. 844

Matto M, Niskanen M (2019) Religion, national culture and cross-country differences in the use of trade credit: evidence from European SMEs. Int J Manag Financ 15(3):350–370

McGowan P, Cooper S, Durkin M, O'Kane C (2015) The influence of social and human capital in developing young women as entrepreneurial business leaders. J Small Bus Manag 53(3):645–661

Meoli A, Fini R, Sobrero M and Wiklund J (2020) How entrepreneurial intentions influence entrepreneurial career choices: the moderating influence of social context. J Bus Ventur 35(3)

Mishra OH, Tripathi PS (2017) Culture, ethnicity and access to bank credit. Glob Bus Rev 18(6):1552–1567

Moro A, Wisniewski TP, Mantovani GM (2017) Does a manager's gender matter when accessing credit? Evidence from European data. J Bank Finance 80:119–213

Muravyev A, Talavera O, Schäfer D (2009) Entrepreneurs' gender and financial constraints: evidence from international data. J Comp Econ 37(2):270–286

Oggero N, Rossi M, Ughetto E (2019) Entrepreneurial spirits in women and men. The role of financial literacy and digital skills. Small Bus Econ 55:313–327

Ongena S, Popov A (2016) Gender bias and credit access. J Money Credit Bank 48(8):1691–1724

Popov A, Udell GF (2012) Cross border banking, credit access and the financial crisis. J Int Econ 87:147–161

Powell M, Ansic D (1997) Gender differences in risk behaviour in financial decision- making: an experimental analysis. J Econ Psychol 18(6):605–628

Rossi M (2016) The impact of age on firm performance: a literature review. Corp Ownersh Control 13(2):217–223

Rossi M, Trucchi S (2016) Liquidity constraints and labor supply. Eur Econ Rev 87:176–193

Stefani ML and Vacca VP (2013) Credit access for female firms: Evidence from a survey on European SMEs. Questioni di Economia e Finanza (Occasional Papers), 176, Bank of Italy, Economic Research and International Relations Area.

Ughetto E, Rossi M, Audretsch D, Lehmann E (2020) Female entrepreneurship in the digital era. Small Bus Econ 55(2):305–312

Yacus AM, Esposito SE, Yang Y (2019) The influence of funding approaches, growth expectations, and industry gender distribution on high-growth women entrepreneurs. J Small Bus Manag 57(1):59–80