

# Bank credit constraints for women-led SMEs: Self-restraint or lender bias?

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## Abstract

We test the existence of possible gender biases affecting firm behavior in demanding and obtaining bank credit using a cross-country sample of European small- and medium-sized enterprises (SMEs). We show consistent evidence that female-led firms are more likely than their male counterparts to refrain from applying for loans. When they apply, female-led enterprises do not seem to face gender discrimination from the lender. Interestingly, however, signs of gender bias appear to arise during the upside phase of the economy. Overall, our study provides support for policy actions aimed at reducing the frictions faced by women-led SMEs when accessing credit markets.

## KEYWORDS

access to finance, bank lending, SMEs, self-restraint, gender discrimination

## JEL CLASSIFICATION

D22; G21; G32; J16

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## 1 | INTRODUCTION

Small- and medium-sized enterprises (SMEs) heavily rely on banks to finance their projects as they find it difficult to raise funds via capital markets (Caglayan & Xu, 2016; Cingano, Manaresi, & Sette, 2016). The conditions faced by SMEs when accessing bank credit are thus crucial for their existence and development (Degryse, Matthews, & Zhao, 2018; Ferrando, Popov, & Udell, 2017; Vermoesen, Deloof, & Laveren, 2013). Specific issues concern the impact that such conditions may have on businesses led by women managers. If we look at the worldwide data on the gender gap in 2018 (Global Gender Gap Index), significant gender inequalities, especially in economic participation and political empowerment, emerge even across European countries. This is not inconsequential, as gender differences may also affect the bank–firm relationship. Indeed, several studies demonstrate that problems with access to finance represent a major impediment to women successfully managing their businesses (see, for example, Marlow & Patton, 2005; World Bank, 2011).

The literature highlights the existence of issues faced by women-led firms, when accessing finance, from both the demand and the supply sides of the channel. More specifically, from the demand side there is a discrete branch of the literature highlighting that women-led enterprises tend to refrain from applying for bank credit because they generally feel less confident than men about their bargaining abilities when dealing with lenders. Hence, they are more likely not to apply, thus behaving as discouraged borrowers (Bardasi, Sabarwal, & Terrell, 2011; Freil, Carter, Tagg, & Mason, 2012; Moro, Wisniewski, & Mantovani, 2017; Ongena & Popov, 2016). Other scholars have also pointed that female-led businesses may be more likely to refrain from applying for external funds (e.g. equity capital) as they prefer to finance their projects via internal sources (Carter, Shaw, Wing, & Wilson, 2007; Coleman & Robb, 2009; Mukhtar, 2006), thus limiting their growth opportunities, or by relying on networks of friends and family (see, for example, Alesina, Lotti, & Mistrulli, 2013; Guiso, Sapienza, & Zingales, 2004; Lim & Suh, 2019; Sena, Scott, & Roper, 2012). With regard to the supply side, on the other hand, a typical issue that female-led firms may face, compared to male-led enterprises, is a higher rate of rejection of their loan applications (see, for example, Cavalluzzo, Cavalluzzo, & Wolken, 2002). Additionally, women-led businesses may experience a partial rejection from the lender (Kremel & Yazdanfar, 2015; Treichel-Zimmerman & Scott, 2006), or may even face higher price conditions or be required to provide higher collateral than men in order to obtain credit (Alesina et al., 2013; Bellucci, Borisov, & Zazzaro, 2010; Mascia & Rossi, 2017; Muravyev, Talavera, & Schäfer, 2009; Wu & Chua, 2012). It is also worth mentioning that the literature on this issue is not conclusive and that several studies have not detected signs of gender-based discrimination (see, for example, Carter et al., 2007; Moro et al., 2017).

In this paper we build on the above literature to comprehensively investigate whether and in what way female-led companies are likely to be discriminated against, compared to men, when they apply for bank loans, as well as whether and why they avoid applying for bank loans to finance their projects.

Various reasons motivate our study. First, although the topic appears to be widely debated, even recent papers (such as Bui, Nguyen, Pham, & Phung, 2019) underscore the need for more empirical investigations, in response to the numerous qualitative and theoretical works, on the potential gender gap faced by the SMEs when accessing finance. Second, as recently highlighted by Rostamkalaei, Nitani, and Riding (2018), most papers still provide mixed evidence on the existence of gender issues in access to finance, which motivates us to further investigate the topic. Third, the vast majority of existing studies tend to focus on single issues, rather than

jointly considering a range of reasons, arising from the demand or the supply side of the bank lending market. In this regard, it is worth mentioning that most scholars in the field have investigated the issue of borrower discouragement to apply for bank loans, and loan rejection perpetrated by the lenders (see, for example, Cowling, Marlow, & Liu, 2019; Moro et al., 2017; Presbitero, Rabellotti, & Piras, 2014). What is missing, though, to the best of our knowledge, is a study that jointly assesses a variety of motivations (from the borrowers' perspective) not to apply for loans, as well as a range of adverse outcomes (of applications for bank lending) experienced by the SMEs.

By relying on the wealth of information provided by the Survey on the Access to Finance of Enterprises (SAFE) confidentially released by the European Central Bank (ECB), our study offers the following contributions. First, we extend the literature on gender gap issues in access to finance by concurrently considering (with an appropriate methodology) a variety of self-restraint motives of the firms, as well as a number of adverse outcomes arising from applications for external finance. Notably, with regard to the former, in addition to the discouragement motivation, we investigate whether female-led SMEs tend, more than men, not to apply for bank loans because of sufficient funds or for other reasons. When we turn to the results of the loan applications, not only do we consider the actual rejection by the lender, but also we investigate whether female-led firms are more likely than men to be partially rejected or to refuse the loan because the price conditions are too costly. Overall, to do so we employ multinomial logistic models that allow simultaneous and efficient estimates to predict the probabilities of alternative outcomes of a categorically distributed dependent variable. In our study, these are represented by the reasons for non-application, on the demand side, and by the results of the applications, on the supply side. Furthermore, because the choice to appoint a female leader as head of a company might not fully be exogenous (Adams & Ferreira, 2009; Mascia & Rossi, 2017; Sila, Gonzalez, & Hagedorff, 2016), we address possible endogeneity affecting our estimates through the use of a two-step instrumental variable technique, in a similar fashion to Cumming (2008) and Heger and Tykvová (2009).

Second, we exploit the macroeconomic heterogeneity characterizing our data to detect whether possible disparities between female and male firms arise during different phases of the economic cycle. Negative macroeconomic scenarios, by affecting banks, translate into lower lending quantity or higher cost of credit for SMEs (Cole & Sokolyk, 2016; Degryse et al., 2018). Therefore, the perception of such issues might significantly impact on the firm's behavior leading, for instance, to discouragement conduct (Mac an Bhaird, Vidal, & Lucey, 2016). Interestingly, recent studies on access to finance have limited their analysis to the post-global financial crisis period in a specific country only (Cowling et al., 2019), or have exploited the country heterogeneity characterizing their data regardless of the time-specific macroeconomic conditions (Mascia & Rossi, 2017). To the best of our knowledge, we are thus the first to explore whether differences in macroeconomic conditions affect the self-restraint behavior of women-led firms, as well as the outcomes of their bank loan applications, focusing on opposite dynamics of the business cycle occurring during and after a particular turbulent period across our sampled countries.

Our findings reveal that female-led firms are more likely than male-led ones to be financially constrained since they behave as discouraged borrowers. Moreover, they also tend to refrain from taking out loans as they rely, more than men-led businesses, on internal funding. Results are robust to various model specifications and are corroborated after addressing endogeneity. In addition, female discouragement persists in both phases of the business cycle, whereas non-applications for sufficient funds and other reasons—by female-led SMEs—mainly occur during economic downturns. As regards the supply, signs of discrimination perpetrated by the lender

against women arise only during the upside phase of the business cycle. Finally, our results highlight that, during economic downturns, female-led businesses are less likely, than men, to refuse a loan offer even if it is too costly.

The remainder of paper is organized as follows. In Section 2 we offer a review of the literature and define the research hypotheses. In Section 3 we describe the data and the methodology. In Section 4 we discuss the empirical results and provide additional analyses. Section 5 concludes.

## 2 | LITERATURE REVIEW AND RESEARCH HYPOTHESES

There is a wide literature in the field of entrepreneurship that investigates whether the manager's gender is a major factor affecting firms' inclination to access bank credit, as well as whether lenders behave differently when providing loans to male and female borrowers. Most of these papers, however, provide mixed evidence on the existence of gender issues in access to finance (Rostamkalaei et al., 2018), and are usually focused on single concerns (such as borrower discouragement to apply for bank loans, and loan rejection perpetrated by the lenders) or investigate the behavior of SMEs chartered in specific countries (see, for example, Cowling et al., 2019; Presbitero et al., 2014). Hence, more comprehensive and more conclusive studies on the problems faced by SMEs when accessing bank lending are still needed by policy-makers, especially because of the acknowledged importance of small businesses for the real economy in Europe.

Our setup enables us to investigate various issues potentially affecting SMEs' access to bank finance. Therefore, in developing our testable hypotheses, we will survey two branches of the literature: one that highlights gender-based disparities arising from the demand side, and one that attributes the existence of gender gap issues to supply-driven factors.

### 2.1 | Demand-side predictions

On the demand side there is some consensus around the view that women-led enterprises may tend to refrain from applying for bank credit, as their general inclination to be less confident and more risk-averse than men could lead them to be more skeptical about their ability to successfully obtain funding (see, for example, Carter, Mwaura, Ram, Trehan, & Jones, 2015; Chaudhuri, Sasidharan, & Raj, 2018; Croson & Gneezy, 2009; Malmström, Johansson, & Wincent, 2017; Ongena & Popov, 2016; Poczter & Shapsis, 2018; Roper & Scott, 2009; Treichel-Zimmerman & Scott, 2006). Because of differences between men's and women's characteristics, skills or preferences, female firms could thus behave as discouraged borrowers (Freel et al., 2012; Kalnins & Williams, 2014; Kon & Storey, 2003; Moro et al., 2017). We therefore propose to test the following hypothesis.

**Hypothesis 1.** *Female-led firms face a higher probability of not applying for bank loans than their male counterparts because they behave as discouraged borrowers (i.e. they refrain from applying for fear of rejection).*

The literature also argues that non-applications for bank loans can be due to a different attitude of women-led firms, which may prefer to resort to internal rather than external funds

(see, for example, Carter et al., 2007; Coleman & Robb, 2009; Fairlie & Robb, 2009; Mukhtar, 2006; Orser, Riding, & Manley, 2006; Sena et al., 2012) or to friends and family networks (see, for example, Alesina et al., 2013; Charness & Gneezy, 2012; Guiso et al., 2004; Kwong, Jones-Evans, & Thompson, 2012; Lim & Suh, 2019; Manolova, Carter, Manev, & Gyoshev, 2007; Sena et al., 2012; Watson & McNaughton, 2007). Relying on internal funds is viewed as a form of financial constraint (on this point, see Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988; Guariglia & Liu, 2014; Sasidharan, Lukose, & Komera, 2015) which, in turn, may affect the firm's growth. Indeed, choosing to resort to internal or external finance is not inconsequential, as debt financing—compared to internal finance—is supposed to generate, via the leverage effect, a more than proportional impact on growth (Carpenter & Petersen, 2002). However, female-led companies are usually less eager than their male peers to expand their business—an attitude that essentially mirrors their higher risk aversion (Alsos, Isaksen, & Ljunggren, 2006; Carter et al., 2015) which could justify their greater reliance on internal funds. In this regard, it is worth noting that, following the pecking order theory (Myers & Majluf, 1984), female-led SMEs might exhibit a stronger preference for internal rather than external sources of finance (Watson, 2006) potentially because of their higher need to be in control of most aspects of their business (Mukhtar, 2002). Another argument supporting this view relates to the information asymmetries in capital markets—between firms and potential providers of funds—that determine a wedge between the cost of internal and external finance, which is even more pronounced for SMEs (Carpenter & Petersen, 2002). Such evidence—coupled with the potential perception of women as differently treated by lenders—might then lead female managers to build up, over time, their own cushion of internal finances that could eventually lead them to be independent from banks. Ultimately, we cannot rule out the possibility that firms could also decide to avoid engaging with banks for other unknown reasons. All in all, this brings us to test the following hypothesis.

**Hypothesis 2.** *Female-led firms face a higher probability of not applying for bank loans than their male counterparts, because they have sufficient funds or have other reasons for doing so.*

## 2.2 | Supply-side predictions

As regards the issue of gender discrimination from the supply side, it is worth mentioning that the literature identifies two different types of discrimination, namely taste-based or prejudicial discrimination (driven by preferences and beliefs that are not based on objective criteria) and the statistical discrimination (occurring when the collection of information on the firm's creditworthiness is difficult and costly). In these situations, one thus easily infers the necessary information by observing obvious features, such as gender (see, for example, Aristei & Gallo, 2016; Bellucci et al., 2010; Mascia & Rossi, 2017).

Several studies suggest that the credit requirements imposed by banks are more likely to favor male rather than female-led firms, mainly because lenders have different perceptions about the entrepreneurs' potential (Alsos & Ljunggren, 2017; Carter et al., 2007; Marlow & Patton, 2005). Compared to male-led enterprises, female-led firms may indeed face a higher rate of rejection of their loan applications (Cavalluzzo et al., 2002), partial rejection by the lender (Kremel & Yazdanfar, 2015; Treichel-Zimmerman & Scott, 2006), higher price conditions, or be required to provide higher collateral for the credit supplied (Alesina et al., 2013; Bellucci et al., 2010;

Mascia & Rossi, 2017; Muravyev et al., 2009; Wu & Chua, 2012). It is worth noting, however, that this evidence is far from conclusive. Indeed, several other studies do not find signs of gender-based discrimination, as they show that women's constraints in access to credit are mostly due to structural features of the firm, such as size, activity sector, the manager's level of education and experience, and the inability or reluctance to provide suitable collateral or personal guarantees (see, for example, Blanchflower, Levine, & Zimmerman, 2003; Carter et al., 2007; Cavalluzzo & Cavalluzzo, 1998; Coleman, 2002; Moro et al., 2017).

We therefore try to shed light on the potential discrimination motives arising from the supply side by testing the following hypotheses.

**Hypothesis 3.** *Female-led firms face a higher probability of being credit constrained, than their male counterparts because they are rejected by the lender, or they decide to refuse the loan as it is too costly.*

**Hypothesis 4.** *Female-led firms face a higher probability of being credit constrained, than their male counterparts because they receive only part of the amount requested.*

### 3 | DATA, MODEL, AND METHODOLOGY

#### 3.1 | Data

We carry out our analysis by relying on firm-level data retrieved from the SAFE, which is jointly run by the ECB and the European Commission (EC). The SAFE is a harmonized and homogeneous data set providing qualitative information on enterprises' financial needs, their experience of access to finance, as well as a series of firm-level and financial characteristics provided on the basis of self-assessed perceptions.<sup>1</sup> Each survey round (or so-called *wave*) of the SAFE is addressed to a randomly selected sample of nonfinancial SMEs included in the Dun & Bradstreet business register.

Although the SAFE does not provide balance sheet data, it has a number of relevant advantages. First, it allows us to trace over time firms' decisions to either access credit or to refrain. It provides qualitative information based on firms' perceptions concerning their experience of accessing credit, and distinguishes the different motives behind firms' decisions about financing. In addition, data are available for a large sample of European SMEs, allowing us to take into account cross-country heterogeneity. Specifically, our analysis covers the 11 largest euro-area economies (Austria, Belgium, France, Finland, Germany, Greece, Italy, Ireland, the Netherlands, Portugal, Spain), as they are the countries whose firms have been systematically surveyed, every round, since 2009.

The SAFE also offers information about the gender of the owner, director, or chief executive officer (CEO) of the firms surveyed. This information is available only from the second to the tenth wave of the survey (the period from July 2009 to March 2014). Therefore, we end up with a sample of 60,058 observations, collected from those nine waves. Specifically, 20,150 observations are from micro-enterprises, 20,245 from small firms, 15,284 from medium-size businesses, and the remaining 4,379 observations refer to a sample of large firms which serves

<sup>1</sup>Because of the anonymity characterizing the survey, we are not able to link quantitative balance sheet information related to the enterprises in our data set.

as control group. In Tables S1 and S2 provided in the Supporting Information available online, we offer a snapshot of the sample observations by country and gender and by country and wave, respectively.

## 3.2 | Model, variables, and methodology

Considering the research hypotheses outlined in Section 2, our model estimates the probability of observing the possible outcomes of our dependent variables as follows:

$$P_i(Y) = f(\text{Female}, \text{firm characteristics}, \text{structural and cyclic macro}, \text{country}, \text{wave}) \quad (1)$$

where  $Y$  is one of the two dependent variables that we employ in our analysis, *Female* is our key regressor, the vector *firm characteristics* controls for the firm's features, *structural and cyclic macro* is a vector of country-level controls, and *country* and *wave* are vectors of country and time dummies, respectively.

### 3.2.1 | Dependent variables

For the purpose of our analysis, we select two questions from the SAFE, namely *q7a\_a* and *q7b\_a*. Question *q7a\_a* inquires about the firms' choices in the application to bank credit and asks:

*[With regard to bank loans], could you please indicate whether you: (1) applied for them over the past 6 months; (2) did not apply because you thought you would be rejected; (3) did not apply because you had sufficient internal funds; (4) or did not apply for other reasons?*

The numbers in parentheses denote the way each interviewee's answers were coded. Hence, we employ such information to generate our first dependent variable which we call *Applying for bank loans*.

Question *q7b\_a* is addressed only to the firms that applied for bank loans and inquires about the outcomes of the applications as follows:

*If you applied and tried to negotiate for [bank loans] over the past 6 months, did you: (1) receive all the financing you requested; (2) receive only part of the financing you requested; (3) refuse to proceed because of unacceptable costs or terms and conditions; (4) or have you not received anything at all?*

Again, the numbers in parentheses denote the way each interviewee's answers were coded. We employ this information to generate our second dependent variable, which we identify as *Obtaining bank loans*.<sup>2</sup>

<sup>2</sup>In Table S3 in the online Supporting Information we provide a breakdown of the sample observations for both dependent variables.

### 3.2.2 | Regressors

The key variable of our investigation is *Female*, which is a dummy that equals 1 if the owner/director/CEO of the enterprise is female, and 0 otherwise. It is worth noting that the information provided by the SAFE does not allow us to distinguish among the three roles (owner, director, and CEO). We acknowledge that the lack of such detail is not negligible. However, it is not crucial in our investigation, as the firms in our sample are mainly micro and small. Therefore, we assume that, in most cases, the firm's owner is also the firm's manager (i.e. manager corresponds to owner-manager).<sup>3</sup>

*Firm characteristics* is a vector that includes both standard firm features (i.e. age, sector, size) and financial indicators, such as the perceived variations in capital, profitability and credit history of the enterprises surveyed. Specifically, to control for the firm's age we utilize the following three dummies; *Very recent*, equal to 1 if the firm is less than 2 years old; *Recent*, equal to 1 if the firm is between 2 and 5 years old; and *Old*, equal to 1 if the firm is between 5 and 10 years old.

In addition, we include industry fixed effects to control for the firm's activity sector: we employ the dummies *Construction*, *Manufacturing*, *Wholesale/retail*, equal to 1 if the firm belongs to the construction, manufacturing, and wholesale and retail trade sector, respectively. Then, to control for the size of the firms surveyed, we utilize three other dummies: *Micro*, equal to 1 if the firm has between 1 and 9 employees; *Small*, equal to 1 if the firm has between 10 and 49 employees; and *Medium*, equal to 1 if the firm has between 50 and 249 employees.

With regard to financial controls, we capture the perceived variations in a firm's capital via the dummies *Capital up* and *Capital down*. Notably, *Capital up (down)* takes the value 1 if the firm declares that its own capital has increased (decreased) over the past 6 months, and 0 otherwise. Similarly, we control for changes in profitability via the dummies *Profit up (down)*, equal to 1 if a firm experienced an increase (decrease) in its profits during the previous 6 months, and 0 otherwise. Moreover, we keep track of the declared variations in the firm credit history by generating *Creditworthiness up (down)*, equal to 1 when an enterprise perceives an increase (decrease) of its creditworthiness over the past 6 months, and 0 otherwise. It is worth noting that all these dummies are not capturing the *level* of capital, profitability, and creditworthiness. Rather, they offer information about the firm's perception of the *change* experienced in each of the above-mentioned measures. We expect that firms exhibiting positive variations in creditworthiness and profitability may be more likely to obtain a bank loan. Finally, we account for the change in the need for loans by including the dummies *Demand up (down)*, equal to 1 when a firm declares that its need for bank credit has increased (decreased) over the past 6 months, and 0 otherwise. Overall, the inclusion of all these variables is aimed at limiting potential biases arising from our estimates, as well as to alleviate concerns that possible gender effects are driven by omitted variables rather than being signs of discrimination.

The *structural and cyclic macro* vector includes the growth of credit, the Index of Economic Freedom, the Herfindahl index of bank concentration, the rate of unemployment, and a dummy accounting for the expansionary monetary policies. Notably, we account for the availability of credit in the economy by including the annual growth rate of bank loans provided to nonfinancial corporations, which we retrieve from the ECB Data Warehouse. In particular, because the SAFE is run with biannual frequency, for the growth of credit we employ averages

<sup>3</sup>To corroborate this assumption, we have checked whether the findings from our analyses change when we run our estimates on a subsample consisting of single-owner businesses only. The results (not reported) appear to be consistent.



of quarterly data for each wave of the survey (similarly to Ferrando et al., 2017). We expect that, during periods characterized by positive growth of credit, firms will be less likely to refrain from applying for credit as well as to face a negative outcome from their loan applications. Moreover, we utilize the Index of Economic Freedom to account for the impact of the legal-institutional environment on the functioning of the credit market. We expect that the higher the level of economic freedom, the easier and less costly the financial transactions will be. Additionally, we control for the structure of the banking market, in each country, via the Herfindahl index of total assets' concentration that we collected from the ECB Data Warehouse. Furthermore, we account for the fluctuations in the business cycle by utilizing the rate of unemployment retrieved from Eurostat, which we compute as averages of quarterly data for each survey round. Overall, we expect that during a slowdown of the cycle, characterized by lower rates of employment, firms tend to suffer more when accessing credit markets, *ceteris paribus*. Finally, we keep track of a period of expansionary monetary policy that followed the announcement of the Outright Monetary Transactions program in 2012 by employing a specific dummy, *OMT*. We suppose that firms can more easily access bank credit during periods characterized by high volumes of money in circulation. Table 1 shows the summary statistics related to the variables included in our specifications, while descriptions and sources of variables are provided in Table A1 in the Appendix. The matrix reporting pairwise correlations between the regressors is available in Table S4 in the online Supporting Information.

### 3.2.3 | Methodology

To estimate model (1), we use multinomial logistic regressions. This method is suitable when the dependent variable is qualitative and has more than two outcome categories with no natural ordering. Indeed, in a multinomial logistic setting, binary logistic regressions are simultaneously run for comparison among the various outcome categories, which permits efficient analysis of the estimates as opposed to multiple independent logit models. The use of both qualitative and quantitative regressors is admitted with such a technique that employs maximum likelihood to assess the regression's function. Additionally, our empirical setup includes calibrated weights to adjust the sample to be representative of the population from which it is extracted (as in Ferrando et al., 2017). Furthermore, we correct standard errors to address heteroskedasticity and we cluster them at the country level in order to remove potential bias affecting the estimates. Finally, we carry out all our tests by including either country and time dummies separately or, alternatively, country  $\times$  time dummies (while dropping our country-level regressors) in order to control for unobserved time-varying country characteristics.

### 3.3 | Endogeneity

There is a discrete consensus in the literature around the view that the gender of a firm's leader might not be exogenous (Adams & Ferreira, 2009; Mascia & Rossi, 2017; Sila et al., 2016). Thus, any potential correlation between the leader's gender and the outcomes of our dependent variables accounting for bank loan (non-)applications and results may be spurious. Specifically, omitted-firm characteristics can be source of endogeneity. Indeed, unobservable factors, such as corporate culture, may guide the choice regarding the gender of the firm leadership.

**TABLE 1** Summary statistics

This table reports summary statistics of the variables employed in our analyses. *Applying for bank loans* is a variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively. *Obtaining bank loans* is a variable equal to 1, 2, 3, or 4 if a firm applied and got everything, applied but only got part of the loan, applied but refused because the cost was too high, or applied but was rejected during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Medium* is a dummy variable equal to 1 if the firm has between 50 and 249 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. *Construction* is a dummy variable equal to 1 if the firm's main activity is construction. *Manufacturing* is a dummy variable equal to 1 if the firm's main activity is manufacturing. *Wholesale/retail* is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program.

	Observations	Mean	Median	St. Dev.	p1	p99
Dependent variables						
Applying for bank loans	60,058	2.625	3.000	1.085	1.000	4.000
Obtaining bank loans	14,866	1.591	1.000	0.994	1.000	4.000
Key regressor						
Female	60,058	0.125	0.000	0.331	0.000	1.000
Firm-level controls						
Profit up	60,058	0.246	0.000	0.431	0.000	1.000
Profit down	60,058	0.466	0.000	0.499	0.000	1.000
Creditworthiness up	60,058	0.213	0.000	0.409	0.000	1.000
Creditworthiness down	60,058	0.141	0.000	0.348	0.000	1.000
Capital up	60,058	0.253	0.000	0.434	0.000	1.000
Capital down	60,058	0.203	0.000	0.403	0.000	1.000
Demand up	60,058	0.190	0.000	0.392	0.000	1.000
Demand down	60,058	0.135	0.000	0.341	0.000	1.000
Micro	60,058	0.336	0.000	0.472	0.000	1.000
Small	60,058	0.337	0.000	0.473	0.000	1.000
Medium	60,058	0.254	0.000	0.436	0.000	1.000
Very recent	60,058	0.017	0.000	0.127	0.000	1.000
Recent	60,058	0.066	0.000	0.248	0.000	1.000
Old	60,058	0.126	0.000	0.332	0.000	1.000
Construction	60,058	0.100	0.000	0.300	0.000	1.000
Manufacturing	60,058	0.256	0.000	0.436	0.000	1.000
Wholesale/retail	60,058	0.336	0.000	0.472	0.000	1.000

(Continues)

**TABLE 1** (Continued)

	Observations	Mean	Median	St. Dev.	p1	p99
Country-level controls						
Credit growth	60,058	-0.141	0.400	4.004	-10.150	8.400
Economic freedom	60,058	67.814	69.200	5.575	55.400	81.300
Unemployment rate	60,058	11.693	9.400	6.477	4.700	27.400
Concentration	60,058	0.091	0.060	0.079	0.021	0.370
OMT	60,058	0.478	0.000	0.500	0.000	1.000

Abbreviations: p1, percentile 1; p99, percentile 99.

In order to cope with this potential endogeneity issue, we employ a two-step approach in a similar fashion to Cumming (2008) and Heger and Tykvová (2009). Notably, in the first step we utilize a logit model to investigate the determinants of our *Female* dummy. More specifically, for identification purposes, we need an instrument that is strongly correlated with the *Female* regressor and is not correlated with the error term. We therefore identify the share of female employment by sector of activity in each country as a proper instrument for our *Female* dummy (as in Mascia & Rossi, 2017). We retrieve this instrument from Eurostat and utilize averages of quarterly data for each wave of the survey. Hence, we regress *Female* on the rate of female employment and a variety of firm and country controls from model (1). Then, in the second stage, we estimate model (1) by employing our multinomial logistic setting where we include the predicted values from the first step instead of using the *Female* dummy.

As an additional robustness check, we address the endogeneity issue by employing an alternative instrument. Indeed, we are aware that the use of the share of female employment by sector may present some limitations due to the fact that an industry with, say, a higher portion of female workers might not necessarily be an industry with a corresponding share of women entrepreneurs/managers. Therefore, to further corroborate our analysis, we instrument our *Female* dummy by employing the share of female self-employment, by sector of activity. Like the previous instrument, this variable is available quarterly from Eurostat, and we thus link its averages to each survey round. Finally, this variable is only available for a smaller sample, which is also the reason why we do not employ it as the main instrument.<sup>4</sup>

## 4 | EMPIRICAL RESULTS

### 4.1 | Multinomial logistic analysis

We start our empirical analysis by simultaneously testing Hypotheses 1 and 2 through the use of our multinomial logistic setting. Notably, we estimate model (1) with the first of the two dependent variables (i.e. *Applying for bank loans*). More specifically, the use of such methodology requires us to specify a base outcome (i.e. *applied*) against which we compare the remaining outcomes of the dependent variable under investigation (i.e. *non-application for fear of rejection, for sufficient funds, for other reasons*). The first four columns in Table 2 report the results of a test carried out utilizing country and time dummies individually; the remaining four columns report the same test when employing country  $\times$  time dummies in lieu of the country-level controls.

<sup>4</sup>For the sake of clarity, this instrument is available for the manufacturing and wholesale/retail industries for all the sampled countries. As regards the construction industry, the variable is missing for Austria, France, Ireland, and Portugal. No observations are available for the mining industry.

**TABLE 2** Impact of gender on non-applications for bank loans

This table reports regression results for the multinomial logistic model presented in Section 3.2, concerning the impact of gender on non-applications for bank loans. The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Medium* is a dummy variable equal to 1 if the firm has between 50 and 249 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. *Construction* is a dummy variable equal to 1 if the firm's main activity is construction. *Manufacturing* is a dummy variable equal to 1 if the firm's main activity is manufacturing. *Wholesale/retail* is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country  $\times$  time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
<b>Female</b>	<b>(base)</b>	<b>0.296***</b> (0.09)	<b>0.102***</b> (0.04)	<b>0.096***</b> (0.03)	<b>(base)</b>	<b>0.295***</b> (0.09)	<b>0.100***</b> (0.04)	<b>0.098***</b> (0.03)
Credit growth		-0.032 (0.03)	-0.021* (0.01)	0.011 (0.02)				
Economic freedom		-0.051 (0.08)	-0.042 (0.04)	-0.014 (0.04)				

(Continues)

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
	Applied rejection	Did not apply because of possible rejection	Did not apply sufficient internal funds	Did not apply for other reasons	Applied	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
Unemployment rate	0.132*** (0.02)	0.008 (0.03)	0.045 (0.03)					
Concentration	-5.669 (5.62)	1.837 (1.61)	-0.080 (3.66)					
OMT	-0.463*** (0.14)	-0.077 (0.06)	0.014 (0.10)					
Profit up	-0.033 (0.07)	-0.004 (0.06)	-0.093 (0.06)		-0.040 (0.07)	-0.002 (0.06)	-0.093* (0.06)	
Profit down	0.048 (0.06)	-0.071* (0.04)	0.100*** (0.02)		0.047 (0.05)	-0.068* (0.04)	0.098*** (0.02)	
Creditworthiness up	-0.222 (0.15)	-0.266*** (0.08)	-0.303*** (0.11)		-0.202 (0.15)	-0.271*** (0.08)	-0.309*** (0.12)	
Creditworthiness down	0.238*** (0.09)	-0.791*** (0.14)	-0.391*** (0.11)		0.247*** (0.09)	-0.787*** (0.14)	-0.385*** (0.11)	
Capital up	-0.309*** (0.07)	-0.006 (0.03)	-0.312*** (0.07)		-0.314*** (0.08)	-0.007 (0.03)	-0.309*** (0.07)	
Capital down	0.510*** (0.13)	-0.124** (0.05)	0.104 (0.07)		0.518*** (0.13)	-0.126** (0.05)	0.103 (0.07)	
Demand up	-1.118*** (0.13)	-2.908*** (0.14)	-2.176*** (0.11)		-1.122*** (0.13)	-2.917*** (0.14)	-2.175*** (0.12)	
Demand down	-0.143 (0.11)	-0.329*** (0.09)	-0.357*** (0.10)		-0.141 (0.11)	-0.325*** (0.09)	-0.351*** (0.10)	
Micro	1.576*** (0.17)	0.556*** (0.13)	0.777*** (0.12)		1.565*** (0.17)	0.557*** (0.13)	0.778*** (0.13)	

(Continues)

TABLE 2 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply sufficient internal funds	Did not apply for other reasons	Applied rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
Small	1.001*** (0.16)	0.246 (0.16)	0.356*** (0.12)	0.995*** (0.16)	0.247 (0.16)	0.357*** (0.12)	
Medium	0.503*** (0.11)	0.051 (0.09)	0.042 (0.08)	0.496*** (0.12)	0.052 (0.09)	0.043 (0.08)	
Very recent	-0.066 (0.18)	-0.293 (0.18)	-0.163 (0.25)	0.047 (0.15)	-0.311 (0.19)	-0.111 (0.24)	
Recent	0.549*** (0.09)	0.019 (0.06)	0.309*** (0.11)	0.530*** (0.10)	0.039 (0.06)	0.299*** (0.11)	
Old	0.297*** (0.10)	0.080 (0.08)	0.218*** (0.06)	0.300*** (0.10)	0.089 (0.08)	0.215*** (0.06)	
Construction	-0.003 (0.11)	-0.152*** (0.05)	-0.097 (0.07)	-0.007 (0.11)	-0.150*** (0.05)	-0.097 (0.07)	
Manufacturing	-0.162** (0.08)	0.069 (0.07)	0.050 (0.07)	-0.157** (0.08)	0.068 (0.07)	0.043 (0.07)	
Wholesale/retail	-0.001 (0.07)	0.163*** (0.04)	0.168*** (0.06)	0.005 (0.06)	0.164*** (0.04)	0.170*** (0.06)	
Observations	60,058	60,058	60,058	60,058	60,058	60,058	
Pseudo <i>R</i> -squared	0.144	0.144	0.144	0.151	0.151	0.151	
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	
Country × Time dummies							Yes

Starting with column 2 of Table 2 (Hypothesis 1), we observe that the coefficient related to *Female* is positive and highly significant at the 1% level, signaling that women are more likely than men not to apply for fear of rejection. The same result is observed in column 6 where we employ country  $\times$  time dummies in lieu of the country-level controls. This evidence underscores that, in the euro area, women seem to behave as discouraged borrowers anticipating a possible denial from the lender. Such a finding is consistent with theories emphasizing the greater lack of confidence characterizing women (see, for example, Carter et al., 2015; Moro et al., 2017).

Moving to columns 3–4 and 7–8 of Table 2, where we test Hypothesis 2, we again find that *Female* is highly significant at the 1% level.<sup>5</sup> This suggests that female-led firms are more likely than men-led firms not to apply for bank loans because they have sufficient funds or for other reasons, as opposed to the applied outcome. This evidence gives support to the idea that women either suffer, more than men, from potential frictions characterizing the credit markets, thus leading them to rely on internal finance (see, for example, Fazzari et al., 1988), or are less inclined than men to exploit possible growth opportunities, thus not requesting additional finance (Alsos et al., 2006; Carter et al., 2015; Malmström et al., 2017), or are simply more parsimonious in the use of funds. Furthermore, the result from columns 4 and 8 would appear to signal, for instance, that women turn to the bank-lending channel less than men as they perhaps prefer to rely on informal channels, such as family or other social ties (Alesina et al., 2013).

As regards the controls employed in the model, it is worthy of note that the dummy *Capital up* enters with a negative sign, suggesting that, when firms increase their capital endowment, their probability of not applying for bank loans diminishes.<sup>6</sup> Moving to the country-level controls, interestingly we observe the significance of the unemployment rate and the *OMT* variable in column 2 of Table 2. Specifically, an increase in the unemployment rate leads firms to doubt that any loan application they may make will be successful, given the negative macroeconomic environment surrounding their enterprise, so that they eventually give up. In contrast, during periods of expansionary monetary policy, as captured by our *OMT* dummy, firms seem to regain confidence in the banking system, thus showing a reduction in their fear of rejection.

Turning to the supply side, Table 3 shows regressions arising from model (1) when employing our second dependent variable (i.e. *Obtaining bank loans*) to estimate Hypotheses 3 and 4. Here we assess the occurrence of a bias between female- and male-led firms by looking at the different forms of financial constraints perpetrated by the lender (i.e. *applied and got part of the loan requested*, *applied and refused because the loan was too costly*, *applied but was rejected*) as opposed to the base outcome (i.e. *applied and got everything*). The first four columns in Table 3 report regressions results when we estimate model (1) by employing country and time dummies separately. The remaining four columns show the results obtained when including country  $\times$  time dummies in lieu of the country-level controls.

Overall, we find that the *Female* dummy is never significant across the various columns, suggesting that there is no sign of loan officer bias against women. This result contradicts

<sup>5</sup>Unreported tests show that results from Table 2 are confirmed if we exclude from our analysis observations related to large firms.

<sup>6</sup>Results do not change appreciably if we employ three continuous variables (taking values of -1 when decreased, 0 when unchanged, and 1 when increased) to capture the change in the levels of capital, profit, and creditworthiness, rather than using two dummies for each firm characteristic (six dummies overall) as we are doing here.

**TABLE 3** Impact of gender on the results of applications for bank loans

This table reports regression results for the multinomial logistic model presented in Section 3.2, concerning the impact of gender on the results of applications for bank loans. The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied and got everything, applied but only got part of the loan, applied but refused because the cost was too high, or applied but was rejected during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Medium* is a dummy variable equal to 1 if the firm has between 50 and 249 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. *Construction* is a dummy variable equal to 1 if the firm's main activity is construction. *Manufacturing* is a dummy variable equal to 1 if the firm's main activity is manufacturing. *Wholesale/retail* is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country  $\times$  time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected
<b>Female</b>	<b>(base)</b>	<b>0.041</b> <b>(0.16)</b>	<b>0.035</b> <b>(0.38)</b>	<b>0.202</b> <b>(0.14)</b>	<b>(base)</b>	<b>-0.085</b> <b>(0.06)</b>	<b>-0.058</b> <b>(0.17)</b>	<b>0.108</b> <b>(0.10)</b>
Credit growth		-0.013 (0.01)	-0.009 (0.04)	0.013 (0.02)				
Economic freedom		-0.010 (0.05)	-0.032 (0.12)	-0.183** (0.08)				

(Continues)



TABLE 3 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected
Unemployment rate		0.054** (0.03)	0.127* (0.07)	0.107*** (0.04)				
Concentration		-7.143 (5.06)	-3.427 (5.49)	-18.963*** (5.91)				
OMT		-0.079 (0.13)	-1.440*** (0.31)	-0.348* (0.18)				
Profit up		0.001 (0.06)	0.158 (0.30)	0.261* (0.14)	-0.030 (0.04)	0.050 (0.19)	0.239*** (0.09)	0.239*** (0.09)
Profit down		0.100** (0.04)	0.102 (0.20)	0.267*** (0.04)	0.148*** (0.03)	0.161 (0.11)	0.303*** (0.05)	0.303*** (0.05)
Creditworthiness up		0.041 (0.08)	-0.183 (0.27)	-0.120 (0.10)	0.002 (0.04)	-0.136 (0.15)	-0.134** (0.06)	-0.134** (0.06)
Creditworthiness down		0.573*** (0.05)	0.698*** (0.25)	0.965*** (0.12)	0.581*** (0.06)	0.621*** (0.21)	0.979*** (0.11)	0.979*** (0.11)
Capital up		-0.247*** (0.02)	-0.072 (0.22)	-0.039 (0.08)	-0.159*** (0.05)	-0.021 (0.11)	-0.177*** (0.07)	-0.177*** (0.07)
Capital down		0.411*** (0.12)	0.451** (0.18)	0.622*** (0.12)	0.402*** (0.07)	0.510*** (0.12)	0.622*** (0.08)	0.622*** (0.08)
Demand up		0.447*** (0.11)	-0.522** (0.26)	0.007 (0.17)	0.433*** (0.08)	-0.334* (0.19)	0.030 (0.15)	0.030 (0.15)
Demand down		0.268** (0.13)	-0.096 (0.21)	0.258 (0.17)	0.179** (0.09)	0.033 (0.19)	0.368** (0.15)	0.368** (0.15)
Micro		-0.199 (0.23)	0.776** (0.34)	1.403*** (0.28)	-0.261 (0.20)	0.613 (0.38)	1.355*** (0.24)	1.355*** (0.24)
Small		-0.174* (0.10)	0.323 (0.23)	0.923*** (0.21)	-0.193** (0.09)	0.272 (0.28)	0.845*** (0.21)	0.845*** (0.21)

(Continues)

TABLE 3 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected
Medium		-0.134*** (0.05)	-0.122 (0.29)	0.637*** (0.15)		-0.149*** (0.05)	-0.119 (0.33)	0.592*** (0.15)
Very recent		0.260 (0.29)	-0.122 (0.36)	0.661** (0.27)		0.409 (0.34)	0.332 (0.37)	0.726*** (0.23)
Recent		0.221** (0.09)	0.558* (0.33)	0.896*** (0.12)		0.261*** (0.09)	0.475** (0.24)	0.810*** (0.12)
Old		0.041 (0.20)	-0.009 (0.37)	0.455*** (0.16)		0.073 (0.08)	0.010 (0.28)	0.434*** (0.09)
Construction		0.287** (0.11)	0.293** (0.14)	0.309** (0.14)		0.228* (0.12)	0.198 (0.16)	0.221* (0.12)
Manufacturing		-0.084 (0.10)	-0.561*** (0.21)	-0.212** (0.09)		-0.050 (0.09)	-0.409** (0.20)	-0.153* (0.08)
Wholesale/retail		-0.036 (0.05)	-0.258 (0.21)	-0.057 (0.13)		0.011 (0.07)	-0.026 (0.22)	-0.047 (0.13)
Observations	14,866	14,866	14,866	14,866	14,866	14,866	14,866	14,866
Pseudo <i>R</i> -squared	0.127	0.127	0.127	0.127	0.133	0.133	0.133	0.133
Time dummies	Yes	Yes	Yes	Yes				
Country dummies	Yes	Yes	Yes	Yes				
Country × Time dummies					Yes	Yes	Yes	Yes

previous studies highlighting the opposite (see, for example, Bellucci et al., 2010; Cavalluzzo et al., 2002).

Moving on to the firm-level controls, in Table 3 we note that the coefficients of the dummies *Creditworthiness down* and *Capital down* are generally positive and significant, implying that a perceived deterioration in the firm's credit history and capital endowment are associated, as expected, with a greater probability of receiving only part of the required funds, refusing the loan because of its high costs, as well as facing rejection by the lender. As regards the country-level variables, we observe that the unemployment rate is positive and significant, suggesting that worsening employment levels lead lenders to refuse loan applications or, at best, to provide only part of the required credit, presumably because of the severe macroeconomic conditions. In contrast, the negative and significant coefficients of the *OMT* dummy (columns 3 and 4, Table 3) underscore that the probability of SMEs refusing the proposed loan or being denied credit diminishes during periods of expansionary monetary policy. Additionally, some interesting insights emerge with respect to the structural controls. First, the coefficient of the banking market *Concentration* variable is negative and significant (column 4, Table 3). This result corroborates the information hypothesis (Dell'Ariccia & Marquettz, 2006; Fungáčová, Shamshur, & Weill, 2017), which suggests that the higher the banking market concentration, the higher the incentive for banks to focus on relationship lending. This enables banks to reduce information asymmetries (thanks to a greater amount of soft information collected throughout the relationship) and favors the functioning of the credit market. Finally, the variable accounting for a country's *Economic freedom* exhibits a negative and significant coefficient in column 4, which highlights that firms are less likely to face a loan rejection in countries characterized by greater levels of economic freedom.<sup>7</sup>

In additional analyses, which we do not report for the sake of brevity, we obtain similar results when the demand for and supply of other sources of finance—namely, (a) trade credit, (b) other external financing, and (c) bank overdraft, credit line or credit card overdraft—are investigated.<sup>8</sup> Notably, we find that female-led SMEs are also more likely not to apply for each of the three above-mentioned sources of finance, compared to male-led ones, for fear of rejection, due to sufficient funds, and for other reasons. In contrast, and in line with the results from Table 3, female-led SMEs do not appear to be discriminated against when they apply for trade credit, for other external finance, and for bank overdrafts. These findings bring novel evidence to a branch of the literature that has traditionally investigated the attitude of firms and credit institutions with respect to bank loan demand and supply, and seem to suggest that self-restraint is intrinsically rooted in women's behavior.

## 4.2 | Robustness check: interaction terms

A concern that may arise from our investigation is that the self-restraint behavior of women is guided by deteriorations in firms' performance, rather than being a sign of potential gender bias. To address the issue, we re-estimate an alternative version of Equation (1) where we

<sup>7</sup>In unreported analyses, we find that our results do not change when we employ an alternative measure of economic freedom, the Economic Freedom of the World index provided by the Fraser Institute.

<sup>8</sup>The SAFE also investigates (via questions *q7a\_b*, *q7a\_c*, and *q7a\_d*, respectively) the reasons that led enterprises not to apply for trade credit, other external financing, and bank overdrafts (the latter being available only from the third wave of the survey). Furthermore, limited to the enterprises that applied for one of the above-mentioned sources of finance, the SAFE also enquires about the outcome of their applications via questions *q7b\_b*, *q7b\_c*, and *q7b\_d*.

**TABLE 4** Impact of gender on non-applications for bank loans: interactions

This table reports regression results for the multinomial logistic model presented in Section 3.2, concerning the impact of gender on non-applications for bank loans. The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Medium* is a dummy variable equal to 1 if the firm has between 50 and 249 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. *Construction* is a dummy variable equal to 1 if the firm's main activity is construction. *Manufacturing* is a dummy variable equal to 1 if the firm's main activity is manufacturing. *Wholesale/retail* is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country × time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
<b>Female</b>	<b>(base)</b>	<b>0.262***</b> (0.07)	<b>0.081**</b> (0.04)	<b>0.048</b> (0.05)	<b>(base)</b>	<b>0.257***</b> (0.08)	<b>0.077**</b> (0.04)	<b>0.050</b> (0.05)
Profit up		-0.052 (0.06)	-0.013 (0.06)	-0.118 (0.07)		-0.062 (0.06)	-0.011 (0.05)	-0.119 (0.07)
Female × Profit up		0.180 (0.18)	0.101 (0.10)	0.249 (0.18)		0.197 (0.18)	0.111 (0.10)	0.250 (0.18)

(Continues)

TABLE 4 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply sufficient internal funds	Did not apply for other reasons	Applied	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
Credit growth		-0.032 (0.03)	-0.021* (0.01)	0.011 (0.02)				
Economic freedom		-0.051 (0.08)	-0.042 (0.04)	-0.014 (0.04)				
Unemployment rate		0.132*** (0.02)	0.008 (0.03)	0.045 (0.03)				
Concentration		-5.685 (5.63)	1.834 (1.61)	-0.098 (3.66)				
OMT		-0.463*** (0.14)	-0.077 (0.06)	0.013 (0.10)				
Profit down		0.048 (0.06)	-0.071* (0.04)	0.100*** (0.02)	0.047 (0.05)	-0.068* (0.04)	0.098*** (0.02)	
Creditworthiness up		-0.222 (0.15)	-0.266*** (0.08)	-0.304*** (0.11)	-0.202 (0.15)	-0.271*** (0.08)	-0.310*** (0.12)	
Creditworthiness down		0.238*** (0.09)	-0.791*** (0.14)	-0.392*** (0.11)	0.247*** (0.09)	-0.787*** (0.14)	-0.386*** (0.11)	
Capital up		-0.308*** (0.07)	-0.006 (0.03)	-0.310*** (0.07)	-0.313*** (0.08)	-0.006 (0.03)	-0.308*** (0.07)	
Capital down		0.511*** (0.13)	-0.123** (0.05)	0.105 (0.07)	0.520*** (0.13)	-0.125** (0.05)	0.105 (0.07)	
Demand up		-1.118*** (0.13)	-2.908*** (0.14)	-2.176*** (0.11)	-1.122*** (0.13)	-2.917*** (0.14)	-2.176*** (0.12)	
Demand down		-0.144 (0.11)	-0.329*** (0.09)	-0.358*** (0.10)	-0.142 (0.11)	-0.326*** (0.09)	-0.352*** (0.10)	
Micro		1.575*** (0.17)	0.556*** (0.13)	0.777*** (0.12)	1.564*** (0.17)	0.557*** (0.13)	0.778*** (0.12)	

(Continues)



include an interaction term between our *Female* dummy and a measure of the change in firms' performance. Specifically, because the SAFE is not linked to the enterprises' balance sheet data, we capture variations in performance by utilizing the declared increase in the firm's profits (*Profit up*). If our hypothesis is corroborated, we should yet find a positive coefficient for *Female* even when firms exhibit better performance. Table 4 displays the results of such a test. Although the interaction term is never significant, we observe that *Female* always remains positive and statistically significant in all columns except those related to non-application for other reasons. This suggests that women-led firms are more likely than men-led ones not to apply for credit because they are discouraged or because they have sufficient funds, and this result does not appear to be driven by the economic conditions of the enterprise.<sup>9</sup>

Overall, the message we get from this test is that female-led SMEs appear to unconditionally refrain from applying for bank loans for fear of rejection or because they have enough funds, even if their businesses are profitable. This is unfortunate, considering that past performance may serve as a signal to banks of the viability of the firm (Eddleston, Ladge, Mitteness, & Balachandra, 2016) and hence improve the chances of success with a loan application. This result particularly highlights that policy-makers should act in order to mitigate the concerns faced by female-led SMEs—especially when they behave as discouraged—and help them gain confidence in their abilities in successfully running and growing their businesses.

### 4.3 | Addressing endogeneity

As pointed out in Section 3.3, the choice of hiring a female leader at the head of an enterprise might not be completely exogenous. To cope with such a concern, we employ a two-step approach following Cumming (2008) and Heger and Tykvová (2009). As widely described earlier, we use the biannual share of female employment by sector of activity as an instrument for our *Female* dummy. However, because the SAFE does not provide information about the main activity carried out by large firms (thus implying that we are not able to link their observations with our instrument), we are forced to carry out our endogeneity checks on the sample formed by SMEs only. Therefore, our sample size decreases by about 7% to 55,679 observations.<sup>10</sup>

In Table 5 we report the estimates of the first logistic step, where we find that the instrument has a highly significant (at the 1% level) positive impact on the probability of female leadership. This significant result is an essential condition for going forward with our investigation and thus carrying out the second step of our methodology. Therefore, in Tables 6 and 7 we report the estimates of the second stage of our two-step approach, where we estimate model (1) via a multinomial logistic model that utilizes—in lieu of the original *Female* dummy—the predicted value of *Female* obtained from the first-step logistic estimation.<sup>11</sup>

Starting from Table 6, where we employ the first of our dependent variables, we observe that, even after correcting for endogeneity, *Female* has a significant positive effect on the probability of the various non-application reasons. To rule out the possibility that the inclusion of country and time dummies generates collinearity with the macro and structural controls (as utilized in

<sup>9</sup>We find analogous results (not reported for the sake of brevity) when we interact *Female* with variables accounting for improvements in firms' credit history (*Creditworthiness up*) and capital (*Capital up*).

<sup>10</sup>Note that, to avoid collinearity with the (sector-invariant) instrument, we omit the dummies accounting for sector of activity.

<sup>11</sup>Unreported tests highlight that our results are robust to using bootstrapped standard errors.

**TABLE 5** Two-step multinomial logistic analysis (first step): impact of the share of female employment (by sector of activity) on the *Female* dummy

This table reports regression results of the first stage of the two-step multinomial logistic model discussed in Section 3.3, concerning the impact of the share of female employment (by sector of activity) on the *Female* dummy. The dependent variable is a variable equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. *Female employment* is a variable accounting for the share of female employment, by sector of activity. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. The regression uses sampling weights that adjust the sample to be representative of the population. Additionally, the regression includes time and country dummies. The intercept is included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	<b>Female</b>
<b>Female Employment</b>	<b>1.195*** (0.19)</b>
Credit growth	0.015** (0.01)
Economic freedom	0.005 (0.00)
Unemployment rate	0.001 (0.00)
Concentration	-1.450*** (0.54)
OMT	0.086* (0.05)
Profit up	-0.032 (0.03)
Profit down	-0.006 (0.04)
Creditworthiness up	0.006 (0.02)
Creditworthiness down	-0.037 (0.04)

(Continues)



**TABLE 5** (Continued)

	<b>Female</b>
Capital up	−0.292*** (0.03)
Capital down	0.035 (0.02)
Demand up	−0.109*** (0.03)
Demand down	−0.158* (0.09)
Micro	0.856*** (0.10)
Small	0.355*** (0.03)
Very recent	0.410*** (0.05)
Recent	0.344*** (0.07)
Old	0.106 (0.08)
Observations	55,679
Pseudo <i>R</i> -squared	0.035
Time dummies	Yes
Country dummies	Yes

the first four columns of Table 6), we re-estimate our model, first excluding time dummies only, then omitting both time and country dummies. Results (not reported for the sake of brevity) confirm our previous findings. In addition, our evidence further improves when we drop the country-level controls and include country  $\times$  time dummies in columns 5–8. Overall, this result underscores that our earlier findings are corroborated even after addressing the endogeneity concern.

We now repeat the same procedure for the second of our dependent variables, namely *Obtaining bank loans*. Results are displayed in Table 7 where we find that *Female* is never statistically significant across the various specifications, confirming that women do not appear to be treated differently than men.

To corroborate our findings, we then use the alternative variable (as described in Section 3.3) to instrument our *Female* dummy. Namely, we utilize the share of female self-employment by sector of activity. Overall, unreported tests show that our two-step multinomial logistic results still hold when we employ this alternative instrument.

#### 4.4 | Additional analysis: the impact of the economic cycle

In this section we exploit the macroeconomic heterogeneity characterizing our set of data. Notably, we aim to investigate whether variations in the macroeconomic conditions over time exert a different impact on both the self-restraint behavior of women-led firms as well as on the

**TABLE 6** Two-step multinomial logistic analysis (second step): impact of gender on non-applications for bank loans

This table reports regression results of the final stage of the two-step multinomial logistic model discussed in Section 3.3, concerning the impact of gender on non-applications for bank loans. The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively. Here, the variable *Female* contains predicted values of the *Female* dummy obtained from the first-step logistic estimation reported in Table 5. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country  $\times$  time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply because of sufficient internal reasons	Applied rejection	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply because of sufficient internal reasons
<b>Female</b>	<b>(base)</b>	<b>0.746**</b> (0.35)	<b>3.294***</b> (0.62)	<b>3.045***</b> (0.49)	<b>(base)</b>	<b>0.687**</b> (0.34)	<b>3.262***</b> (0.62)	<b>3.041***</b> (0.52)
Credit growth		-0.012 (0.03)	-0.015 (0.02)	0.012 (0.02)				
Economic freedom		-0.073 (0.06)	-0.065* (0.04)	-0.039 (0.04)				
Unemployment rate		0.121*** (0.02)	0.006 (0.03)	0.046* (0.03)				

(Continues)

TABLE 6 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied rejection	Did not apply because of possible rejection	Did not apply sufficient internal funds	Did not apply for other reasons	Applied	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
Concentration	-4.844 (3.68)		3.301** (1.67)	0.394 (2.74)				
OMT	-0.440** (0.20)		-0.128** (0.06)	-0.023 (0.12)				
Profit up	0.076 (0.12)		0.135*** (0.05)	0.000 (0.03)	Applied	0.070 (0.12)	0.133*** (0.05)	-0.003 (0.03)
Profit down	0.120** (0.05)		0.011 (0.07)	0.166*** (0.04)		0.116*** (0.04)	0.013 (0.07)	0.161*** (0.04)
Creditworthiness up	-0.265** (0.11)		-0.242*** (0.05)	-0.247*** (0.06)		-0.249** (0.11)	-0.248*** (0.05)	-0.247*** (0.06)
Creditworthiness down	0.172* (0.10)		-0.771*** (0.17)	-0.419*** (0.11)		0.178* (0.09)	-0.769*** (0.17)	-0.414*** (0.11)
Capital up	-0.248*** (0.09)		0.159*** (0.04)	-0.132*** (0.04)		-0.247*** (0.09)	0.157*** (0.04)	-0.132*** (0.04)
Capital down	0.483*** (0.10)		-0.186*** (0.04)	0.033 (0.04)		0.482*** (0.10)	-0.189*** (0.04)	0.033 (0.04)
Demand up	-0.981*** (0.11)		-2.913*** (0.18)	-2.074*** (0.11)		-0.984*** (0.12)	-2.927*** (0.19)	-2.069*** (0.11)
Demand down	-0.140 (0.11)		-0.377*** (0.08)	-0.377*** (0.12)		-0.144 (0.11)	-0.372*** (0.08)	-0.377*** (0.12)
Micro	1.096*** (0.10)		0.519*** (0.07)	0.757*** (0.10)		1.095*** (0.10)	0.520*** (0.07)	0.756*** (0.10)
Small	0.508*** (0.10)		0.197** (0.08)	0.320*** (0.07)		0.510*** (0.10)	0.199** (0.08)	0.320*** (0.07)
Very recent	-0.091 (0.15)		-0.584*** (0.09)	-0.401* (0.23)		-0.006 (0.13)	-0.612*** (0.09)	-0.363* (0.22)

(Continues)

TABLE 6 (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons	Applied	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons
Recent		0.457*** (0.08)	-0.270*** (0.06)	0.012 (0.06)		0.449*** (0.09)	-0.248*** (0.06)	0.001 (0.06)
Old		0.256** (0.10)	-0.081 (0.09)	0.072 (0.08)		0.262** (0.10)	-0.073 (0.08)	0.069 (0.08)
Observations	55,679	55,679	55,679	55,679	55,679	55,679	55,679	55,679
Pseudo <i>R</i> -squared	0.132	0.132	0.132	0.132	0.139	0.139	0.139	0.139
Time dummies	Yes	Yes	Yes	Yes				
Country dummies	Yes	Yes	Yes	Yes				
Country × Time dummies					Yes	Yes	Yes	Yes

**TABLE 7** Two-step multinomial logistic analysis (second step): impact of gender on the results of applications for bank loans

This table reports regression results of the final stage of the two-step multinomial logistic model discussed in Section 3.3, concerning the impact of gender on the results of applications for bank loans. The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied and got everything, applied but only got part of the loan, applied but refused because the cost was too high, or applied but was rejected during the past 6 months, respectively. Here, the variable *Female* contains predicted values of the *Female* dummy obtained from the first-step logistic estimation reported in Table 5. *Credit growth* is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round. *Economic freedom* is an aggregate measure of a country's overall economic freedom. *Unemployment rate* is the annual unemployment rate based on averages of quarterly data for each survey round. *Concentration* is the Herfindahl index of total assets concentration (for the banking sector). *OMT* is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. *Profit up* is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months. *Profit down* is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months. *Creditworthiness up* is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months. *Creditworthiness down* is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months. *Capital up* is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months. *Capital down* is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months. *Demand up* is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months. *Demand down* is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months. *Micro* is a dummy variable equal to 1 if the firm has between 1 and 9 employees. *Small* is a dummy variable equal to 1 if the firm has between 10 and 49 employees. *Very recent* is a dummy variable equal to 1 if the firm is less than 2 years old. *Recent* is a dummy variable equal to 1 if the firm is between 2 and 5 years old. *Old* is a dummy variable equal to 1 if the firm is between 5 and 10 years old. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country × time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Female</b>	<b>Applied and got everything (base)</b>	<b>Applied but only got part</b>	<b>Applied but refused because cost too high</b>	<b>Applied but was rejected</b>	<b>Applied and got everything (base)</b>	<b>Applied but only got part</b>	<b>Applied but refused because cost too high</b>	<b>Applied but was rejected</b>
		0.032 (1.04)	-1.133 (3.96)	-0.922 (1.48)	0.010 (0.99)	0.010 (0.99)	-0.998 (4.04)	-0.901 (1.57)
Credit growth		-0.019 (0.02)	0.002 (0.02)	0.010 (0.03)				
Economic freedom		0.001 (0.03)	-0.010 (0.07)	-0.096* (0.06)				
Unemployment rate		0.029 (0.03)	0.085 (0.07)	0.076** (0.03)				

(Continues)

TABLE 7 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected	Applied and got everything	Applied and only got part	Applied but refused because cost too high	Applied but was rejected
Concentration	-2.511 (3.18)	-9.475* (5.42)	-11.468*** (3.82)				
OMT	0.016 (0.13)	-0.564 (0.35)	-0.114 (0.26)				
Profit up	-0.047 (0.06)	0.103 (0.17)	0.223** (0.09)	Applied and got everything	-0.052 (0.06)	0.099 (0.17)	0.221** (0.09)
Profit down	0.199*** (0.04)	0.201* (0.12)	0.308*** (0.04)	Applied but was rejected	0.195*** (0.04)	0.184* (0.11)	0.293*** (0.04)
Creditworthiness up	-0.008 (0.05)	-0.136 (0.14)	-0.139* (0.07)	Applied and got everything	-0.005 (0.05)	-0.116 (0.14)	-0.137** (0.07)
Creditworthiness down	0.564*** (0.07)	0.566*** (0.21)	0.958*** (0.10)	Applied but was rejected	0.560*** (0.07)	0.567*** (0.22)	0.967*** (0.10)
Capital up	-0.096 (0.07)	-0.085 (0.15)	-0.256*** (0.08)	Applied and got everything	-0.093 (0.08)	-0.086 (0.15)	-0.243*** (0.07)
Capital down	0.391*** (0.07)	0.512*** (0.13)	0.627*** (0.08)	Applied but was rejected	0.401*** (0.07)	0.503*** (0.13)	0.626*** (0.08)
Demand up	0.416*** (0.09)	-0.260 (0.20)	0.005 (0.15)	Applied and got everything	0.417*** (0.09)	-0.270 (0.21)	0.011 (0.15)
Demand down	0.141* (0.08)	0.033 (0.22)	0.374** (0.16)	Applied but was rejected	0.146* (0.09)	0.033 (0.23)	0.383** (0.16)
Micro	-0.116 (0.20)	0.779*** (0.29)	0.841*** (0.16)	Applied and got everything	-0.119 (0.20)	0.772** (0.30)	0.840*** (0.16)
Small	-0.037 (0.08)	0.402*** (0.11)	0.286** (0.11)	Applied but was rejected	-0.039 (0.08)	0.410*** (0.11)	0.279** (0.12)

(Continues)

TABLE 7 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected	Applied and got everything	Applied but only got part	Applied but refused because cost too high	Applied but was rejected
Very recent	0.351 (0.32)	0.422 (0.50)	0.555*** (0.19)		0.431 (0.33)	0.434 (0.52)	0.722*** (0.25)
Recent	0.214*** (0.08)	0.495 (0.31)	0.849*** (0.08)		0.226*** (0.08)	0.476 (0.31)	0.825*** (0.09)
Old	0.069 (0.07)	-0.042 (0.27)	0.441*** (0.11)		0.059 (0.07)	-0.021 (0.28)	0.433*** (0.10)
Observations	13,310	13,310	13,310	13,310	13,310	13,310	13,310
Pseudo <i>R</i> -squared	0.110	0.110	0.110	0.124	0.124	0.124	0.124
Time dummies	Yes	Yes	Yes				
Country dummies	Yes	Yes	Yes				
Country × Time dummies				Yes	Yes	Yes	Yes

**TABLE 8** Impact of gender on non-applications for bank loans during different phases of the business cycle

This table reports regression results for the multinomial logistic model presented in Section 3.2, concerning the impact of gender on non-applications for bank loans during both negative (Panel A) and positive phases of the business cycle (Panel B). The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. The set of country-level controls (which are added in columns 1–4) include: *Credit growth*, which is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round; *Economic freedom*, which is an aggregate measure of a country's overall economic freedom; *Unemployment rate*, which is the annual unemployment rate based on averages of quarterly data for each survey round; *Concentration*, which is the Herfindahl index of total assets concentration (for the banking sector); and *OMT*, which is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. The set of firm-level controls (added to all the regressions) include: *Profit up*, which is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months; *Profit down*, which is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months; *Creditworthiness up*, which is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months; *Creditworthiness down*, which is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months; *Capital up*, which is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months; *Capital down*, which is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months; *Demand up*, which is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months; *Demand down*, which is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months; *Micro*, which is a dummy variable equal to 1 if the firm has between 1 and 9 employees; *Small*, which is a dummy variable equal to 1 if the firm has between 10 and 49 employees; *Medium*, which is a dummy variable equal to 1 if the firm has between 50 and 249 employees; *Very recent*, which is a dummy variable equal to 1 if the firm is less than 2 years old; *Recent*, which is a dummy variable equal to 1 if the firm is between 2 and 5 years old; *Old*, which is a dummy variable equal to 1 if the firm is between 5 and 10 years old; *Construction*, which is a dummy variable equal to 1 if the firm's main activity is construction; *Manufacturing*, which is a dummy variable equal to 1 if the firm's main activity is manufacturing; and *Wholesale/retail*, which is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country  $\times$  time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply for other reasons	Did not apply because of possible rejection	Did not apply because of sufficient internal funds	Did not apply because of sufficient internal funds	Did not apply for other reasons
<b>Female</b>	0.337*** (0.10)	0.214*** (0.03)	0.167*** (0.05)	(base)	0.337*** (0.10)	0.203*** (0.03)	0.171*** (0.05)

Panel A: if GDP growth &lt; 0

(Continues)



TABLE 8 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Applied	Did not apply	Did not apply	Did not apply	Applied	Did not apply	Did not apply	Did not apply
rejection	because of	because of	because of	rejection	because of	because of	because of
possible	possible	sufficient	sufficient	possible	sufficient	sufficient	sufficient
rejection	rejection	internal	internal	rejection	internal	internal	internal
reasons	reasons	funds	funds	reasons	funds	funds	reasons
reasons	reasons	reasons	reasons	reasons	reasons	reasons	reasons
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	26,328	26,328	26,328	26,328	26,328	26,328	26,328
Pseudo R-squared	0.135	0.135	0.135	0.140	0.140	0.140	0.140
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: if GDP growth ≥ 0							
<b>Female</b>	<b>0.260**</b>	<b>0.029</b>	<b>0.041</b>	<b>(base)</b>	<b>0.261**</b>	<b>0.032</b>	<b>0.037</b>
	<b>(0.12)</b>	<b>(0.05)</b>	<b>(0.06)</b>		<b>(0.13)</b>	<b>(0.05)</b>	<b>(0.06)</b>
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,730	33,730	33,730	33,730	33,730	33,730	33,730
Pseudo R-squared	0.148	0.148	0.148	0.152	0.152	0.152	0.152
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country × Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald test of the difference between Female in Panel A and Panel B							
$\chi^2$	2.26	6.54	4.47	2.23	5.64	4.94	4.94
Prob > $\chi^2$	0.133	0.011	0.035	0.136	0.018	0.026	0.026

outcomes of their bank loan applications. The underlying hypothesis is that, for instance, during recessions all SMEs will be more likely to deal with an impaired credit market (and, hence, worse access conditions) than in the upside phase of the cycle (Cole & Sokolyk, 2016; Degryse et al., 2018).

Because our time-span is not long enough to detect a complete business cycle, we split our data set into two distinct sub-samples: one gathering all the observations related to firms whose country (in a given wave) faced negative GDP growth, and the other collating the observations related to firms whose economy (in a given wave) experienced null or positive GDP growth.<sup>12</sup> We therefore re-estimate model (1) for both our dependent variables, in both sub-samples. Results are reported in Tables 8 and 9.

Some interesting findings arise from this analysis. Specifically, in Table 8—where we employ *Applying for bank loans* as the dependent variable—we observe that female-led SMEs are discouraged during both phases of the economic cycle, as testified by *Female* being positive and significant in the case of non-application for fear of rejection (see Panels A and B of Table 8 for regression results in the two sub-samples). Additionally, as reported at the bottom of Table 8, the Wald test highlights that the coefficients of *Female* in columns 2 and 6 are not statistically different between the two panels, suggesting that female-led firms do not appear to behave differently during opposite phases of the business cycle. Interestingly, from this analysis we observe that, even when the macroeconomic scenario appears to be favorable to the success of enterprises, women do not seem to feel confident in their capabilities and, anticipating rejection, do not even bother to submit a loan application. Furthermore, from Table 8 we learn that female-led SMEs are more likely than male-led ones to refrain from applying for loans—because they have sufficient funds or for other reasons—only during the economic downturns. This evidence could be interpreted by policy-makers as good news. Indeed, it might reveal that female-led companies are less susceptible to financial distress during turbulent times, as they are more likely than men to be able to rely on an internal cushion of funds.

When we turn to the supply side, unexpected differences between opposite phases of the business cycle emerge (see Panels A and B of Table 9 for regression results in the two sub-samples). We observe that during periods of negative economic growth, female-led firms appear to be less likely to reject credit when the price conditions are too high (see columns 3 and 7 of Panel A in Table 9).<sup>13</sup> This is because women-led businesses might feel that bank credit is the only available funding, given the economic downturn. Therefore, by accepting worse conditions, they are basically carrying a much larger burden than their male peers. This excessive burden might then translate into additional levels of stress and consequent decreasing rates of success than would otherwise be the case. This partially explains why female-led SMEs are more likely to refrain from applying for loans. Moving on to Panel B of Table 9, we observe that during the upside of the business cycle female-led enterprises face a greater likelihood of seeing their loan applications rejected by the lender than male-led enterprises. More specifically, unreported marginal effects (computed on regressions outputs from columns 4 and 8 of Panel B in Table 9) show that the probability of women receiving a loan rejection during a period of positive GDP growth is 2.2% higher than for men. Moreover, the Wald test reported at the bottom of the table

<sup>12</sup>It is worth clarifying that this is not a geographical split grouping, say, six countries in one bucket and the remaining five in the other. Rather, via this sample split, the same country can be present in both sub-samples. Indeed, the split is based on the growth of GDP (either negative or null/positive), which can vary wave by wave within the same country.

<sup>13</sup>We are conscious that the *Female* coefficients in columns 3 and 7 of Panels A and B in Table 9 are only mildly statistically different, their Wald test *p*-values both being a little in excess of 10% (see the bottom of the table).

**TABLE 9** Impact of gender on the results of applications for bank loans during different phases of the business cycle

This table reports regression results for the multinomial logistic model presented in Section 3.2, concerning the impact of gender on the results of applications for bank loans during both negative (Panel A) and positive phases of the business cycle (Panel B). The dependent variable, which is also described in Section 3.2, is a variable equal to 1, 2, 3, or 4 if a firm applied and got everything, applied but only got part of the loan, applied but refused because the cost was too high, or applied but was rejected during the past 6 months, respectively. *Female* is a dummy equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise. The set of country-level controls (which are added in columns 1–4) include: *Credit growth*, which is the annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round; *Economic freedom*, which is an aggregate measure of a country's overall economic freedom; *Unemployment rate*, which is the annual unemployment rate based on averages of quarterly data for each survey round; *Concentration*, which is the Herfindahl index of total assets concentration (for the banking sector); and *OMT*, which is a dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program. The set of firm-level controls (added to all the regressions) include: *Profit up*, which is a dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months; *Profit down*, which is a dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months; *Creditworthiness up*, which is a dummy variable equal to 1 if the firm's credit history improved in the past 6 months; *Creditworthiness down*, which is a dummy variable equal to 1 if the firm's credit history worsened in the past 6 months; *Capital up*, which is a dummy variable equal to 1 if a firm's own capital increased in the past 6 months; *Capital down*, which is a dummy variable equal to 1 if a firm's own capital decreased in the past 6 months; *Demand up*, which is a dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months; *Demand down*, which is a dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months; *Micro*, which is a dummy variable equal to 1 if the firm has between 1 and 9 employees; *Small*, which is a dummy variable equal to 1 if the firm has between 10 and 49 employees; *Medium*, which is a dummy variable equal to 1 if the firm has between 50 and 249 employees; *Very recent*, which is a dummy variable equal to 1 if the firm is less than 2 years old; *Recent*, which is a dummy variable equal to 1 if the firm is between 2 and 5 years old; *Old*, which is a dummy variable equal to 1 if the firm is between 5 and 10 years old; *Construction*, which is a dummy variable equal to 1 if the firm's main activity is construction; *Manufacturing*, which is a dummy variable equal to 1 if the firm's main activity is manufacturing; and *Wholesale/retail*, which is a dummy variable equal to 1 if the firm's main activity is wholesale or retail trade. All regressions use sampling weights that adjust the sample to be representative of the population. Additionally, regressions outputs in columns 1–4 (5–8) include time and country (country × time) dummies. Intercepts are included but not reported. Heteroskedasticity-robust standard errors, clustered at the country level, appear in parentheses. \*\*\* indicates significance at the 1% level, \*\* at the 5% level, and \* at the 10% level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Applied and got everything		Applied but refused because cost too high		Applied and got everything		Applied but refused because cost too high	
<b>Female</b>	(base)	-0.147 (0.10)	-0.775*** (0.25)	-0.092 (0.15)	(base)	-0.146 (0.09)	-0.812*** (0.25)	-0.103 (0.15)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel A: if GDP growth < 0

(Continues)

TABLE 9 (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Applied and got everything	Applied but only got part	Applied but cost too high	Applied but was rejected	Applied and got everything	Applied but only got part	Applied but cost too high	Applied but was rejected
Observations	6,754	6,754	6,754	6,754	6,754	6,754	6,754
Pseudo R-squared	0.115	0.115	0.115	0.120	0.120	0.120	0.120
Time dummies	Yes	Yes	Yes				
Country dummies	Yes	Yes	Yes				
Country × Time dummies				Yes	Yes	Yes	Yes
Panel B: if GDP growth ≥ 0							
<b>Female</b>	<b>0.186</b> <b>(0.25)</b>	<b>0.627</b> <b>(0.52)</b>	<b>0.468***</b> <b>(0.17)</b>	<b>(base)</b>	<b>0.178</b> <b>(0.25)</b>	<b>0.622</b> <b>(0.52)</b>	<b>0.486***</b> <b>(0.18)</b>
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes				
Observations	8,112	8,112	8,112	8,112	8,112	8,112	8,112
Pseudo R-squared	0.121	0.121	0.121	0.134	0.134	0.134	0.134
Time dummies	Yes	Yes	Yes				
Country dummies	Yes	Yes	Yes				
Country × Time dummies				Yes	Yes	Yes	Yes
<i>Wald test of the difference between Female in Panel A and Panel B</i>							
$\chi^2$	0.03	2.41	3.49		0.07	2.50	4.54
Prob > $\chi^2$	0.866	0.121	0.062		0.793	0.114	0.033

underscores that the *Female* coefficients in Panels A and B of Table 9 are statistically different. Our results document that during times of crisis lenders might be less willing to provide credit in general, thus not particularly discriminating against women. In contrast, when the economy is in a positive phase, banks seem to favor male-led enterprises. The absence of gender bias in the full sample might thus reflect a counterbalancing effect of the opposite results we detect in the two sub-samples.

## 5 | CONCLUSIONS

Bank credit is a pivotal financing tool for SMEs. A rich literature investigates the existence of possible differences in the behavior of firms and lenders when the former try to access bank loans. However, the empirical evidence on these issues is far from conclusive and supposedly driven by the different country settings investigated.

In this paper we focus on a large sample of European SMEs and apply an efficient methodology in order to detect potential differences between male- and female-led companies with regard to the propensity to use bank credit as well as the outcome of their loan applications. Specifically, using multinomial logistic models, on the demand side we investigate the existence of gender differences in the behavior of enterprises by testing whether female-led businesses are more likely than men not to apply for loans (i.e. for fear of rejection, due to sufficient internal funds, or for other reasons), with respect to the base outcome (i.e. *Applied*). On the supply side we test whether female-led firms are more credit-constrained by lenders than are their male peers. Then we address possible endogeneity affecting our estimates by employing a two-stage technique. Finally, we exploit the macroeconomic heterogeneity characterizing our sample to detect any possible difference in the behavior of firms and banks during different phases of the business cycle.

Our findings suggest that female-led firms have a greater propensity to refrain from credit applications than men. This evidence turns out to be stable, for the whole sample, over different model specifications, and is confirmed even after addressing our endogeneity concerns. Additionally, female discouragement persists in both phases of the business cycle, whereas non-applications by female-led SMEs due to sufficient funds and for other reasons mainly occur during economic downturns. On the supply side, we interestingly observe that signs of gender bias on the part of lenders only arise when the economy is performing well, but not from the whole sample. Finally, our results highlight that, during economic downturns, female-led businesses are less likely than male-led ones to refuse a loan offer even if it is too costly.

Overall, our analysis reveals in particular that the inclination of women not to apply for bank loans due to sufficient funds is not a completely negative outcome. Indeed, our further tests highlight that this behavior most likely arises during economic downturns, which may signal that female-led businesses are less susceptible to stress, given that they do not need to rely on external providers of finance.

In addition, our investigation highlights the prevalence of self-restraint behavior by female-led firms, rather than a consistent attitude of lenders denying credit. This evidence is crucial from a policy perspective. Indeed, borrower discouragement implies forgone investment opportunities for firms and lost selling opportunities for banks (Freel et al., 2012).

Therefore policy-making bodies (such as the European Institute of Gender Equality) might endeavor to design and suggest policies aimed at addressing the self-restraint attitude of women-led businesses by, for instance, helping female managers to gain confidence in the

bank-credit market, thus encouraging the use of external sources of finance. More generally, such policies should also aim to help women leaders to acquire more confidence in their ability to run the business. Addressing these issues is also fundamental because such demand-driven behaviors produce suboptimal allocation of resources, growth constraints, and loss of employment opportunities.

Differently from other survey-based contributions in the literature, our study, given its large and comprehensive sample of female- and male-owned companies across a large set of countries, has the advantage of being more representative of SMEs operating in different areas of the European continent. However, we also acknowledge a major limitation of our analysis which does not control for the education and skills of firm CEOs/managers/owners. Using such information, if available, would allow us to gain more knowledge about the importance of other personal traits in relation to the attitude toward the use of external finance. Future research is needed in this direction.

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## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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## APPENDIX

**TABLE A1** Variable descriptions and sources

This table reports descriptions and sources of the variables employed in our analyses.

Variables	Description	Source
Dependent variables		
Applying for bank loans	Variable equal to 1, 2, 3, or 4 if a firm applied, did not apply because of possible rejection, did not apply because of sufficient internal funds, or did not apply for other reasons during the past 6 months, respectively	ECB-EC: SAFE
Obtaining bank loans	Variable equal to 1, 2, 3, or 4 if a firm applied and got everything, applied but only got part of the loan, applied but refused because the cost was too high, or applied but was rejected during the past 6 months, respectively	ECB-EC: SAFE
Key regressor		
Female	Dummy variable equal to 1 if the firm's owner/director/CEO is female, and 0 otherwise	ECB-EC: SAFE
Firm-level controls		
Profit up	Dummy variable equal to 1 if a firm experienced an increase in net income after taxes in the past 6 months	ECB-EC: SAFE
Profit down	Dummy variable equal to 1 if a firm experienced a decrease in net income after taxes in the past 6 months	ECB-EC: SAFE
Creditworthiness up	Dummy variable equal to 1 if the firm's credit history improved in the past 6 months	ECB-EC: SAFE
Creditworthiness down	Dummy variable equal to 1 if the firm's credit history worsened in the past 6 months	ECB-EC: SAFE
Capital up	Dummy variable equal to 1 if a firm's own capital increased in the past 6 months	ECB-EC: SAFE
Capital down	Dummy variable equal to 1 if a firm's own capital decreased in the past 6 months	ECB-EC: SAFE
Demand up	Dummy variable equal to 1 if a firm's need for bank loans increased in the past 6 months	ECB-EC: SAFE

(Continues)

TABLE A1 (Continued)

Variables	Description	Source
Demand down	Dummy variable equal to 1 if a firm's need for bank loans decreased in the past 6 months	ECB-EC: SAFE
Micro	Dummy variable equal to 1 if the firm has between 1 and 9 employees	ECB-EC: SAFE
Small	Dummy variable equal to 1 if the firm has between 10 and 49 employees	ECB-EC: SAFE
Medium	Dummy variable equal to 1 if the firm has between 50 and 249 employees	ECB-EC: SAFE
Very recent	Dummy variable equal to 1 if the firm is less than 2 years old	ECB-EC: SAFE
Recent	Dummy variable equal to 1 if the firm is between 2 and 5 years old	ECB-EC: SAFE
Old	Dummy variable equal to 1 if the firm is between 5 and 10 years old	ECB-EC: SAFE
Construction	Dummy variable equal to 1 if the firm's main activity is construction	ECB-EC: SAFE
Manufacturing	Dummy variable equal to 1 if the firm's main activity is manufacturing	ECB-EC: SAFE
Wholesale/retail	Dummy variable equal to 1 if the firm's main activity is wholesale or retail trade	ECB-EC: SAFE
Country-level controls		
Credit growth	The annual growth rate of loans provided by credit institutions to nonfinancial corporations based on averages of quarterly data for each survey round	ECB: Data Warehouse
Economic freedom	An aggregate measure of a country's overall economic freedom	Heritage Foundation
Unemployment rate	The annual unemployment rate based on averages of quarterly data for each survey round	Eurostat
Concentration	The Herfindahl index of total assets concentration (for the banking sector)	ECB: Data Warehouse
OMT	Dummy variable equal to 1 from the year of announcement (2012) of the Outright Monetary Transactions program	Authors' calculation