WORKING paper

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Women-Led Firms' Access to Bank Credit

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ABSTRACT

This paper documents the existence and evolution of a gender gap in bank financing among non-financial firms, disentangling demand- and supply-side effects. Using quarterly panel data for French firms from 2012 to 2023, we find that this gap is driven by the demand side: women-led firms are between 12% and 26% less likely to apply for bank credit, depending on the type of loan. However, conditional on applying, the probability of rejection for women-led firms does not differ significantly from that of men-led firms. Moreover, we find no evidence that the gender gap in credit demand is closing over time.

Keywords: Finance Gender Gap, Bank Credit, Gender Ask Gap.

JEL classification: E51, G30, J16.

NON-TECHNICAL SUMMARY

From an economic perspective, a gender gap in access to business financing is of first-order importance: unequal access to credit among women- and men-led firms may entail underutilization of women's talent, reduced survival and growth prospects for efficient and innovative firms, and, ultimately, macroeconomic inefficiencies arising from capital misallocation.

In this context, this paper documents the existence and evolution of a gender gap in bank financing among non-financial firms, using data on French firms covering the period 2012-2023. We first show that, everything else equal, women-led firms operate with less bank debt than men-led firms. We then investigate whether this gap in bank financing originates primarily from the demand side (i.e., women CEOs demand less bank credit) or from the supply side (i.e., women CEOs who apply for loans face higher rejection rates).

We show that women-led enterprises are consistently less likely to apply for bank credit, by between 12% and 26% depending on the type of credit instrument (credit lines, cash loans, and investment loans). This gender 'ask' gap holds when taking into account a wide range of differences in the characteristics of women- and men-led firms, and women and men CEOs. For example, it is not driven by women managing smaller firms, nor by their disproportionate presence in specific industries. In contrast, women-led firms do not face higher rejection rates than men-led firms, once controlled for confounding factors. Taken together, the demand and supply results suggest that the gender gap in bank financing is primarily driven by lower demand from women-led firms. The gap in credit demand has remained remarkably stable over the 12-year period, suggesting little progress toward gender equality.

We discuss the potential determinants underlying the gender differences in bank credit demand. Recent research suggests caution in attributing gender gaps to presumed differences in risk aversion or self-confidence. Seeking alternative explanations for the gender gap in credit demand, this paper provides new evidence that female business leaders in France tend to be less financially literate than their male counterparts. We believe this should be a priority for future research. Promoting greater equality in financial literacy is important in its own right, both for reasons of fairness and efficiency, but it would be even more so if it led to improved access to external financing.

Given that France is broadly representative of major European economies in terms of the societal status of women and is comparable to the United Kingdom, Germany, and Spain, our findings are likely to be relevant at the European level.

Demand of bank credit: women- vs. men-led firms

Notes: Panel *(a)* shows the proportion of firms that applied for credit lines in the past twelve months, while panels *(b)* and *(c)* show the proportions that applied for cash credit and investment credit, respectively, in the past three months.

L'accès au crédit bancaire des entreprises dirigées par des femmes

RÉSUMÉ

Cet article met en lumière l'existence d'un écart entre les femmes et les hommes dans le recours au financement bancaire des entreprises non financières, en distinguant les effets liés à la demande et à l'offre. En mobilisant des données de panel trimestrielles pour des entreprises françaises, de 2012 à 2023, nous montrons que cet écart est principalement lié à la demande : les entreprises dirigées par des femmes sont, selon le type de crédit considéré, entre 12 % et 26 % moins susceptibles de solliciter un crédit bancaire. De surcroît, les données ne suggèrent pas de réduction de cet écart au fil du temps. En revanche, la probabilité de rejet ne diffère pas significativement entre les entreprises dirigées par des femmes ou par des hommes.

Mots-clés : écart femmes-hommes en matière de financement, crédit bancaire, écart femmes-hommes dans la demande de crédit.

1   Introduction

Women's representation among business leaders has increased in recent years, though levels remain low. Within the MSCI World Index, for instance, the share of female CEOs rose from 3.9% in 2016 to 7.9% in 2024.[1] Similarly, at the other end of the firm size spectrum, OECD [2023] documents diminishing gender disparities in business creation and self-employment across most member countries, although these gaps remain sizable.

While substantial evidence points to a slowly declining gender imbalance along the extensive margin of entrepreneurship, the picture is less clear when it comes to the intensive margin, particularly as business financing is concerned. Yet a potential gender gap in access to finance is of first-order importance: unequal access to credit may entail underutilization of women's talent, reduced survival and growth prospects for efficient and innovative firms, and, ultimately, macroeconomic inefficiencies arising from capital misallocation. For instance, Morazzoni and Sy [2022] estimate that the removal of the gender gap in credit access would increase aggregate output in the United States by 4%, driven by higher female entrepreneurship and reduced capital misallocation.

In this context, the aim of our paper is not only to provide a novel assessment of the existence of a gender gap in business financing, by disentangling the demand and supply sides of several bank credit instruments, but also to investigate how this gap evolved over time.

We use quarterly data from 2012 to 2023, collected through a survey on access to credit conducted by the Banque de France among French firms, enriched with information from firms' financial statements, and other firm-level information based on Banque de France credit ratings, Business Surveys, and Credit Register. Our analysis focuses on 2,543 standalone firms (not part of a larger corporate group) led by a sole woman or man, allowing us to unambiguously identify the gender of the individual responsible for the

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[1]The MSCI World Index comprises 1,320 large- and mid-cap companies across developed-market countries. It covers approximately 85% of the free-float-adjusted market capitalization in each country.

credit application.[2]

Analyzing how the gender of firms' corporate officers affects their access to bank credit raises two main identification issues. First, only a subset of firms chooses to apply for a loan. In other words, firms self-select into applying, which may bias the results if the characteristics of applicant firms differ from those that do not apply. Second, the characteristics of women-led firms are potentially different from those of men-led firms. We address these issues by controlling for an extensive set of corporate officer- and firm-level covariates. Moreover, to better address the self-selection problem in loan application, we apply the Heckman two-step estimation method. Finally, we use a matching procedure to better account for the potential endogeneity of a corporate officer's gender.

We find that women-led firms apply less frequently for each and every type of bank credit covered by the survey (i.e., credit lines, cash loans, and investment loans). This gender gap in credit demand is robust to controlling for CEO and firm characteristics, as well as time-variant sector characteristics, and geographical location. Moreover, this gap is sizable: women-led firms are between 12% and 26% less likely to apply for bank credit, depending on the financing instrument. At the same time, we find that, conditional on having applied, the rejection rate for women-led companies, while higher, is not statistically significantly different from that for men-led firms. Finally, we investigate whether the gender ask gap is closing and find no evidence of progress over the 12-year period.

Several studies have investigated access to bank credit for women-led businesses.[3] While their conclusions do not converge systematically, some broad tendencies emerge. First, most papers relying on European data find

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[2]The individual we focus on is the corporate officer of the company. Throughout the paper, we may refer to her/him interchangeably as the top executive, CEO, or business leader. The corporate officer is not necessarily the founder or a shareholder of the company.

[3]This short literature review focuses on high-income countries. For developing countries, Asiedu et al. [2013] find that female-owned firms have a lower access to finance in Sub-Saharan Africa (SSA), but not in Latin America and Caribbean, East Asia and Pacific, and East and Central Europe. Our review only focuses on bank credit, while other strands of the literature examine alternative financing instruments. In particular, several studies show that female founders are less likely to receive venture capital backing than male founders (see, e.g., Ewens and Townsend [2020] and Hebert [2025]).

that women-led firms are less likely to ask for a loan (Basiglio et al. [2023], de Andrés et al. [2021], Moro et al. [2017], Ongena and Popov [2016]). However, Morazzoni and Sy [2022] do not find a significant ask gap for start-ups in the United States. Second, most papers, drawing on either American or European data, do not find that women-led firms are significantly more likely to face a rejection on their loan applications (Asiedu et al. [2012], Blanchard et al. [2008], Moro et al. [2017], Ongena and Popov [2016]). A notable exception is again Morazzoni and Sy [2022] that find women-led start-ups to be more frequently rejected in the United States. Also de Andrés et al. [2021] find the same result for newly created firms in Spain, but the gender gap disappears after two years of activity. [4]

Our paper makes several contributions to this literature. First, rather than relying solely on a single estimate, we deepen the analysis by examining how the estimated effect evolves over time. Indeed, our 12-year sample (2012-2023) allows us to capture potentially hidden dynamics. To the best of our knowledge, Asiedu et al. [2012] is the only other paper that makes comparisons over time, albeit over a much shorter time horizon (1998 versus 2003).

Second, to our knowledge, this paper is the first to assess gender discrepancies in access to bank credit considering several types of loans, including cash loans, investment loans, and credit lines. We believe that this diversity helps strengthen the robustness of our results and enriches our discussion of the determinants of the gender gap in credit demand.

Third, we discuss the external validity of our results. We argue that regional cultural idiosyncrasies are a major issue in analyzing any gender gap. In terms of the status of women in society, France lies near the center of the distribution of major European economies, particularly close to Great Britain, Germany, and Spain. In contrast, much of the existing empirical evidence relies on data from Italy and the United States, where the status of

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[4]Even in the absence of disparities in rejection rates, supply-side discrimination could manifest through more stringent conditions applied to women-led businesses. Some studies examine potential gender gaps in the interest rates paid and in the collateral or guarantees required for bank financing. We discuss the mixed evidence regarding this dimension of discrimination in Section 5.2.2.

women is not directly comparable with that in the largest Western European countries.

Fourth, building on our conclusion that the gender gap in bank financing is driven by an ask gap, we provide a detailed discussion of why women apply for bank credit less frequently. In doing so, we seek to move beyond standard explanations – often limited to higher risk aversion and lower self-confidence, which recent economic research has largely challenged (see, e.g., Harrison et al. [2025], Exley et al. [2025], Bertrand [2020]).

This paper is organized as follows. Section 2 describes the data and provides descriptive evidence on gender differences in bank debt observed in balance sheets, as well as on the demand for bank credit and approval rates derived from our survey. Section 3 outlines the econometric framework and presents the main results. Section 4 assesses the robustness of the findings, with particular attention to endogeneity concerns. Section 5 discusses the external validity of the results and explores potential explanations for why women-led firms apply less frequently for bank financing. Section 6 concludes.

2 Data

2.1 Data sources

We draw on data from several sources. First, we use quarterly data from 2012 to 2023 of a Survey on Access to Credit, conducted by the Banque de France among French firms. The survey covers the manufacturing, services, and construction sectors.[5] Firms are asked about their credit applications and the corresponding outcomes for three types of credit: credit lines (contracts providing drawing rights), cash loans (one-off loans to cover liquidity shortages), and investment loans (longer-term loans typically used to finance major expenditures in equipment or real estate).[6]

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[5]Coverage of the construction sector began in Q3 2013.

[6]For cash and investment loans, firms report whether they applied within the past three months, while for credit lines, they report whether they applied within the past twelve months.

Second, the Banque de France's FIBEN database (*FIchier Bancaire des ENtreprises*) provides information on business leaders' characteristics (e.g., gender, age), and firms' characteristics (accounting data extracted from tax files, geographical location, and credit risk as measured by the Banque de France's rating[7]).

In robustness analyses, we also exploit information from the French Credit Register, as well as the Banque de France's Business Survey (*Enquête mensuelle de Conjoncture*).

2.2 Sample construction

In order to neatly identify the gender of the person managing a firm's application to bank credit, we restrict our analysis to firms led by a sole individual. Moreover, we exclude firms that are owned by or that own another company. We remove firms that filed for bankruptcy. We winsorize financial ratios at the first and last centile. Our sample comprises quarterly panel data for 2,543 private firms over the period Q2 2012 – Q4 2023.[8]

2.3 Descriptive statistics

2.3.1 Gender comparison of firm characteristics

About 14% of the firms in our sample are led by women. Table 1 shows that, on average, women business leaders are younger, have less tenure in their position, and are less likely to be the founders of their firms. Comparing the two subsamples of women- and male-led firms, Table 1 indicates that the characteristics of the former differ significantly from those of latter. Women-led businesses are smaller, whatever the size metric (revenue, total assets, or employment). The sectoral composition of firms also varies with

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[7]In addition to internal credit ratings by banks, and external ratings by private agencies, several national central banks produce corporate credit ratings (including France, Germany, Italy, Portugal and Spain). Their main scope is to determine the eligibility of bank loans as collateral for Eurosystem funding.

[8]The panel is unbalanced: firms are observed for between 1 and 47 quarters over the period Q2 2012 – Q4 2023, with an average of 15 quarters and a standard deviation of 13.

their top executive's gender: the Construction sector is substantially under-represented among women-led firms, whereas Business Support Services and Accommodation and Food Services are over-represented. Women-led firms are slightly younger and exhibit higher credit risk.

These systematic differences underscore the importance of controlling for firm and executive characteristics when comparing access to bank credit between women- and men-led firms.

TABLE 1: Descriptive statistics of characteristics of women- and men-led firms

	Women-led firms	Men-led firms	Difference
CEO:			
Age (years)	54	55	-1***
Tenure (years)	12	14	-2***
Founder (%)	0.30	0.33	-0.04***
Past failure (%)	0.26	0.24	0.00
Firm:			
Total assets (EUR M)	3.36	3.92	-0.56***
Sales (EUR M)	4.41	5.50	-1.09***
N.employees	34	36	-2***
Sector (%):			
Manufacturing	0.27	0.26	0.01*
Business support services	0.23	0.15	0.08***
Accomod. & food services	0.17	0.09	0.08***
Construction	0.14	0.32	-0.18***
Transportation	0.09	0.09	0.00
Information & communication	0.04	0.05	-0.01***
Trade	0.03	0.04	-0.01*
Other services	0.03	0.01	0.02***
Tangible assets ratio	0.51	0.46	0.05***
Firm age (years)	30	31	1***
Exporter (%)	0.34	0.32	0.02***
Investment grade rating (%)	0.72	0.76	-0.04***

Notes: The definitions of the variables are detailed in appendix Table A.1. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

2.3.2 Gender gap in bank debt

A first step in assessing whether access to bank credit differs by gender consists in examining whether women-led firms operate with less bank debt. Column I of Table 2 reports the results of a simple regression that examines

the correlation between a firm's ratio of bank debt to total assets and the gender of its CEO. Quantitatively, the average ratio for women-led firms is 0.7 percentage point (p.p.) lower than that of men-led firms, that is 10.8% versus 11.5%. When controlling for time, firm size, sector, geographical location, and credit rating, the estimated bank financing gap is three times larger. Indeed, women-led firm's ratio of bank debt to total assets is 2.1 p.p. lower. This gender gap is not only statistically significant but sizable: bank financing is 18% lower for women corporate officers.

TABLE 2: The gender gap in bank financing

Bank debt to total assets ratio	I	II
Woman-led firm	-0.007***	-0.021***
	(0.002)	(0.007)
Time	no	yes
Size	no	yes
Sector	no	yes
County	no	yes
N.firm clusters	.	2,329
N.obs.	35,006	35,005

Notes: This table presents estimates of the effect of having a female CEO on the bank debt-to-total-assets ratio over the 2012–2023 period. Size is measured by the natural logarithm of annual revenue. Other variables are detailed in Table A.1 of Appendix A. Standard errors are reported in parentheses and clustered at the firm level in column II. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

2.3.3 Demand and supply of bank credit

We now investigate whether the gender gap in bank financing originates primarily from the demand side (i.e., women executives demand less bank credit) or from the supply side (i.e., women executives who apply for loans face higher rejection rates).

Table 3 summarizes the average probabilities of credit demand and, conditional on application, of rejection across different types of bank credit instruments. In our sample, the average probability of applying for bank credit

TABLE 3: Application and rejection rates of credit lines, cash loans, and investment loans

	Application rate				Rejection rate			
	Women-led firms	Men-led firms	All	N.obs.	Women-led firms	Men-led firms	All	N.obs.
Credit lines	0.24	0.31	0.30	36,660	0.05	0.03	0.03	10,492
Cash loans	0.05	0.07	0.07	33,988	0.15	0.09	0.09	1,776
Investment loans	0.15	0.18	0.18	34,316	0.02	0.02	0.02	5,550

Notes: This table presents the proportion of firms that applied for a loan (left panel) or had their application rejected (right panel) over the 2012–2023 period. Application and rejection rates are calculated by CEO gender and loan type. The evolution of those rates is illustrated in Figure 1.

is 30% for credit lines, 7% for cash loans, and 18% for investment loans.[9] Conditional on application, the observed probability of rejection is 2% for investment loans, 3% for credit lines, and 9% for cash loans. [10]
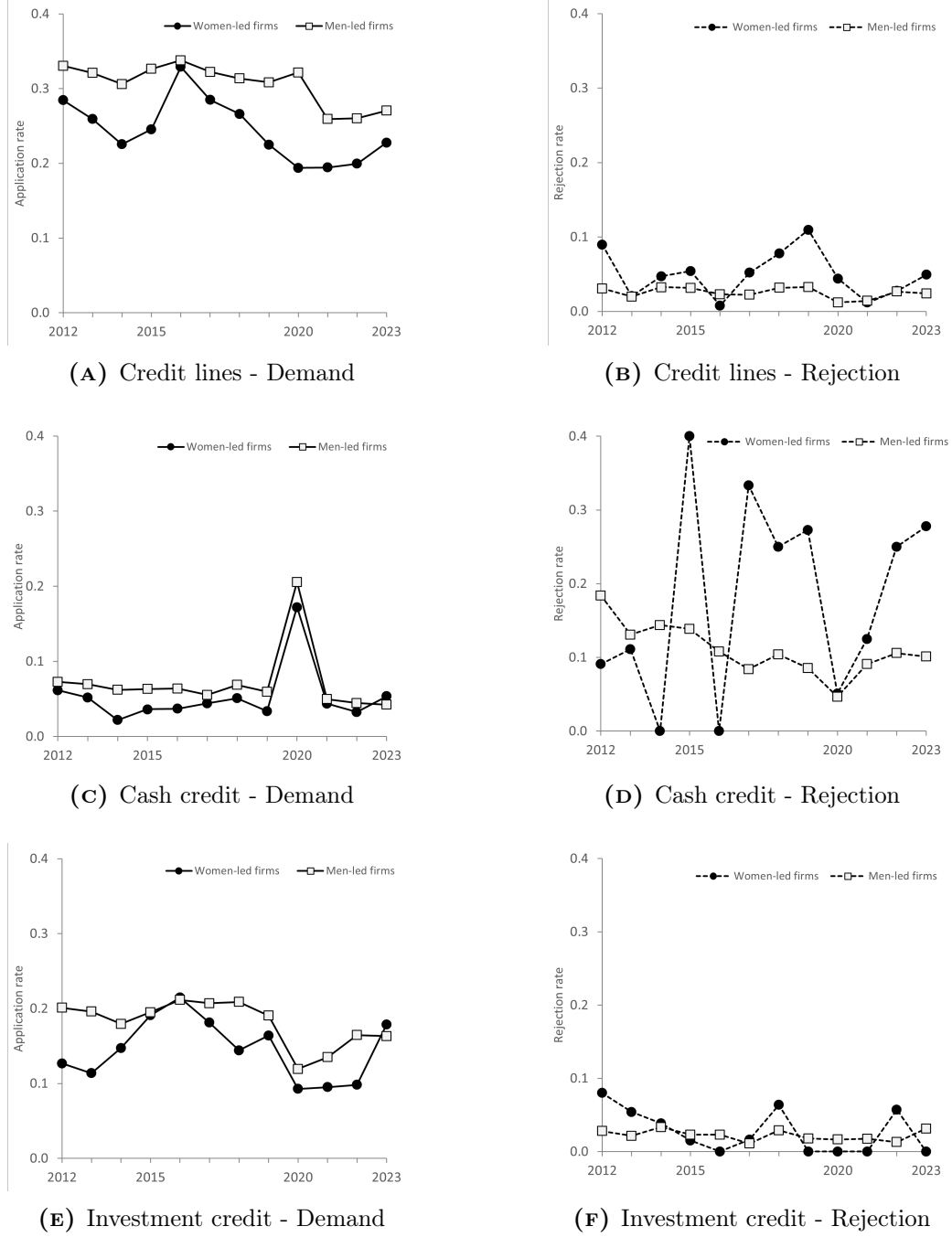
Crucially, a comparison of the averages in the subsamples of women-led and men-led firms reveals gender discrepancies. In particular, the left panel of Table 3 shows that, on the demand side, companies run by women are less likely to apply for bank financing, and this pattern holds across all types of bank credit. On the supply side (right panel of Table 3), the sample probability that an application is rejected is higher for women-led firms than for men-led firms in the case of credit lines and cash loans, whereas it is similar for investment loans.

Figure 1 depicts the evolution of credit demand and supply over time. Panels A, C, and E provide strong descriptive evidence of a gender 'ask' gap: across all types of credit, firms led by women are less likely to apply for bank financing, regardless of the period. However, there is no clear pattern indicating that the magnitude of this gap has either increased or decreased over time. On the supply side, Panels B, D and F show no pronounced differences in rejection rates between women- and men-led firms.

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[9]Note that the figures for cash and investment loans are not directly comparable to those for credit lines. As mentioned above, for cash and investment loans, firms report whether they applied within the past three months, whereas for credit lines, the reference period is the past twelve months.

[10]An application is considered unsuccessful if the demand is not even partially satisfied.

FIGURE 1: Demand and supply of credit lines, cash loans, and investment loans

(A) Credit lines - Demand

(B) Credit lines - Rejection

(C) Cash credit - Demand

(D) Cash credit - Rejection

(E) Investment credit - Demand

(F) Investment credit - Rejection

Notes: Panels A, C, and E show the proportion of firms that applied for credit lines, cash credit, and investment credit, respectively. Panels B, D, and F display the proportion of firms whose applications were rejected, conditional on submission. Both application and rejection rates are calculated annually for women-led and men-led firms. The average application and rejection rates over the entire period are reported in Table 3.

While these descriptive statistics are suggestive, they do not allow for a definitive assessment of whether the observed gender gap in bank financing stems from differences in demand and/or supply. Thus, we next undertake a formal econometric analysis, as detailed in the following section.

3   Specification and main results

3.1   Specification

To investigate the underlying causes of the gender gap in bank financing, we take advantage of specific questions from the Banque de France's Access to Credit Survey concerning credit demand and supply.

We consider a demand-side dependent variable, $credit_{i,t}^D$ (a binary indicator equal to one if firm i applied for credit at time t, an zero otherwise) and a supply-side dependent variable, $credit_{i,t}^R$ (a binary variable equal to one if the credit application was rejected, and zero if it was successful). The key explanatory variable is $woman_{i,t}$, a dummy variable that takes value one if the firm's CEO is a woman, and zero if the CEO is a man.

We control for a comprehensive set of CEO and firm characteristics, $X_{i,t}$. At the CEO level, controls include age, tenure, whether they founded the company, and whether they experienced a business failure in previous years. At the firm level, we control for size (proxied by total assets), physical collateral (proxied by the tangible asset ratio), firm age, exporter status, and credit rating. [11] We also include sector-by-quarter fixed effects ($FE_{s \times t}$) to control for time-varying heterogeneity across sectors (defined at the NACE 2-digit level). Additionally, we incorporate county-level (French *départements*) fixed effects (FE_g) to account for geographical heterogeneity.[12] Standard errors are clustered at the firm level, to account for within firm correlation. We then estimate the following regression:

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[11]Table A.2 reports descriptive statistics of these variables.

[12]An ideal empirical specification would include firm fixed effects to capture unobservable firm characteristics. However, fixed effects at the firm level cannot be included while investigating the gender gap, because only very few firms had a change in the gender of their corporate officer in the sample period.

$$credit_{i,t}^{D,R} = \alpha + \beta \, woman_{i,t} + \gamma \, X_{i,t-1} + FE_{s \times t} + FE_g + \varepsilon_{i,t} \qquad (1)$$

Our data distinguish among three types of credit instruments: credit lines, cash loans, and investment loans. Therefore, we estimate six main regressions: demand and supply for credit lines, cash loans, and investment loans. For comparison purposes, we systematically report unconditional estimates of the β coefficients (columns I, III, and V of Tables 4 and 5), alongside conditional estimates (columns II, IV, and IV). [13]

In each estimation, the null hypothesis is that there is no gender gap. More specifically, in the context of credit demand, a negative (respectively, positive) β coefficient indicates that women-led firms apply for bank credit less (respectively, more) frequently than men-led firms. On the supply side, a positive (respectively, negative) β coefficient suggests that applications submitted by women-led firms are more (respectively, less) likely to be unsuccessful.

3.2 Demand results: the probability of applying for bank credit

Table 4 provides consistent evidence of a gender gap in credit demand. Across all types of credit instruments, and even after controlling for a comprehensive set of covariates, our variable of interest, *Woman-led firm* (labeled *woman* in Equation 1 for brevity), systematically presents negative and statistically significant coefficients. In other words, women-led firms consistently exhibit a lower likelihood of applying for bank credit.

For credit lines, the conditional probability of applying is 5.5 p.p. lower for women-led firms compared to men-led firms (see column II of Table 4). This estimate is statistically significant at the 1% level. The sample mean probability for men being 31% (see Table 3), a coefficient of 5.5 p.p. implies

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[13]Section 4 describes the alternative specifications used to assess the robustness of our results.

a sizable gender effect: firms led by a woman are 18% less likely to apply for a credit line. Note also that the unconditional gender gap (6.5 p.p., see column I) is relatively close to the conditional gap (5.5 p.p.). This suggests that the large differences in the characteristics of men and women-led firms (see Table 1) explain only a small fraction of the gender gap in the demand for credit lines.

As with credit lines, we also estimate a significant ask gap for cash loans. Women-led firms have a 1.8 p.p. lower probability of applying for a cash loan compared to men-led firms (see column IV of Table 4). Given the sample mean probability for men of 7% (see Table 3), this implies that women-led firms are approximately 26% less likely to apply for cash loans than firms led by men. Moreover, in this case, the estimated coefficient remains virtually unchanged whether or not controls are included in the regression (see columns III and IV).

The probability of applying for investment loans is also significantly lower for firms led by women, as it is the case for other types of bank credit applications. Women-led firms have a 2.2 p.p. lower probability of applying for an investment loan compared to men-led firms (see column VI of Table 4). This estimate is statistically significant at the 5% level, in contrast to the 1% significance observed for the other two types of loans. Given the sample mean probability for men of 18% (see Table 3), this implies that women-led firms are 12% less likely to apply. In this case, our set of controls explains a relatively large portion of the unconditional gap: in absolute value, the conditional gap is nearly 40% lower than the unconditional one (-3.6 p.p. versus -2.2 p.p., see column V and VI).

In conclusion, whatever the bank credit instrument, there is econometric evidence of a gender ask gap in bank financing, whereby female-led firms apply less often for bank credit. [14] However, the magnitude of the gender gap in credit demand varies across instruments. Women-led firms are 26% less likely to apply for cash loans than men-led firms, while the difference is

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[14]This result is consistent with the existing literature. As noted above, most studies using European data find that women-led firms are less likely to apply for a loan (Basiglio et al. [2023], de Andrés et al. [2021], Moro et al. [2017], Ongena and Popov [2016]).

18% for credit lines, and 12% for investment credit.[15]

Regarding covariates, some CEO and firm characteristics stand out as important determinants of the demand for credit, in particular a corporate officer's age, a firm's size and sector, and – most notably – its credit rating.[16] For credit lines (column II) and cash loans (column IV), a higher rating is associated with lower demand for credit. This is consistent with the idea that stronger firms have access to a broader range of short-term financing options (cash reserves, financial markets, etc.), while lower-rated firms are more financially constrained and therefore more dependent on bank financing. In the case of longer-term investment credit, however, the weakest firms tend to demand credit less frequently (column VI), which may reflect their limited ability to pursue growth opportunities.

3.3 Supply results: the probability of unsuccessfully applying for bank credit

Contrary to the significant gender ask gap on the credit demand-side, we do not find consistent econometric evidence of a gender gap in the supply of bank financing. Indeed, Table 5 shows that women-led businesses have a significantly higher probability of an unsuccessful application only when CEO and firm characteristics are not controlled for. This statistical significance disappears once these characteristics are accounted for.

For credit lines, a naive estimation that ignores the sharp differences in the characteristics of women- and men-led firms suggests that women-led firms are significantly more likely to have their applications rejected (see column I of Table 5). This result is misleading, however. Once CEO and firm characteristics are controlled for, the estimated coefficient halves and becomes statistically insignificant (column II). Similarly, for cash loans, the probabil-

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[15]The potential underlying causes of these differences, particularly their possible link to gender-related differences in risk preferences and confidence, are discussed in Subsection 5.2.

[16]A strength of our dataset is that it allows to control for firms' credit ratings. These are assessed on an eight-point scale (the reference category consists of unrated firms). To the best of our knowledge, this paper is the first in the literature on gender disparities in bank financing within a European context to account for credit ratings.

ity of rejection is significantly higher (6.2 p.p.) for women-led firms when no dimensions of heterogeneity other than gender are considered (column III). However, once the heterogeneity between women- and men-led firms across multiple dimensions is taken into account, this difference disappears (column IV). Finally, in the case of investment loans there is no gender gap in rejection rates: with or without controls, the estimated coefficients remain close to zero (columns V and VI).

Overall, we do not find consistent evidence of a gender gap in credit rejection.[17] However, differences do emerge when confounding factors are not accounted for, which may help explain why some perceive that such a gap exists. Regarding covariates, credit ratings emerge as an important determinant of the probability of rejection: as expected, lower-rated firms are more likely to have their applications rejected.

Taken together, the demand and supply results suggest that the gender gap in bank financing is primarily driven by lower demand from women-led firms, rather than by a higher rejection rate of their applications.

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[17]This finding aligns with prior research. As noted above, most studies drawing on American or European data find no evidence that women-led firms are significantly more likely to experience loan application rejection (Asiedu et al. [2012], Blanchard et al. [2008], Moro et al. [2017], Ongena and Popov [2016]). Notice that this does not necessarily imply that gender discrimination is absent in other dimensions of credit supply, such as in interest rate levels or collateral requirements. We discuss these in Section 5.2.2.

TABLE 4: Demand of credit lines, cash loans, and investment loans

	Credit lines		Cash loans		Investment loans	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Woman-led firm	-0.065***	-0.055***	-0.018***	-0.018***	-0.036***	-0.022**
	(0.007)	(0.019)	(0.004)	(0.006)	(0.006)	(0.011)
CEO controls:						
Age (ln)		-0.096**		-0.053***		-0.085***
		(0.040)		(0.014)		(0.021)
Tenure (ln)		0.018		0.009**		0.009
		(0.012)		(0.004)		(0.006)
Founder		0.029		-0.002		-0.001
		(0.020)		(0.007)		(0.010)
Past failure		0.015		0.015		0.064**
		(0.041)		(0.018)		(0.026)
Firm controls:						
Total assets (ln)		0.044***		0.012***		0.035***
		(0.007)		(0.003)		(0.005)
Tangible assets ratio		0.040		0.005		0.073***
		(0.027)		(0.011)		(0.017)
Firm age (ln)		0.005		-0.008		-0.013
		(0.014)		(0.005)		(0.008)
Exporter		0.014		0.002		0.009
		(0.015)		(0.006)		(0.009)
Rating: highest		-0.176***		-0.073***		-0.036*
		(0.030)		(0.010)		(0.020)
excellent		-0.150***		-0.062***		-0.008
		(0.026)		(0.010)		(0.016)
very strong		-0.080***		-0.052***		0.028*
		(0.024)		(0.009)		(0.015)
strong		-0.060***		-0.032***		0.028*
		(0.023)		(0.009)		(0.014)
good		0.029		-0.010		0.024*
		(0.022)		(0.009)		(0.013)
intermediate		0.094***		0.042***		-0.003
		(0.023)		(0.010)		(0.014)
weak		0.063**		0.056***		-0.034**
		(0.027)		(0.012)		(0.016)
compromised		0.061*		0.056***		-0.088***
		(0.034)		(0.016)		(0.016)
Sector x time FE	no	yes	no	yes	no	yes
County FE	no	yes	no	yes	no	yes
N.firm clusters	.	2,477	.	2,343	.	2,342
N.obs.	36,660	36,660	33,988	33,988	34,316	34,316
Adj.R^2	0.00	0.12	0.00	0.09	0.00	0.09

Notes: Columns I and II report our unconditional and benchmark estimates for the probability of applying to credit lines. Similarly, columns III and IV, and V and VI report our unconditional and benchmark estimates for cash and investment loans, respectively. Standard errors are reported in parentheses and clustered at the firm level in columns II, IV, and VI. The reference category for credit rating is none assigned. The definitions of the variables are detailed in appendix Table A.1. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE 5: Rejection of credit lines, cash loans, and investment loans

	Credit lines		Cash loans		Investment loans	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Woman-led firm	0.024***	0.012	0.062**	0.005	0.003	0.002
	(0.005)	(0.011)	(0.024)	(0.036)	(0.007)	(0.009)
CEO controls:						
Age (ln)		0.008		0.098		0.002
		(0.020)		(0.061)		(0.017)
Tenure (ln)		0.002		-0.019		0.001
		(0.004)		(0.017)		(0.004)
Founder		0.002		0.013		0.006
		(0.008)		(0.028)		(0.008)
Past failure		0.017		0.072		0.008
		(0.021)		(0.075)		(0.017)
Firm controls:						
Total assets (ln)		0.001		-0.001		-0.006*
		(0.003)		(0.010)		(0.003)
Tangible assets ratio		0.011		0.043		0.000
		(0.012)		(0.036)		(0.012)
Firm age (ln)		0.000		-0.012		0.001
		(0.005)		(0.019)		(0.005)
Exporter		0.006		-0.004		-0.000
		(0.008)		(0.028)		(0.007)
Rating: highest		-0.048***		-0.044		-0.016
		(0.016)		(0.061)		(0.023)
excellent		-0.037***		-0.047		-0.014
		(0.014)		(0.052)		(0.022)
very strong		-0.040***		-0.108**		-0.021
		(0.014)		(0.046)		(0.021)
strong		-0.035***		-0.084**		-0.020
		(0.013)		(0.039)		(0.021)
good		-0.020		-0.043		-0.018
		(0.013)		(0.039)		(0.021)
intermediate		0.004		-0.015		0.024
		(0.014)		(0.039)		(0.023)
weak		0.048***		0.109**		0.066**
		(0.018)		(0.045)		(0.028)
compromised		0.089***		0.205***		0.270***
		(0.026)		(0.057)		(0.061)
Sector x time FE	no	yes	no	yes	no	yes
County FE	no	yes	no	yes	no	yes
N.firm clusters	.	1,535	.	784	.	1,250
N.obs.	10,492	10,492	1,763	1,763	5,550	5,550
Adj.R^2	0.00	0.07	0.00	0.21	0.00	0.14

Notes: Columns I and II report our unconditional and benchmark estimates for the probability of unsuccess when applying to credit lines. Similarly, columns III and IV, and V and VI report our unconditional and benchmark estimates for cash and investment loans, respectively. Standard errors are reported in parentheses and clustered at the firm level in columns II, IV, and VI. The reference category for credit rating is none assigned. The definitions of the variables are detailed in appendix Table A.1. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

3.4 Quarterly estimates and temporal dynamics

We now investigate how the gender gap described above evolves over time. Our sample allows us to track its progress across 47 consecutive quarters, from Q2 2012 to Q4 2023.

Let us first consider the demand side. Figure 2 plots the quarterly estimates of our variable of interest, *Woman-led firm* (denoted as *woman* in Equation 1 for brevity) and shows a persistent gender gap across all three bank credit instruments (credit lines, cash credit, and investment credit) as most quarterly estimates are negative.[18] In line with the single-point estimates above, the gap is more pronounced for credit lines and cash credit than for investment credit. Specifically, women-led firms exhibit lower demand in 43 of 47 quarters for credit lines (91%), 38 of 47 quarters for cash credit (81%), and 31 of 47 quarters for investment credit (66%).[19]

Figure 2 also shows that the gender ask gap is broadly stable over time. The cubic trend lines fitted to the scatter plots exhibit a slight increase in the most recent couple of years. However, we argue that the evidence is too weak to suggest a paradigm shift. First, although the gap is slightly smaller in 2022–2023 than in other periods, Figure 2 shows that similar temporary reductions have been observed in the past. Second, for credit lines and cash credit, (unreported) hypothesis tests confirm that the 2022–2023 period does not differ significantly from other periods of reduced gaps, such as 2016–2017. Third, for investment credit, the apparent trend is distorted by an outlier in Q4 2023.

Regarding credit rejection, the evolution of quarterly coefficient estimates is presented in Figure A1 of Appendix A. The estimated gender gap is either negligible or alternates in sign from one quarter to the next. This evidence is consistent with the absence of systematic gender differences documented above. More importantly, the lack of a gender gap in credit rejection appears

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[18]The specifications for panels A (credit lines), B (cash credit), and C (investment credit) correspond to column II, IV and VI, respectively, in Table 4, with the sole exception that the variable of interest is interacted with quarter dummies.

[19]Due to reduced power in the small quarterly samples, quarterly estimates are rarely statistically significant, however.

to date back at least to the early 2010s.

4 Robustness

4.1 Robustness to endogeneity

Analyzing how the gender of firms' corporate officers affects their access to credit raises two main identification issues. The first one is that rejection of a credit application can only be observed for firms that apply for credit. In other words, firms self-select into applying, which may undermine conclusions on credit supply if the characteristics of firms that apply differ from those that do not. The second challenge is that the characteristics of women-led firms are potentially different from those of men-led ones.

We address both issues in several ways. First, we use a particularly rich set of controls. Second, to address the self-selection problem in loan applications, we estimate a Heckman specification, relying on an exclusion restriction inspired by Ferrando et al. [2019] and conveying firms' own outlook. Third, to better account for the potential endogeneity of gender, we follow Albareto et al. [2022], Chen et al. [2020], and Alesina et al. [2013] and employ matching procedures. Matching enables us to compare male- and female-led firms that are ex ante very similar in terms of observable characteristics. Note that, since sex is constant for each individual in our dataset, it is not possible to include individual fixed effects in our regressions. Additionally, changes in corporate executives within firms are too rare in our dataset to incorporate firm fixed effects.

4.1.1 Potential selection bias in loan applications

Firms that apply for credit may differ systematically from those that do not. To account for this potential selection bias in loan application, we implement the Heckman two-step estimation method. To do so, the main challenge is to use a valid exclusion restriction, i.e., a variable that affects selection – here, the choice of applying for a loan – but does not have a partial effect on credit

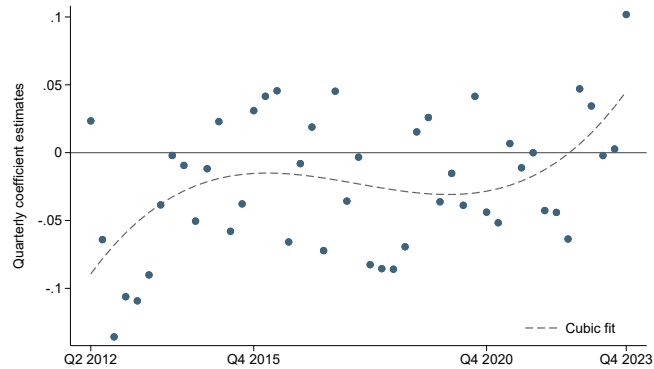**FIGURE 2:** Differences in loan demand probability between women- and men-led firms (quarterly estimates).
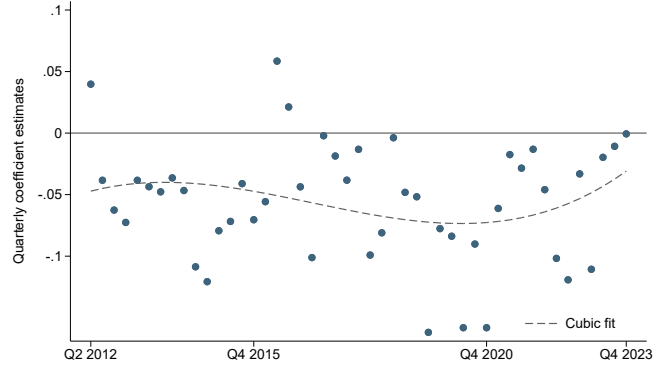
(A) Credit lines
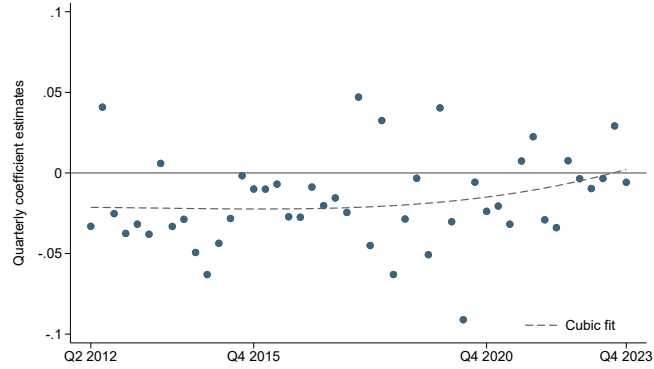
(B) Cash credit

(C) Investment credit

Notes: Each panel plots the quarterly estimates of our variable of interest, *Woman-led firm* (denoted as *woman* in Equation 1 for brevity). The dashed lines represent a cubic fit to the scatter plots.

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approval.

We follow Ferrando et al. [2019] and use data on firms' own outlook. Ferrando et al. [2019] consider a firm's own outlook improvement in the past 6 months and argue that this variable should satisfy the relevance condition because a better outlook should increase the demand for funding and hence for credit, and it should satisfy the exclusion restriction as it is unlikely that the bank can observe the firm's improved outlook so quickly. We find that in our data a firm's own outlook is an even stronger predictor of credit demand than the evolutions of a firm's outlook. Therefore, we consider a firm's own outlook over the previous period as our exclusion restriction variable.

Table 6 presents the results of the Heckman endogenous selection models. Starting with the selection equation, we find that a positive outlook increases the probability of applying for a loan, regardless of the credit type considered. Second-step results vary depending on the type of loan. For credit lines and cash loans, the inverse Mills ratio (λ), included as a correction term in the outcome equation (i.e., the rejection of a credit application), is not statistically different from zero. In other words, no selection bias is detected.[20] In these cases, the gender gap in application rejection remains slightly positive but is not statistically significant. However, for investment credit, the inverse Mills ratio is statistically significant, indicating the presence of selection bias. In this case, adjusting for the non-randomness of the sample results in a lower probability of rejection for women-led firms applying for investment loans. That is, there are some unobservable characteristics of firms self-selecting into applying that increase the probability of rejection. Once taken into account such unobservable characteristics, women-led firms are actually less likely to unsuccessfully apply for investment loans. However, the difference is statistically significant only at the 10% level.

4.1.2 Potential endogeneity of CEO gender

As documented in the Section 2.3.1, women- and men-led firms differ across various characteristics (size, sector, etc.). Therefore, as a robustness check,

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[20]The absence of a selection bias is also observed, in a similar context, by Asiedu et al. [2012], Basiglio et al. [2023], and Blanchard et al. [2008].

TABLE 6: Endogenous selection for credit lines, cash loans, and investment loans.

	Credit lines	Cash loans	Investment loans
Rejection:			
Woman-led firm	0.007	0.033	-0.017*
	(0.007)	(0.030)	(0.010)
Inverse Mills Ratio (λ)	0.017	-0.171	0.220***
	(0.041)	(0.130)	(0.081)
Selection into applying:			
Woman-led firm	-0.146***	-0.155***	-0.076***
	(0.026)	(0.043)	(0.030)
Positive outlook	0.107***	0.111***	0.057***
	(0.017)	(0.025)	(0.019)
CEO controls	yes	yes	yes
Firm controls	yes	yes	yes
Sector FE	yes	yes	yes
Time FE	yes	yes	yes
County FE	yes	yes	yes
N.obs.selected	10,085	2,071	5,519
N.obs.	34,608	33,103	33,103

Notes: Estimations are run with Stata's heckman command, using the twostep option, which does not support the vce(cluster) option. The controls are the same as in our main regressions (see Tables 4 and 5), with the exception that sector and time fixed effects are not combined due to computational constraints. CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. The definitions of the variables are detailed in appendix Table A.1. Standard errors are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

we perform entropy balancing as well as propensity score matching. These techniques enable us to compare women- and men-led firms that are ex ante very similar in terms of observable characteristics.

We first perform entropy balancing. The idea is achieving balance between firms led by women and by men, by constructing weights that satisfy specified moment conditions. We do so both for credit demand and supply. Table 7 reports the estimated ask gap for each type of credit (credit lines, cash loans, and investment loans). For each, the first column reports the estimated coefficient relative to women-led business when entropy balanc-

ing targets and balances one moment of all covariates. The second column achieves balance on three covariate moments. The gender ask gap size and statistical significance prove robust to entropy balancing: women-led firms are less likely to apply for each and every type of credit. As far as the probability of rejection is concerned, panel B of Table 7 confirms the absence of a significant gender gap.

By achieving exact balance on covariate moments, entropy balancing does not need to model treatment assignment, unlike propensity score matching. However, it may be sensitive to extreme weights if covariate overlap is poor. Therefore, as a robustness check, we also perform propensity score matching for both credit demand and supply. Panel A of Table A.6 reports the estimated ask gap for each type of credit.[21] The first column reports the estimated coefficient relative to women-led business when propensity score matching method is nearest neighbor one-to-one, while the second one one-to-three. Again, the gender ask gap size and statistical significance prove robust: women-led firms are less likely to apply for each and every type of credit. Comparing the ask gaps estimated in the matched sample with those computed in the unmatched sample (second row of Table A.6), we conclude that matching halves the gender gap in the case of investment loans, while it actually increases it for cash loans. As a consequence, the magnitude of the gender ask gap estimated for cash and investment loans becomes more similar. As far as the probability of rejection is concerned, panel B of Table A.6 again does not point to a significant gender gap. However, both for demand and supply, the values of the Rubin B statistic reported at the bottom of each panel of Table A.6 suggest that the balance achieved after propensity score matching is not satisfactory. Specifically, the absolute standardized difference in the means of the linear propensity score index between firms led by women and men is too large. [22]

Finally, we test the robustness of our result to other non-parametric propensity score matching methods. For each type of credit, the first and

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[21]Notice that it was not possible to cluster standard errors at the firm level when applying propensity score matching.

[22]In the case of nearest neighbor one-to-one for cash loan rejections, convergence is not achieved.

second columns in panel A of Table A.7 report the estimated ask gap with kernel density and local linear regression matching methods, respectively. The results are very similar to those achieved with nearest neighbor propensity score matching and the Rubin B and R statistics suggest that the balance achieved after non-parametric matching is satisfactory. Panel B of Table A.7 refers to the probability of rejection and shows no statistically significant gender gap in the matched sample. The Rubin B statistic are not completely satisfactory, but better than those of propensity score matching.

4.2   Additional robustness checks

We conduct a set of additional tests to ensure the robustness of our results. First, we verify that the estimates of the β coefficients in Equation 1, which reflect the impact of gender on the demand or supply of bank credit, are robust to various sets of controls (see Tables A.3, A.4, and A.5 in Appendix A).

Second, Table A.8 differentiates between firms with and without prior bank credit, the latter accounting for only a small fraction of firms in our sample (12 to 14%). No gender gap in credit demand appears among firms without prior bank credit (columns I, III, V). The observed gender gap is, therefore, driven by firms with prior bank credit. For firms with prior bank credit, columns II, IV and VI of Table A.8 examine whether our estimates vary when accounting for bank characteristics. Namely, we take into account the number of banks with which a firm has a credit relationship, the duration of the longest active firm-bank credit relationship, and fixed effects for the bank holding the largest share of the firm's loans (based on data from the French credit register). The estimate remain largely unchanged for credit lines. However, the magnitude of the gender gap decreases slightly for cash loans and investment loans (which are statistically significant at the 5% and 12% percent level, respectively, compared to 1% and 5% in the main estimations).[23]

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[23]These are not our preferred specifications, however, as the three bank variables reflect previous choices made by the firm. These choices may depend on unobserved time-invariant characteristics of the firm, implying that the bank variables could be correlated

TABLE 7: Robustness to endogeneity of women-led business: Entropy balancing

	Credit lines		Cash loans		Investment loans	
Panel A: Demand	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.067***	-0.065***	-0.021***	-0.020***	-0.021**	-0.021**
	(0.017)	(0.017)	(0.006)	(0.006)	(0.009)	(0.009)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.firm clusters	2,487	2,486	2,356	2,351	2,357	2,352
N.obs.	36,905	36,901	34,241	34,229	34,562	34,550
Adj.R^2	0.15	0.16	0.11	0.11	0.11	0.12
Panel B: Rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.010	0.009	-0.008	-0.011	-0.010	-0.007
	(0.010)	(0.010)	(0.027)	(0.027)	(0.009)	(0.009)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.firm clusters	1,563	1,563	889	889	1,318	1,316
N.obs.	10,872	10,872	2,250	2,250	5,982	5,978
Adj.R^2	0.13	0.14	0.34	0.34	0.14	0.15

Notes: For each type of credit, the first and second columns report the estimated coefficients relative to women-led business when entropy balancing targets and balances, respectively, one and three moments for each covariate. The controls are the same as in our main regressions (see Tables 4 and 5), with the exception that sector and time fixed effects are not combined due to computational constraints. CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. The definitions of the variables are detailed in appendix Table A.1. Standard errors are reported in parentheses and clustered at the firm level. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

Finally, we estimate probit and logit non-linear specifications (available upon request) and obtained results similar to our main estimates.

5 Discussion

5.1 External validity

To what extent can our results be generalized to other contexts? We believe that regional specificities remain a major issue in the analysis of any gender gap, as cultural idiosyncrasies may at least partially drive the conclusions of studies. Much of the existing empirical evidence relies on data from Italy (e.g., Alesina et al. [2013], Basiglio et al. [2023], Bellucci et al. [2010], Calcagnini et al. [2015]), and the United States (e.g., Asiedu et al. [2012], Blanchard et al. [2008], Morazzoni and Sy [2022]). We argue that in these countries the status of women is not directly comparable to that in major European economies, while France lies near the center of the distribution concerning the status of women in society, close to Great Britain, Germany, and Spain.

Building on data from the Joint European Values Study/World Values Survey, Figure 3 illustrates the peculiarity of Italy or the United States, and the similarities between France and Great Britain, Germany, and Spain. Within Europe, the values of Italian respondents tend to be less oriented toward gender equality, whatever the question. Between Europe and the United States differences are notable. The portray of the United States appears complex. For example, the proportion of respondents who believe that men make better business executives than women is higher in the United States (0.12) than in Europe (between 0.07 and 0.10, excluding Italy). However, the share of respondent who agree that men should have more right to a job than women is lower in the United States (0.06) than in Europe (between 0.06 and 0.29).
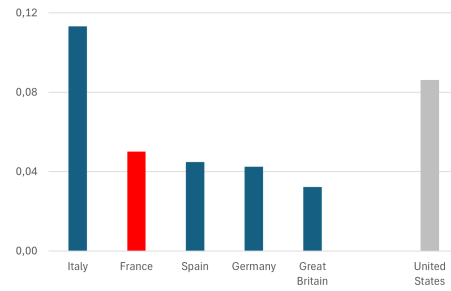
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with the error term.

FIGURE 3: Percentage of the respondents who answered "agree" or "strongly agree" to the following questions:

(A) "Men make better business executives than women do"
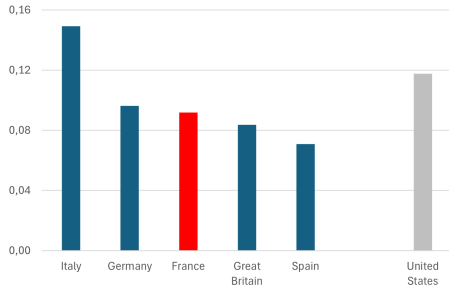
(B) "University is more important for a boy than for a girl"

(C) "Pre-school child suffers with working mother"
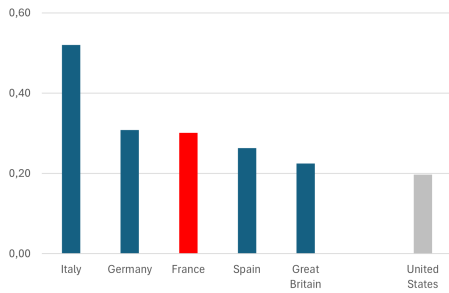
(D) "When jobs are scarce, men should have more right to a job than women"
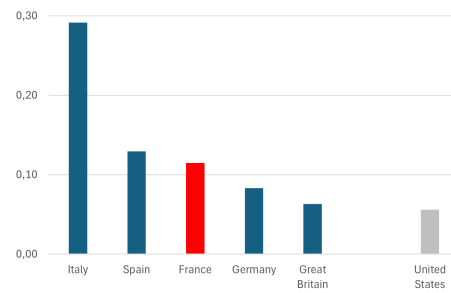
Notes: Data from the Joint European Values Study/World Values Survey (EVS/WVS) 2017-2022 (dataset v5.0; Jun 24, 2024).

5.2 Why are female executives less likely to request a loan?

Women-led firms exhibit a significantly lower propensity to apply for bank financing. This result holds even after controlling for a wide range of firm and executive characteristics. For instance, it is not driven by women managing smaller firms, nor by their disproportionate presence in specific industries.

For firms that did not apply, the Banque de France survey asks respondents to indicate the reason behind this decision, selecting one of the following alternatives: 1) the firm did not need external finance, 2) willingness to avoid debt, 3) the respondent considered the company's situation to be unfavor-

able, and 4) lending criteria were expected to be too strict.[24] However, the analysis of these responses does not provide additional insight, as the distribution across alternatives does not differ significantly between women- and men-led companies.[25]

Therefore, the question remains open: what are the determinants underlying the gender differences that we have ascertained? Previous literature has identified potential explanations, which we discuss in the following subsections.

5.2.1 Are women really more risk averse and less self-confident?

The two explanations most frequently cited in the literature are risk aversion (see, e.g., de Andrés et al. [2021], Ongena and Popov [2016], and anticipated rejection (see, e.g., de Andrés et al. [2021], Moro et al. [2017], Ongena and Popov [2016]). The latter assumption implicitly entails that women are less self-confident than men. If this is the case, their perceived probability of credit approval is lower, and potentially too low to compensate the cost of applying for bank financing.

At first glance, both explanations have some appeal. For instance, in line with the risk aversion hypothesis, Berardi and Bureau [2025] show a generally more cautious financial management approach by French female business leaders. They find that women-led businesses maintain both a cash buffer (measured as the ratio of cash over total assets) and an equity buffer (measured as the ratio of equity over total liabilities) that are significantly higher than men-run businesses. Regarding anticipated rejection, Moro et al. [2017] and Ongena and Popov [2016] offer some evidence on the link between women's doubt about future loan approval and the decision to self-exclude. However, other studies find no such evidence (see, e.g., Cavalluzzo et al. [2002]).

More specifically, one could interpret our results by type of financing instrument through the lens of risk aversion or self-confidence. For instance,

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[24]Since the introduction of this additional question in the survey in 2015, the average percentages of answers for each alternative are 92%, 4%, 3%, and 1%, respectively.

[25]The regression results are available upon request.

we observed that women-led firms are 26% less likely to apply for cash loans than men-led firms, while the difference is only 12% for investment credit. These two types of loans differ not only in maturity but also in the type of collateral that secures them. Investment credit corresponds to what Ivashina et al. [2022] refer to as "asset-based loans". They are secured by specific collateral in the form of physical assets. In contrast, when banks assess a standard cash loan, the focus is placed not on the value of collateral, but on the borrower's capacity to service both interest and principal from the cash flow the business generates. A firm's borrowing capacity under such a loan is determined by its expected earnings (Ivashina et al. [2022]). In this context, one could argue that, if women are less self-confident than men, they are especially likely to avoid an assessment of their borrowing capacity relying on subjective due diligence process and, therefore, to refrain from applying for cash loans. In other words, women may feel more at ease applying for asset-based loans, which rely on relatively more objective valuations of physical assets.

Moreover, our results point to a smaller gender ask gap for credit lines than for cash loans. Indeed, women-led firms are 18% less likely to apply for credit lines than men-led firms, versus 26% for cash credit. While both instruments are typically associated with short maturities, credit lines differ from standard loans in that they provide liquidity insurance.[26] Therefore, assuming that women are more risk-averse than men could help explain why the gender gap is smaller for credit lines-which serve to mitigate risk—than for standard short-maturity loans.

However, the landmark paper by Bertrand [2020] urges caution in interpreting gender gaps. Building notably on Tinsley and Ely [2018], she emphasizes that "despite the widely held beliefs among economists that women are less confident than men, have lower preferences for risk, and/or are less willing to negotiate [. . .], meta-analyses reveal that the gender gaps in these traits are minimal [. . .]". Another meta-analysis by Bandiera et al. [2022] draws

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[26]Note that the flexibility offered by credit lines is limited in duration (typically 12 months, in France) and applies only as long as a firm remains compliant with its financial covenants.

similar conclusions. Later research published in top-tier economics journals has continued to question presumed inherent gender-based differences. For example, Exley et al. [2025] show that, although women are commonly believed to be more generous and equality-oriented than men, this presupposed gender gap is largely inaccurate. Harrison et al. [2025] find that women process the confidence of their choices over risky responses better or no worse than men.

Overall, while we are not able to reach a definitive conclusion on this matter, recent research suggests caution in attributing gender gaps to presumed differences in risk aversion or self-confidence, in the absence of conclusive evidence. The reasons behind the ask gap may then well lie elsewhere.

5.2.2 Do women face higher costs?

Women-led firms may apply less for bank credit if they face higher costs than men-led businesses, such as higher interest rates or more stringent collateral requirements. The empirical evidence on a gender gap in the interest rate paid for bank financing is mixed, however. Alesina et al. [2013] find that women-led firms pay higher interest rates than their male counterparts in Italy. Other studies, in Europe and in the United States, however, do not find ~~this~~ these gender differences (Asiedu et al. [2012], Bellucci et al. [2010], Blanchard et al. [2008], Ongena and Popov [2016]). We cannot assess the level of interest rates paid by firms from the survey data, but we do have some information about their evolution. Indeed, firms are asked: "How has the overall borrowing cost changed compared with your previous application?". We leverage this information and explore whether any gender differences emerge. The results indicate that women are more likely than their male counterparts to report an increase in financing costs, although the difference is not statistically significant.

Creditors may also discriminate through loan security requirements, such as collateral or guarantees, thereby making borrowing more costly for women. The existing empirical evidence provides some support for this explanation. Alesina et al. [2013] find that women are more frequently required to pro-

vide a guarantee when obtaining a loan, and both Calcagnini et al. [2015] and Bellucci et al. [2010] show that women-owned firms face a higher probability of having to pledge collateral. Our survey data unfortunately does not include details on loan security requirements, but it inquires about their evolution. Indeed, firms are asked: "Did your loan applications involve new guarantees requirements?". All else equal, women are more likely to state that requirements have increased, although the difference is again not statistically significant.[27]

5.2.3 Are women less financially literate than men?

Finally, another explanation for the gender gap in credit demand may lie in gender disparities in financial education. First, a substantial body of empirical research demonstrates that financial expertise is associated with firm-level financial policies, including cash holdings and capital structure decisions (see, e.g., Custódio and Metzger [2014], Drexler et al. [2014]). Second, several studies show that women tend to exhibit lower levels of financial literacy than men (see Bucher-Koenen et al. [2017], for a review).[28]

In Appendix B, we provide new evidence indicating that female business leaders in France tend to be less financially literate than their male counterparts. Unfortunately, the additional data used in Appendix B cannot be matched with our main sample. We are, therefore, unable to estimate the impact of financial literacy on the demand for bank financing.

6   Conclusion

Our analysis provides clear evidence of a persistent gender gap in business financing. Based on quarterly panel data for French firms from 2012 to 2023, we show that women-led enterprises are consistently less likely to seek bank credit, by between 12% and 26% depending on the type of credit instrument.

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[27]Both results about borrowing costs are available upon request.

[28]This issue remains contested, however. Harrison et al. [2025] argue that the mismeasurement of literacy traits may alter prevailing views on the role of gender.

In contrast, conditionally to applying for credit, women-led firms face rejection rates that are not statistically different from those of men-led firms. The gap in credit demand has remained stable over the 12-year period, suggesting little progress toward convergence. Given that France is broadly representative of major European economies in terms of the societal status of women and comparable to the United Kingdom, Germany, and Spain, our findings are likely to be relevant at the European level.

Recent research suggests caution in attributing gender gaps to presumed differences in risk aversion or self-confidence. Seeking alternative explanations for the gender gap in credit demand, this paper provides new evidence that female business leaders in France tend to be less financially literate than their male counterparts. However, we are not able to precisely estimate the effect of financial literacy on the demand for bank loans. We believe this should be a priority for future research. Promoting greater equality in financial literacy is important in its own right, both for reasons of fairness and efficiency, but it would be even more so if it led to improved access to external financing.

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Appendix A Supplementary figures and tables

TABLE A.1: Variable definitions and sources

Variable	Definition	Source
Dependent variables		
Credit line demand	Dummy equal to 1 if firm applied for a credit line within the last 12 months	Access to Credit Survey
Cash credit demand	Dummy equal to 1 if firm applied for a cash loan within the last 3 months	Access to Credit Survey
Investment credit demand	Dummy equal to 1 if firm applied for an investment loan within the last 3 months	Access to Credit Survey
Credit line rejected	Dummy equal to 1 if firm applied for a credit line and the application was unsuccessful	Access to Credit Survey
Cash loan rejected	Dummy equal to 1 if firm applied for a cash loan and the application was unsuccessful	Access to Credit Survey
Investment loan rejected	Dummy equal to 1 if firm applied for an investment loan and the application was unsuccessful	Access to Credit Survey
Variable of interest		
Woman-led firm	Dummy equal to 1 if the firm is led by a woman	FIBEN
CEO controls		
(CEO) Age (ln)	Natural log of age of the CEO in years	FIBEN
Tenure (ln)	Natural log of tenure as CEO in current firm in years	FIBEN
Founder	Dummy equal to 1 if the CEO is the firm's founder	FIBEN
Past failure	Dummy equal to 1 if the CEO experienced at least one business failure in the previous 5 years	FIBEN
Firm controls		
Sector	2-digit NACE categorization of sectoral activity	FIBEN

County	French administrative geographical division (96 *départements*)	FIBEN
Total assets (ln)	Natural log of total assets	FIBEN
Tangible assets ratio	Tangible assets to total assets ratio	FIBEN
(Firm) Age (ln)	Natural log of the age of the firm in years	FIBEN
Exporter	Dummy equal to 1 when the firm has sales from exports	FIBEN
Credit rating	Set of eight dummy variables representing the Banque de France's eight-level rating scale for credit risk: highest (3++), excellent (3+), very strong (3), strong (4+), good (4), intermediate (5+), weak (5), compromised (6 to 9). A ninth dummy, corresponding to the minority group of unrated firms, serves as the reference category in the regressions.	FIBEN
Investment grade rating	Dummy equal to 1 if the firm's rating meets or exceeds the minimum credit rating required for a loan to qualify as collateral with the ECB.	FIBEN

Other variables (Other controls, Robustness tests, and Descriptive statistics)

Time	Time is defined at the quarter level, from Q2 2012 to Q4 2023	
Bank debt to total assets	Bank debt to total assets ratio	FIBEN
Positive outlook	Dummy equal to 1 if the firm's own outlook regarding its business activity was positive in previous period	Business Survey
Bank	Main bank based on loans (i.e., the bank with which the firm has the largest outstanding credit)	Credit Register
N.banks	Number of banks with whom firm has credit lines, cash loans, or investment loans	Credit Register
Length bank relation (ln)	Natural log of the duration (in years) of the longest active credit relationship with a bank	Credit Register

Note: Data sources are described in Section 2.1.

TABLE A.2: Descriptive statistics of firms' characteristics.

	Mean	SD	Q1	Q2	Q3	N.panel obs.
Woman-led firm	0.12	0.32	0.00	0.00	0.00	35,666
Age (ln)	4.01	0.18	3.91	4.03	4.13	35,681
Tenure (ln)	2.50	0.73	2.08	2.64	3.00	35,681
Founder	0.33	0.47				35,674
Past failure	0.02	0.15				35,681
Total assets (ln)	7.51	1.07	6.80	7.42	8.12	38,751
Tangible assets ratio	0.46	0.34	0.16	0.38	0.77	38,751
Firm age (ln)	3.23	0.66	2.89	3.30	3.64	38,740
Exporter	0.32	0.47				38,751
Investment grade rating	0.76	0.43				36,761
Bank debt to total assets	0.11	0.13	0.01	0.07	0.18	38,261

The definitions of the variables are detailed in appendix Table A.1.

FIGURE A1: Differences in the rejection rates between women- and men-led firms (quarterly estimates).
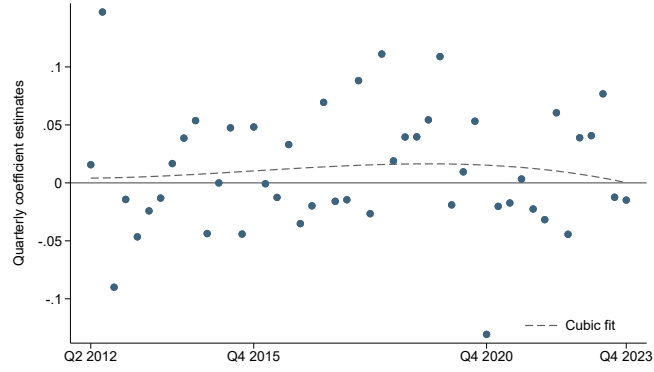
(A) Credit lines

(B) Cash credit

(C) Investment credit

Notes: Each panel plots quarterly estimates of our variable of interest, *Woman-led firm* (denoted as *woman* in Equation 1 for brevity). The dashed lines represent a cubic fit to the scatter plots.

TABLE A.3: Demand (panel A) and rejection (panel B) of credit lines with different sets of controls

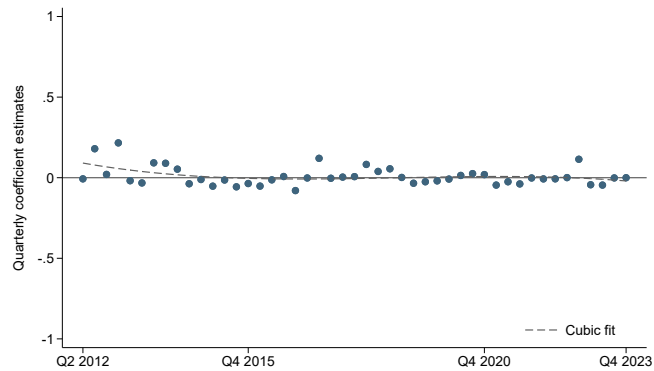| Credit lines						
Panel A: Demand	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.065***	-0.063***	-0.063***	-0.055***	-0.060***	-0.055***
	(0.007)	(0.020)	(0.020)	(0.019)	(0.019)	(0.019)
CEO controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	2,477	2,477	2,477	2,477	2,477
N.obs.	36,660	36,660	36,660	36,660	36,660	36,660
Adj.R^2	0.00	0.01	0.01	0.06	0.12	0.12
Panel B: Rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.024***	0.025**	0.025**	0.021*	0.011	0.012
	(0.005)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
CEO controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	1,535	1,535	1,535	1,535	1,535
N.obs.	10,492	10,492	10,492	10,492	10,492	10,492
Adj.R^2	0.00	0.00	0.00	0.04	0.07	0.07

Notes: CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. The definitions of the variables are detailed in appendix Table A.1. Standard errors are reported in parentheses and clustered at the firm level, except in the first column. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE A.4: Demand (panel A) and rejection (panel B) of cash loans with different sets of controls

Cash loans						
Panel A: Demand	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.018***	-0.019***	-0.019***	-0.019***	-0.019***	-0.018***
	(0.004)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
CEO controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	2,343	2,343	2,343	2,343	2,343
N.obs.	33,988	33,988	33,988	33,988	33,988	33,988
Adj.R^2	0.00	0.05	0.05	0.07	0.09	0.09
Panel B: Rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.062**	0.065*	0.060	0.035	0.032	0.005
	(0.024)	(0.036)	(0.037)	(0.034)	(0.031)	(0.036)
Corporate officer controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	784	784	784	784	784
N.obs.	1,763	1,763	1,763	1,763	1,763	1,763
Adj.R^2	0.00	0.02	0.03	0.11	0.16	0.21

Notes: CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. The definitions of the variables are detailed in appendix Table A.1. Standard errors are reported in parentheses and clustered at the firm level, except in the first column. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE A.5: Demand (panel A) and rejection (panel B) of investment loans with different sets of controls

Investment loans						
Panel A: Demand	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.036***	-0.034***	-0.036***	-0.031**	-0.022**	-0.022**
	(0.006)	(0.013)	(0.013)	(0.012)	(0.011)	(0.011)
CEO controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	2,342	2,342	2,342	2,342	2342
N.obs.	34,316	34,316	34,316	34,316	34,316	34,316
Adj.R^2	0.00	0.01	0.01	0.04	0.09	0.09
Panel B: Rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.003	0.004	0.005	0.001	0.001	0.002
	(0.007)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
CEO controls	no	no	yes	yes	yes	yes
Firm controls	no	no	no	yes	yes	yes
Time FE	no	yes	yes	yes	yes	no
Sector FE	no	no	no	yes	yes	no
Sector x Time FE	no	no	no	no	no	yes
County FE	no	no	no	yes	yes	yes
N.firm clusters	.	1,250	1,250	1,250	1,250	1250
N.obs.	5,550	5,550	5,550	5,550	5,550	5,550
Adj.R^2	-0.00	0.00	0.00	0.08	0.09	0.14

Notes: CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. The definitions of the variables are detailed in appendix Table A.1. Standard errors are reported in parentheses and clustered at the firm level, except in the first column. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE A.6: Robustness to endogeneity of women-led business: Nearest neighbor propensity score matching

Panel A: Demand	Credit lines		Cash loans		Investment loans	
	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.063***	-0.072***	-0.021***	-0.032***	-0.018**	-0.014*
	(0.007)	(0.010)	(0.004)	(0.006)	(0.006)	(0.009)
(unmatched sample)	-0.063***	-0.063***	-0.019***	-0.019***	-0.036***	-0.036***
	(0.007)	(0.007)	(0.004)	(0.004)	(0.006)	(0.006)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.obs	35,509	35,509	32,962	32,962	33,270	33,270
N.obs.matched on comm.support	8,587	35,385	8,066	32,747	8,115	33,067
Pseudo R^2	0.18	0.18	0.18	0.18	0.18	0.18
Rubin B	75.6	25.2	76.5	29.9	78.4	30.4
Rubin R	0.52	0.80	0.57	0.78	0.54	0.72
Panel B: rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.011	0.004	0.022**	0.025	-0.011	-0.014
	(0.008)	(0.009)	(0.036)	(0.039)	(0.077)	(0.010)
(unmatched sample)	0.022***	0.022***	0.060***	0.060***	0.001	0.001
	(0.005)	(0.005)	(0.023)	(0.023)	(0.007)	(0.007)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.obs.	9,575	9,575	1,599	1,599	4,685	4,685
N.obs.matched on comm.support	1,975	9,385	319	1,372	1,112	4,670
Pseudo R^2	0.25	0.25	0.37	0.37	0.25	0.25
Rubin B	94.0	45.0	.	99.6	109.2	52.3
Rubin R	0.32	0.76	.	0.61	0.88	0.75

Notes: For each type of credit, the first and second columns report the estimated coefficient for women-led firms when propensity score matching method is nearest neighbor one-to-one and one-to-three, respectively. The second row allows to easily compare estimates in unmatched samples. The controls are the same as in our main regressions (see Tables 4 and 5), with the exception that sector and time fixed effects are not combined due to computational constraints. CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. Unclustered standard errors are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE A.7: Robustness to endogeneity of women-led business: Non-parametric kernel density and local linear regression matching

Panel A: Demand	Credit lines		Cash loans		Investment loans	
	(Ia)	(IIa)	(IIIa)	(IVa)	(Va)	(VIa)
Woman-led firm	-0.062***	-0.057***	-0.025***	0.041	-0.019***	-0.018*
	(0.008)	(0.011)	(0.005)	(0.028)	(0.007)	(0.008)
(unmatched sample)	-0.063***	-0.063***	-0.019***	-0.019***	-0.036***	-0.036***
	(0.007)	(0.007)	(0.004)	(0.004)	(0.006)	(0.006)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.obs	35,509	35,509	32,962	32,962	33,270	33,270
N.obs. matched on comm.support	35,485	35,485	32,916	32,916	33,204	33,195
Pseudo R²	0.18	0.18	0.18	0.18	0.18	0.18
Rubin B	21.5	25.0	25.0	.	24.1	25.0
Rubin R	0.70	0.59	0.74	.	0.79	0.76
Panel B: Rejection	(Ib)	(IIb)	(IIIb)	(IVb)	(Vb)	(VIb)
Woman-led firm	0.007	0.007	-0.003	-0.014	-0.012	-0.011
	(0.008)	(0.008)	(0.037)	(0.039)	(0.079)	(0.008)
(unmatched sample)	0.022***	0.022***	0.060**	0.060***	0.001	0.001
	(0.005)	(0.005)	(0.023)	(0.023)	(0.007)	(0.007)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
N.obs.	9,575	9,575	1,599	1,599	4,685	4,685
N.obs. matched on comm.support	9,566	9,566	1,585	1,585	4,682	4,682
Pseudo R²	0.25	0.25	0.37	0.37	0.25	0.25
Rubin B	36.3	36.9	75.3	80.6	35.0	35.9
Rubin R	0.70	0.53	0.67	0.54	0.88	0.77

Notes: For each type of credit, the first and second columns report the estimated coefficient for women-led firms with kernel density and local linear regression matching methods, respectively. The controls are the same as in our main regressions (see Tables 4 and 5), with the exception that sector and time fixed effects are not combined due to computational constraints. CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. Unclustered standard errors are reported in parentheses. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

TABLE A.8: Demand for credit lines, cash loans, and investment loans of firms without and with previous bank financing

	Credit lines		Cash loans		Investment loans	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Woman-led firm	0.010	-0.054***	0.001	-0.015**	-0.033	-0.018
	(0.037)	(0.019)	(0.014)	(0.006)	(0.035)	(0.012)
N.banks		0.043***		0.014***		0.018***
		(0.004)		(0.002)		(0.002)
Length bank relation (ln)		0.014		-0.002		0.011*
		(0.010)		(0.004)		(0.006)
CEO controls	yes	yes	yes	yes	yes	yes
Firm controls	yes	yes	yes	yes	yes	yes
Sector x time FE	yes	yes	yes	yes	yes	yes
County FE	yes	yes	yes	yes	yes	yes
Bank FE	no	yes	no	yes	no	yes
N.firm clusters	315	2,306	264	2,193	265	2,192
N.obs.	2,441	33,844	2,036	31,541	2,041	31,849
Adj.R^2	0.14	0.16	0.12	0.10	0.06	0.10

Notes: Columns I and II report the estimates for the probability of applying to credit lines in the case of firms without and with previous bank credit, respectively. Columns III and IV, and V and VI report our estimates for cash and investment loans, respectively. For firms with previous bank credit (columns II, IV, VI), we also control for the number of banks with whom a firm has a credit relation, the natural log of the duration of the longest active firm-bank credit relation (in years), and FE for the bank with whom a firm has the largest share of loans, which are obtained from the French Credit Register. CEO-level controls include: age, tenure, founder status, and past failure. Firm-level controls include: total assets, tangible assets ratio, firm age, exporter status, and credit rating. Standard errors are reported in parentheses and clustered at the firm level. ***, **, * indicate significance at the 1%, 5% and 10% level, respectively.

Appendix B   Financial literacy gender gap among French entrepreneurs

We assess financial literacy among 1,001 French entrepreneurs using data from the 2023 Banque de France - OECD Survey on the financial literacy of new entrepreneurs.[29] We exploit the reported gender of each entrepreneur (630 men, and 371 women) to provide novel evidence on gender differences in financial literacy.

Most indicators suggest that women tend to be less financially literate than men.[30] Table B.1 summarizes our main findings. First, fewer female entrepreneurs report having a "high" or "very high" final financial knowledge, while more report "low" or "very low" financial knowledge. Those differences remain statistically significant (at the 1 or 5%t level) even after controlling for observable characteristics of the entrepreneur and the firm (see panel A). However, this is difficult to determine whether this gap reflects a true lack of knowledge or, rather, lower confidence.

Second, fewer women (30%) than men (39%) have attended a corporate finance training. However, when focusing solely on school and university education, there is no statistically significant difference in participation in business, economics or finance course (see panel B).

Third, respondents were asked whether they had "ever heard of" various corporate finance concepts (e.g., *Have you ever heard of factoring?*). For the most basic concepts (e.g., bank loan, overdrafts) responses do not significantly differ between male and female entrepreneurs. However, for more advanced concepts (e.g., business angels, derivatives, factoring), male entrepreneurs consistently outperform their female counterparts (see panel C).

Fourth, the quantitative assessment of financial literacy reveals a gender

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[29]The main results and the methodological details of the survey are presented (in French) in : *Enquête sur la culture financière des nouveaux entrepreneurs – 2023*, Banque de France (available online at: https://www.mesquestionsdentrepreneur.fr).

[30]Table B.1 reports a subset of questions asked in the survey; we nevertheless consider this subset to be representative of the full survey.

gap. Indeed, to assess respondents' financial knowledge more accurately, entrepreneurs were then asked to answer a series of both closed- and open-ended questions (e.g., *Could you indicate which of these statements best describes return on assets?*). The proportion of correct answers is consistently higher among males, although the differences are not always statistically significant (see panel D).[31]

Fifth, significantly more male entrepreneurs (58%) than female entrepreneurs (46%) received assistance from an accountant or Certified Public Accountant (CPA) in making financial decision, which one may consider a sound management practice (see panel E).

Finally, the researchers who conducted the survey calculated a global financial literacy score based on all respondents' answers, ranging from 0 to 17. The average score for male entrepreneurs (12.6) is higher than that for female entrepreneurs (12.3). The conditional difference is significantly different from zero at the 5% level (see panel F).

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[31]A caveat, however, is that the number of non-responses is higher in panel D than in the other panels of Table B.1 (see column (V)). Most importantly, women are more likely than men to provide no response: the average non-response rate is 12% for men and 16% for women. This gap may introduce some bias into the results, as the reasons for non-response could systematically differ between men and women (e.g., confidence about the appropriate answer, lack of knowledge, etc., see Bucher-Koenen et al. [2025]).

TABLE B.1: Gender differences in financial literacy indicators (1,001 French entrepreneurs, 2023)

	Women (I)	Men (II)	Difference (III)	Difference (controls) (IV)	# of respondents (V)
A. Self-rated financial knowledge					
Very high	0.02	0.07	−0.05***	−0.05***	983
High	0.23	0.27	−0.04	−0.07**	983
Average	0.50	0.52	−0.02	−0.01	983
Low	0.17	0.11	0.06***	0.07***	983
Very low	0.09	0.04	0.05***	0.05***	983
B. Finance training and education					
Corporate finance training	0.30	0.39	−0.08***	−0.10***	998
Business/eco./finance course	0.48	0.45	0.03	−0.01	975
C. Heard of:					
Bank loans	0.80	0.84	−0.04	−0.03	1,001
Overdrafts	0.72	0.75	−0.02	−0.03	1,001
Leasing	0.61	0.72	−0.11***	−0.08**	1,000
Trade credit	0.63	0.69	−0.05*	−0.04	1,001
Private equity	0.44	0.53	−0.08**	−0.07**	993
Bonds	0.40	0.47	−0.07**	−0.05	995
Factoring	0.25	0.38	−0.14***	−0.11***	996
Derivatives	0.26	0.34	−0.08***	−0.09***	1,000
Business angels	0.17	0.29	−0.12***	−0.13***	999
D. Correct answer to a question about:					
Inflation	0.93	0.93	0.01	0.00	984
Risk-return tradeoff	0.88	0.92	−0.04*	−0.05**	961
Dividends	0.86	0.86	0.01	−0.02	920
Interest rates	0.80	0.83	−0.03	−0.06**	745
Compound interest	0.64	0.72	−0.08**	−0.10***	846
Equity	0.50	0.56	−0.06*	−0.05	883
Balance-sheet	0.50	0.55	−0.05	−0.06	918
ROA	0.45	0.46	−0.01	−0.03	616
E. Who helps:					
Financial intermediary	0.27	0.30	−0.03	0.01	1,000
Accountant or CPA	0.46	0.58	−0.12***	−0.10***	1,000
Family or friends	0.45	0.41	0.04	0.03	1,000
F. Financial literacy score (0–17)	12.26	12.62	−0.35**	−0.35**	1,001

Notes: Authors' calculations based on individual data from the 2023 Banque de France – OECD "Survey on the financial literacy of new entrepreneurs". The survey focuses on entrepreneurs running a firm with less than 50 employees, created less than 5 years ago, and who have less than 5 years of cumulated experience as an entrepreneur. Columns I and II present the outcomes for women and men, respectively. Column III shows the difference between women and men and indicates its statistical significance. For example, the first row compares the percentage of female entrepreneurs (0.02) and male entrepreneurs (0.07) who report having a "very high" financial knowledge. The difference is -0.05 and is significant at the 1% level. Column IV takes the analysis one step further, by estimating the gender difference while controlling for a range of entrepreneur and firm characteristics: the entrepreneur's age, executive experience, and education level, as well as the firm's size, industry, age, and geographical location.