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Qi, Shusen ; Ongena, Steven ; Cheng, Hua

DOI: <https://doi.org/10.1007/s11187-021-00579-1>

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ZORA URL: <https://doi.org/10.5167/uzh-223455>

Journal Article

Accepted Version

Originally published at:

Qi, Shusen; Ongena, Steven; Cheng, Hua (2022). Working with women, do men get all the credit? *Small Business Economics*, 59:1427-1447.

DOI: <https://doi.org/10.1007/s11187-021-00579-1>

Working with Women, Do Men Get All the Credit?

Shusen Qi

School of Management, Xiamen University

422 Siming South Road, 361005 Xiamen, China

shusenqi@xmu.edu.cn

+86 185 5962 6821

Steven Ongena

University of Zurich, SFI, KU Leuven, & CEPR

14 Plattenstrasse, CH-8032 Zürich, Switzerland

steven.ongena@bf.uzh.ch

+ 41 44 634 39 54

Hua Cheng

School of Finance, Nankai University

38 Tongyan Road, 300350 Tianjin, China

harrychenghua@utexas.edu

+86 180 3018 7751

August 20, 2021

The authors would like to thank two anonymous referees, Yangming Bao, Jia He, Mingming Jiang, Da Ke, Esteban Lafuente (Editor), Jakob Madsen, and participants at China International Conference in Finance (Tianjin), Great China Area Finance Conference (Xiamen), Nankai University Young Scholars in Finance Conference (Tianjin), 11th International Conference of Methods in International Finance Network (Ji'nan), and Dongbei University of Finance and Economics Workshop (Dalian) for useful comments. Shusen Qi acknowledges financial support from the National Natural Science Foundation of China (71903164, 71790601) and Social Science Foundation of Fujian Province (FJ2019B140). Steven Ongena acknowledges financial support from ERC ADG 2016 - GA 740272 lending.

Working with Women, Do Men Get All the Credit?

Abstract: Are firms that are managed *and* owned by females-only appraised differently than those where genders mix at the top? To answer this question, we study 7,467 small and medium-sized firms from 22 countries. We find that – when borrowing from banks – firms that are both managed *and* owned by females more often report binding credit constraints and higher interest rate payments than male-only firms; differences that we can attribute to taste-based discrimination. In contrast, if the manager and the owner have a different gender, we find no such differences with male-only firms. Hence, interestingly banks seem to assume that women invariably play second fiddle in the mixed-gender firms. We also show that discrimination between female-only and other firms disappears from economically more developed regions and from credit markets that are more competitive or dominated by transactional lenders.

Plain English Summary: Is mixing genders at the top good or bad for firm financing? Turns out it may not matter. To arrive at this answer, we study almost 7,500 small and medium-sized firms from 22 countries. When borrowing from banks, firms that are both managed and owned by females obtain less financing. In contrast, if the manager and the owner have a different gender, we find no such differences with male-only firms. The implication is that bankers rightly or wrongly seem to assume that women invariably play second fiddle in mixed-gender firms. More progress toward gender equality seems possible.

Keywords: Credit Access, Gender, Discrimination, Teamwork

JEL Codes: G21, J16, L26

1. Introduction

Economic growth strongly relies on firm performance, which itself is impeded by many factors, especially the lack of access to credit (Beck and Demirguc-Kunt, 2006; Nkurunziza, 2010). Bank credit is important as they allow firms to overcome liquidity constraints and to invest as they deem desirable. To this extent, it is central to identify the extent to which firms are credit constrained and the factors that might limit their access to credit. Among these factors, discrimination on the basis of gender matters (Becker, 1957). Therefore, an evolving literature focuses on the situation of female borrowers and pays particular attention to the question whether or not women are discriminated in the credit market in the form of limited access to credit or unfavorable loan terms.

The empirical evidence so far has been surprisingly mixed. For instance, Asiedu, Kalonda-Kanyama, Ndikumana, and Nti-Addae (2013) find a gender gap in lending in Sub-Saharan Africa, but using the same region of Sub-Saharan countries, Aterido, Beck, and Iacovone (2013) find no evidence of such a gender gap. Focusing on Italy, Bellucci, Borisov, and Zazzaro (2010) find that female owned firms do not pay higher interest rates for granted loans. However, Alesina, Lotti, and Mistrulli (2013) find the opposite results after explicitly controlling for entrepreneurial risk, i.e., that banks charge higher interest rates for female entrepreneurs. Discrimination against female entrepreneurs is also found to be varying over time in Spain (De Andrés, Gimeno, and de Cabo, 2020). In Asia, Pham and Talavera (2018) find no evidence of gender discrimination in the formal lending markets in Vietnam but significant gender discrimination is found in the online lending markets in China (Chen, Huang, and Ye, 2020). And, using cross-country samples, Muravyev, Talavera, and Schäfer (2009) for example find that female owned firms are more likely to be rejected in their loan applications and that they also pay higher rates. In contrast, Ongena and Popov (2016) and Moro, Wisniewski, and

Mantovani (2017) both find no evidence that banks actively discriminate against female entrepreneurs.

One potential reason for this mixed evidence may be that the current literature focuses on the gender of either the top manager or the owner of a firm. Yet, in many enterprises, the top manager and the owner are not the same person and both their qualifications will matter when banks make their credit decisions (Mukhtar, 2002; Mc Cartan-Quinn and Carson, 2003). Therefore, when studying the role of gender in firm-bank relationships, it is essential to focus simultaneously on the gender of the top manager and the gender of the owner, because both of them will be considered to work as a team when banks evaluate their qualifications for a loan.

In this paper, we first investigate whether female managed/owned firms are discriminated in their lending by banks compared to male managed/owned firms. Due to gender stereotypes, women are often perceived to lack in the attributes thought to be required for success, especially in jobs that are traditionally viewed as male sex-typed (Heilman, Block, Martell, and Simon, 1989; Heilman, Block, and Martell, 1995; Davison and Burke, 2000; Schein, 2001). A typical example is entrepreneurs or top managers of a firm. When serving in these roles, women are usually treated as being less competent and less fit. As a result, a female managed and female owned firm may face unfavorable treatment from banks when applying bank credit.

But what happens if a firm is co-owned-and-managed by women and men? This question is of particular importance given the recent surge in the use of teamwork in virtually every industry and the importance of teams for successful organizational functioning (Ilgen and Pulakos, 1999; Wisner and Feist, 2001). In such cases, firm performance is the outcome of cooperation between females and males and there is clear ambiguity about the source of the performance outcome. Who is actually responsible for bringing it about, the women or the men? Heilman and Haynes (2005) show that when teamed up with men, women are often underrated and are allocated with less appreciation (or “credit” in the psychological sense) for their group

work. Specifically, females were rated as being less competent, less influential, and less likely to have played a leadership role in teamwork. However, most of the evidence is experimental and there is a clear lack of research that focuses on the role of gender in real teamwork in the corporate (finance) field. Little is known about how “credit” is allocated across women and men within an organization.

Therefore, the second question we ask is: when a firm is jointly managed and owned by a female and a male, whether banks undervalue the role that the female plays and consequently treat this firm as equivalent to a male managed/owned firm. The intuition is that banks cannot perfectly observe and separate the top manager and the owner’s influence on a firm’s strategy, they must infer who is more likely to affect the future performance of the firm without having full information as to what each of them does. This might leave room for gender stereotypes to influence the decision of their relative importance in the firm’s operation.

Studying 7,467 small and medium-sized firms (SMEs) from 22 Eastern European countries during 2013-14, we find enterprises that are simultaneously managed and owned by females are “explicitly discriminated” in bank lending. These firms are more likely to be credit constrained compared to their male counterparts, and when they successfully obtain a bank credit, they also have to pay higher interest rates. In contrast, if a firm is managed and owned jointly by a female and a male, the firm does not face any unfavorable treatment by banks. This indicates that women are “implicitly discriminated” that banks allocate less “credit” to the female and undervalue the female’s role in the operation of the firm, and consequently treat these firms as comparable to the male managed/owned firms.

A following question is: whether the explicit discrimination against females managed and owned firms is taste-based or statistical. Female entrepreneurs and managers might differ from males in ways that explain the estimation results absent any taste-based discrimination (Ongena and Popov, 2016). For example, females are more risk-averse (Powell and Ansic, 1997;

Jianakoplos and Bernasek, 1998), which might undermine the growth opportunities of their firms. In addition, gender bias might over time trigger changes in the skill composition of female entrepreneurs or lower their inputs in human capital through self-selection (Mulligan and Rubinstein 2008; Klumpp and Su, 2013). As a result, the skill required to run a firm might be inferior among female entrepreneurs, which leads to lower access to credit for female managed/owned firms. This could also lead to the undervalued role of women when they work with men. However, we find no statistical difference in firms' realized sales growth (three years ahead) between female and male firms. Even stronger than that, we demonstrate that there is also no statistical difference in the growth rates between credit constrained female firms and credit unconstrained male firms. The Oster (2019) test further confirms that any omitted variable would not entirely drive away our current findings. These evidence imply the existence of taste-based discrimination.

We further show how the structure of the local banking market can moderate the gender gap in bank lending. First, as indicated by Berkovec, Canner, Gabriel, and Hannan (1998), taste-based discrimination should be less pronounced in more competitive lending environments. Intuitively, taste-based discrimination indicates that banks choose less qualified over more qualified borrowers for the sake of biased taste and this would forgo expected profits. This non-profit-maximizing behavior is less likely to survive in more competitive markets. As a result, taste-based discrimination against females is supposed to be less common in more competitive loan markets. Our findings are consistent with this expectation that lending discrimination against female entrepreneurs only exists in cities with less competitive banking markets. This heterogeneity further confirms that the discrimination we find is taste-based rather than statistical, where in the latter case we would expect no difference in discrimination between more and less competitive lending environments.

Second, we find female managed/owned firms are more discriminated in lending when they are located in cities dominated by relationship banks rather than transaction banks. The differentiation between relationship and transaction banks is based on information on banks' lending techniques from face-to-face interviews with the ultimate bank insiders (Beck, Degryse, De Haas, and van Horen, 2018). The main difference between relationship and transaction lending is the use of soft versus hard borrower information in the loan granting process. Clearly, demographical characteristics such as gender is not one dimension of hard information and is not included in banks' credit scoring systems. The use of hard information would also delegate the decision-making authority (Liberti and Petersen, 2019). Therefore, transaction lending could eliminate discretion and reduce the room for taste-based discrimination against female entrepreneurs. Therefore, any gender bias in lending should be more (less) pronounced in local banking market with more relationship (transaction) banks and this is indeed what we find.

Our paper contributes to the current literature on gender discrimination in the corporate (finance) field by utilizing both the gender of the owner and the gender of the top manager of a firm. By using this gender mix, we find evidence for both explicit and implicit discrimination against female entrepreneurs. Both types of discrimination are the result of gender stereotypes (running a firm is seen traditionally as a male activity). Banks tend to undervalue or even ignore the role of females in operating mixed gender firms (implicit discrimination) and grant female managed and owned firms with less favorable loan terms (explicit discrimination).

The remainder of the paper proceeds as follows. Section 2 presents the data and summary statistics. Section 3 introduces the methodology and describes the results. Section 4 concludes.

2. Data and Summary Statistics

To empirically identify the gender bias during the corporate lending process and the role of females in the operation of the firms, we utilise firm-level information to measure both the conditions of firms' access to credit and the gender of a firm's owner and top manager. All the

firm-level data come from the fifth round of the Business Environment and Enterprise Performance Survey (BEEPS V) conducted jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank during 2013-14.

We exclude data from BEEPS IV because there is a lack of information on female ownership of firms and earlier waves of this survey are ignored as they do not provide comparable information on credit access. BEEPS V covered 16,566 enterprises in 32 countries of Eastern Europe and Central Asia, and we narrow this sample down to 22 countries for which we also have bank information from the Banking Environment and Performance Survey (BEPS II) and this gives us 8,138 firms.¹ In addition to that, we exclude all firms for which the variables of interest are missing and this leaves us with a final sample of 7,467 firms. The number of firms that report all the information we require for this study ranges from 111 in Montenegro to 894 in Ukraine. These numbers are comparable to studies that use BEEPS datasets, i.e., Ongena and Popov (2016). The detailed variable definitions and data sources are listed in Table IA1 of the online appendix.

When capturing both the gender of the firms' top manager/owner and their credit access, the survey asks direct questions on that topic, so no indirect inference is needed. In other words, they are not perceptual measures, but instead are indicators concerning actual behaviors. These types of questions are relatively straightforward to answer (Jensen, Li, and Rahman, 2010).

2.1. Gender

Information on the gender of a firm's top manager and owner is obtained from two questions in BEEPS V. To capture the gender of a firm's top manager, we turn to the question that asks whether the top manager is female and define the firms accordingly. To distinguish if a firm is

¹ The 22 countries include: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, FYR Macedonia, Moldova, Montenegro, Poland, Romania, Serbia, Slovak Republic, Slovenia and Ukraine.

owned by females, we seek to the question that asks whether the controlling shareholder of the firm is female and we classify firms with positive answers as female owned firms. Therefore, combining these two questions together, we can classify the firms into four categories, namely a *Female Managed and Female Owned Firm*, a *Female Managed and Male Owned Firm*, a *Male Managed and Female Owned Firm*, and a *Male Managed and Male Owned Firm*. The detailed information enables us to distinguish firms by the gender of the top manager and owner simultaneously. In addition, as BEEPS mainly covers SMEs that are privately owned, it provides us with a perfect setting to examine the interaction between the owner and the top manager of the firm, or in other words, teamwork of a firm. In SMEs, the owner and the top manager are often relatives or friends where there is more direct cooperation in the management of the firm. This is in contrast to large firms where cooperation is less of a fact, but instead there is a more severe principal-agency problem.

Summary statistics are reported in Table 1. Most of the firms are both managed and owned by males, which account for 72 percent on average. In contrast, only 14 percent of firms are both managed and owned by females. In addition, 7 percent of firms are managed by males and are owned by females. Similarly, the other 6 percent of firms are managed by females and are owned by males.

[Insert Table 1 here]

The data in Table 2 also demonstrate substantial variation across countries. For example, there are more than 20 percent of firms that are both managed and owned by females in Estonia, Latvia, and Moldova. However, in Azerbaijan, the number is less than 3 percent. Female managed/owned firms are also less common in Albania, Armenia, Bosnia and Herzegovina, and Czech Republic (less than 10 percent). In addition, in Belarus, there are many firms that are managed by females and owned by males (18 percent). There are more than 10 percent of firms that are managed by males and owned by females in countries like Moldova, Poland, and

Romania. Last, male managed/owned firms play a dominate role in Azerbaijan whereas the female and male entrepreneurs are more balanced in countries like Belarus, Estonia, and Georgia. At a first sight, there is substantial variation across countries in terms of the gender of firm top managers and owners.

[Insert Table 2 here]

2.2. Credit Access

To measure firms' access to credit, we follow Popov and Udell (2012) and Beck, Degryse, De Haas, and, van Horen (2018) to create the variable they label *Credit Constrained*. We combine three questions in BEEPS V to first distinguish between the firms with and without demand for credit (*Credit Demand*). Among the former group, we then identify the firms that were credit constrained: Those that either got rejected by a loan application or were discouraged from applying any loan in the first place. This combination allows us to distinguish between firms that do not apply for any loan because they do not need one and those that do not apply because they are discouraged.

We start with question K16: "Did the establishment apply for any loans or lines of credit in the last fiscal year?" For firms that answer "No", we move to question K17, which asks the main reason the establishment did not apply for any line of credit or loan. For firms that answer "Yes", question K18a subsequently asks: "In the last fiscal year, did this establishment apply for any new loans or new credit lines that were rejected?" we group firms that answer both "Yes" to K16 and "No" to K18a as credit unconstrained, and firms are constrained if they answer "Yes" to K18a or answer one of the following "Interest rates are not favorable"; "Collateral requirements are too high"; "Size of loan and maturity are insufficient"; or "Did not think it would be approved" to question K17.

According to the summary statistics in Table 1, virtually half of all sample firms had demand for credit. Among those firms with credit demand, 38 percent were credit constrained.

Thus, bank credit is a vital source of external finance in the sample countries and exerts a major obstacle for the firms that are operating there. Table 2 further reveals substantial variation across the sample countries. Among firms that have demand for credit, the share of credit constrained firms ranges from 13 percent in Czech Republic to 59 percent in Montenegro and Ukraine.

The BEEPS V also collects information about the loan characteristics for the borrowing firms' most recent line of credit or loan, including the annual nominal *Loan Rate* (in percent), the original *Loan Duration* (in months) of the loan and whether the loan required *Loan Collateral*. We restrict our sample to loans that were issued within the past one year to be comparable with our credit access measure and *Loan Rate* is winsorized at the 1 percent level. The summary in Table 1 indicates that the average loan rate was 11 percent with average duration of 35 months. 82 percent of all borrowing firms were asked to pledge collateral.² The loan rates also vary significantly across countries as shown in Table 2. For example, the average loan rate amounts to more than 15 percent in Azerbaijan, Belarus, Georgia, Moldova, and Ukraine, but is around 5 percent in Czech Republic, Estonia, Latvia, Lithuania, and Slovenia.

2.3. Firm Characteristics

We then construct a common set of firm-level control variables using BEEPS V (i.e., Beck, Degryse, De Haas, and van Horen, 2018; Qi and Ongena, 2019). Specifically, we include *Firm Age* as the number of years since a firm is first established. *Number of Employee* captures the size of a firm by the number of permanent full-time employees. An average firm in our sample is established 16 years ago with 51 permanent full-time employees. If a firm's annual financial

² BEEPS also collects information on the value of the collateral, but the information is very incomplete and there are many firms that do not report this information. For firms that do report the information, we use the value of the pledged collateral and the value of the loan at origination to calculate the loan-to-value ratio. The number is 80% on average, which is very reasonable.

statement is checked and certified by an external auditor, then this firm is classified as an *Audited Firm*. In our sample, 38 percent of firms' financial reports are audited by an external auditor. Firm ownerships are also included, including whether a firm is a *Sole Proprietorship Firm*; a *Publicly Listed Firm*; the *State Ownership*; and the *Foreign Ownership*. Detailed summary statistics of these variables are provided in Table 1.

2.4. Local Banking Market

Lastly, we examine whether and how the structure of the local banking market would moderate the gender gap in bank lending. To extract information on the local banking market, we turn to the second round of the Banking Environment and Performance Survey (BEPS II), jointly undertaken by EBRD and Tilburg University. As part of BEPS II, a specialized team of consultants collected the geographical locations and the establishment dates (and possible closures) of all bank branches across the sample countries. So we can draw a precise changing landscape of the banking market in our sample countries. Using this geographical information, we match each firm in BEEPS V with existing bank branches within the same locality (city or town). The underlying assumption is that a firm ensures access to all the bank branches in the locality where it operates.

After matching (identifying the local bank branches that surround each firm), we construct two variables to capture the structure of the local banking market. First, we measure the competition of the local banking market using the *Herfindahl-Hirschmann Index* (HHI). This index is constructed using the number of branches each bank operates in a specific city and ranges from 0 to 1. Larger values indicate less competition among local banks. According to the US Department of Justice, a market with HHI of less than 0.18 is considered "well diversified" or "moderately concentrated", and 0.18 or greater "highly concentrated".

Second, we capture the share of bank branches in each city that rely on relationship lending opposed to transaction lending (*Share of Relationship Banks*). The information on

banks' lending techniques is obtained from a questionnaire that was administered in BEPS II with bank insiders by a specialized team of senior financial consultants, each with considerable first hand banking experience. We follow Beck, Degryse, De Haas, and van Horen (2018) to use BEPS II question Q6 that asked bank CEOs to rate on a five-point scale the importance (frequency of use) of the following techniques when dealing with SMEs: relationship lending, fundamental and cash flow analysis, business collateral, and personal collateral (personal assets pledged by the entrepreneur). Although, as expected, almost all banks find building a relationship (knowledge of the client) of some importance to their lending, only part of the banks finds building a relationship “very important” and the rest considers it only “important” or “neither important nor unimportant”. We categorise the banks that think that relationships are very important as relationship banks.

3. Methodology and Results

3.1. Baseline Results

To examine if there is a gender bias during the bank lending process (explicit discrimination), and if banks would undervalue the role of females when they work with males (implicit discrimination), we exploit the impact of the gender of a firm's top manager and owner on firms' access to credit by the following model:

$$\begin{aligned}
 \text{Credit Access}_{irs} = & \alpha_r + \alpha_s \\
 & + \beta_1 * \text{Female Managed and Female Owned Firm}_{irs} \\
 & + \beta_2 * \text{Female Managed and Male Owned Firm}_{irs} \\
 & + \beta_3 * \text{Male Managed and Female Owned Firm}_{irs} + \gamma X_{irs} + \varepsilon_{irs} \quad (1)
 \end{aligned}$$

for firm i operating in region r in industry sector s . *Credit Access* either measures if a firm is credit constrained from the extensive margin (*Credit Constrained*) or captures the *Loan Rate* of the most recent loan or line of credit last year at the intensive margin. The gender of firm owner/manager captures whether the owner or the top manager of a firm is a female, where the

benchmark group includes firms that are male managed and owned. X represents the common set of firm-level control variables including *Firm Age*, *Number of Employee*, *Publicly Listed Firm*, *Audited Firm*, *Sole Proprietorship Firm*, *Holding Firm*, *State Ownership*, and *Foreign Ownership*. When identifying the impact on *Loan Rate*, we also control for the loan characteristics as *Loan Duration* and *Loan Collateral*. The geographical primary sampling unit (PSU) and industry fixed effects are included to control for the (un)observed variation at the region and industry level, which is crucial for our identification. The comprehensive matrix of the region and sector fixed effects control for the fact that areas or sectors are likely to have disproportionate concentration of female entrepreneurs. For example, stories of “female-run agriculture versus male-run manufacturing” might be very applicable to developing economies like the sample in this paper, so we wish to fully account for such possibilities.

The main coefficient of interest is β , which identifies the impact of the gender of a firm’s owner or top manager on firms’ access to credit. If female entrepreneurs are explicitly discriminated in the lending process by banks, we would expect to find a significantly negative β_1 . Moreover, if the role of women is underrated when they team up with men (implicit discrimination), we would expect to find no significant estimates for both β_2 and β_3 . In other words, banks would ignore the role of females in the corporate field and treat the firms that are simultaneously managed and owned by a female and a male as male managed/owned firms.

Before turning to the multivariate estimates, we start with the univariate results in Table 3, which provide a vivid illustration that link firms’ access to credit with the gender of the firm’s top manager and owner. Again, we focus on two aspects of credit access: The extensive margin which captures the credit constraints of a firm and the intensive margin about the interest rate of the most recent loan in the last fiscal year. Firms are classified into four groups: *Female Managed and Female Owned Firm* (504/137 firms), *Female Managed and Male Owned Firm* (237/92 firms), *Male Managed and Female Owned Firm* (276/118 firms), and

Male Managed and Male Owned Firm (2,688/852 firms). Compared with the firms that are both managed and owned by males, female managed and owned firms are about 9 percent more likely to be credit constrained and pay an interest rate that is 2.3 percentage point higher. The differences are highly significant at the 1 percent level under a two-sample t-test with unequal variances. In contrast, for firms that either the top manager or the owner is a female, there are no significant differences (at the 5 percent level) when compared to the male managed/owned firms in both terms. These results suggest that females are explicitly discriminated in corporate lending, but when they team up with males, the explicit discrimination disappears and is replaced by implicit discrimination. This is in line with our prior that females are undervalued as compared with their male counterparts in joint work, so do banks during their lending process.

[Insert Table 3 here]

We then formally test the relationship between gender and credit access by the multivariate regressions as shown in model (1). The control group only includes firms that are both managed and owned by males. The results are reported in Table 4. The result in columns 1 shows that the likelihood of being credit constrained is about 6 percent significantly higher for female managed and owned firms. To get an idea of the aggregate effect, consider the following back-of-the-envelope calculation. In 2015, according to the European Commission's "Enterprise and industry Small Business Administration Factsheet 2016: Poland", SMEs amount to 1.54 million in Poland.³ According to BEEPS V, 14 percent of these firms were female owned, or 215,571 firms. Out of these, 50 percent had demand for bank credit, of which 37 percent are credit constrained, or 39,881 firms in the aggregate. The results imply that if there is no

³ The BEEPS survey mainly focus on SMEs and according to the European Commission's "Enterprise and industry SBA Factsheet 2016: Poland", in 2015, SMEs in Poland account for 99.8 percent of businesses in the Polish "non-financial business economy".

discrimination against female entrepreneurs, an additional 2,393 female managed/owned firms would be able to gain access to bank credit each year. Of course, this is a conservative calculation that ignores the fact that with no gender discrimination taking place, there could be many more female entrepreneurs in the first place.

Turning to the *Loan Rate*, we find that the female managed/owned firms pay interest rates that are on average higher by almost 1.6 percentage point. We again utilise Poland to get an idea of the economic impact by the following rough calculations. According to Narodowy Bank Polski (National Bank of Poland), in 2015, loans to SMEs amount to 47 billion US dollars in Poland. According to BEEPS V, 14 percent of these loans were issued to firms that were female managed and owned, or 6.6 billion US dollars. The results imply that if the discrimination against female entrepreneurs is eliminated, then an additional 106 million US dollars' interest payment would be "saved" each year.

Both results indicate the existence of explicit discrimination against female entrepreneurs in bank lending. Firms that are both managed and owned by females, compared to their male competitors, are more likely to be credit constrained and have to pay higher loan rates.

In contrast, if either the top manager or the owner is a male, this firm does not face any explicit discrimination during the bank lending process at the 5 percent level. This finding is consistent with the psychology literature that women receive less credit for their joint work with men because of extant biases. As banks cannot perfectly observe the top manager and the owner's contribution to the firm's output, they have to decide who is more influential in the firm without being exposed to the full set of information. As a result, this leaves room for demographic characteristics, such as gender, to influence banks' decisions, and banks would be biased to undervalue the role of females. Consequently, banks would treat firms that are managed and owned by a female and a male as comparable to male managed/owned firms. This is evidence of implicit discrimination against females in the corporate (finance) field.

Interestingly, this implicit discrimination could ultimately eliminate the explicit discrimination against mixed gender firms.

Several of the control variables enter significantly and with coefficient signs consistent with the literature. Older and larger firms, compared to younger and smaller ones, are less likely to be financially constrained. Audited firms and firms under larger holding companies are less likely to experience credit constraints. In terms of loan rate, we find larger firms to be charged with lower rates. We also find publicly listed firms are likely to be charged with higher interest rates, compared to private firms. This might be counter-intuitive at a first glance, but the finding is consistent with Beck, Degryse, De Haas, and, van Horen (2018) who show that public firms became more financially constrained during economic downturns than private firms as a result of the drying up of alternative funding sources (BEEPS V was taking place during a time period when these countries were still in the aftermath of the global financial crisis and the European sovereign debt crisis).

[Insert Table 4 here]

However, in the sample a firm's credit access is only observable if the firm needs a loan. This raises the potential issue of a selection rendering the estimates biased. To address this issue, we follow Qi and Ongena (2020) to utilize a two-stage Heckman selection model where *Crime Experience* and *Product Losses* are the two selection variables (Heckman, 1979). *Crime Experience* is defined as a dummy equals 1 if a firm experienced loss as a result of theft, robbery, vandalism or arson last year and 0 otherwise. We measure *Product Losses* by whether a firm's product was lost in transit due to breakage or spoilage in the last fiscal year. From an economic point of view, these two events can be linked to credit demand in two main ways. First, both of these incidents are likely to cause temporary reductions in firms' available liquidity. Therefore, when a firm experiences a loss because of crime (theft, robbery, vandalism or arson) or its product is lost in transit due to breakage or spoilage, the firm's financing needs will be

directly affected. Second, firms that want to address these incidents and prevent them from happening again in the future need to invest additional money into security systems and logistics. These additional investment needs would in turn drive up firms' credit demand. The firm-level correlation between both incidents and needing bank credit thus is further strengthened. However, both incidents are usually unanticipated and plausibly random (Gorodnichenko and Schnitzer, 2013), and are typically not observed by lenders as borrowers tend to actively hide these negative events (in the loan application process, typically no information is required or collected on such incidents). They should therefore not factor into the subsequent loan supply decisions.⁴ The first-stage Heckman selection model is as below:

$$Credit\ Demand_{irs} = \alpha_r + \alpha_s + \beta_1 Crime\ Experience_{irs} + \beta_2 Product\ Losses_{irs} + \gamma X_{irs} + \varepsilon_{irs} \quad (2)$$

for firm i operating in region r in industry sector s . The same sets of control variables X are included, as well as PSU and industry fixed effects. The hypothesis is that if firm i operating in region r in industry s experienced losses as a result of crime or transit accidents last year, this firm i would need more credit. Therefore, we would expect significantly positive estimates for β_1 and β_2 . The *Inverse Mills' Ratio* is first obtained from Model (2), then it is included in Model (1) to address the selection bias for *Credit Constrained*.

The results are shown in Table 5.⁵ The first-stage selection is displayed in column 1. The dependent variable is *Credit Demand* and the selection variables are *Crime Experience* and

⁴ Although crime experience and product losses may correlate with the social or economic environments where the firm is located and thus contribute to credit access via local banking market competition, but in our analyses we have controlled the PSU fixed effects to address any regional differences and thus only focus on within region variation. Within each region, the social and economic environments are constant.

⁵ We do not report the full set of control variables starting with Table 5 to save space. But we report the results with a full set of control variables in the online appendix from Table IA2 to Table IA7.

Product Losses. As expected, both *Crime Experience* and *Product Losses* are significantly and positively related with *Credit Demand*. In other words, if a firm experienced loss as a result of crime or breakage/spoilage in product transition in the last fiscal year, this firm would demand for more credit (by 8 or 5 percent economically) to cover the resulted financial loss. The second-stage results are presented in columns 2 and 3 of Table 6, where the *Inverse Mills' Ratio* is included to correct for the selection bias. The *Inverse Mills' Ratio* enters insignificantly in both specifications, suggesting that selection bias is not a relevant concern and hence that the estimates obtained through regressions without such a correction are consistent. This is further confirmed by the fact that the coefficient estimates in Table 5 are comparable to those in Table 4, both statistically and economically. In addition, in unreported regressions, we further include *Crime Experience* and *Product Losses* in the second stage and both of them enter insignificantly, which further confirms our prior that these incidents do not factor into the loan decision process.

[Insert Table 5 here]

Currently our *Credit Constrained* measure is constructed when a firm either got rejected by a loan application or was discouraged from applying any loan in the first place. We define a firm to be discouraged if the firm did not apply any bank credit due to the following four reasons: (1) interest rates are not favorable; (2) collateral requirements are too high; (3) size of loan and maturity are insufficient; (4) it did not think it would be approved. The first three reasons indicate a firm gets unfavorable loan terms that prohibit borrowing but the last reason indicates that the firm self-selects to not apply any credit, and we call it self-rationing. So, it could be the case that our credit constraints measure mixes discrimination (rejected or got unfavorable loan terms) and self-rationing. To rule out this concern, we pursue a robustness test where we restrict our credit constraints measure to exclude situations when a firm is self-discouraged (did not think it would be approved). The estimates are shown in Table A1 of the Appendix. After

excluding cases with potential self-rationing, we still find similar results, both statistically and economically.

3.2. Taste-Based versus Statistical Discrimination

The results so far indicate that credit access is far more problematic for female than for male firm entrepreneurs, and when they team up, the role of female entrepreneurs is largely “ignored”. Do these findings imply the existence of taste-based discrimination against female entrepreneurs during the bank lending process? This question crucially depends on the nature of discrimination and on the differences in ability across genders in those countries. For example, if male and female entrepreneurs are indeed of equal ability, then the findings indicate that the banking market indeed discriminates against female entrepreneurs because of bias: First, females are underrated in firm operation when they work with males; Second, female managed/owned firms result in the higher probability of being credit constrained, as well as higher interest rates on granted loans.

However, female entrepreneurs could differ from male entrepreneurs in ways that explain the findings absent any taste-based discrimination. Compared to men, women are usually more risk-averse (Powell and Ansic, 1997; Jianakoplos and Bernasek, 1998). So female entrepreneurs may forgo valuable investment opportunities and ultimately undermine the growth opportunities of their firms. Females’ inputs in human capital such as education might be of lower quality than those of males (Mulligan and Rubinstein, 2008). The belief that females’ human capital distribution has a lower variance than the male distribution can also be self-fulfilling, resulting in a “glass ceiling” effect with fewer “elite” females (Klumpp and Su, 2013). Therefore, female entrepreneurs might be undervalued and face more limited access to credit not because of direct discrimination, but because of differential skills. The latter case is the so-called statistical discrimination whereby banks discriminate because of a perception that loans granted to certain groups perform worse for reasons not observable to the lender (such as

differential skills). Although both types of discrimination are illegal, statistical discrimination may be consistent with profit maximization and therefore, a determination of which types of discrimination is operative has important implications for the design and success of initiatives to combat lending discrimination.

Unfortunately, due to data limitation, we have no information about, and are thus unable to capture, either the owner or the top manager's ability.⁶ But we believe that if the discrimination is statistical rather than taste-based, then any gender differences in owner/top manager ability should be reflected by differences in firm characteristics and performance. To show that the type of discrimination we find is taste-based, rather than statistical, we conduct the following three analyses.

First, we use the propensity score matched sample to remove all observable differences (including age, size, ownership, and transparency) between female and male firms, as well as unobservable differences across sectors and PSUs. To construct a propensity score matched sample of female firms to comparable male firms, we first estimate the probability that a firm is managed and owned by females. The estimation model includes all variables and fixed effects from model (1). We then use the propensity scores from the estimation to perform a one-to-one nearest-neighbor propensity score matching procedure (with no replacement).⁷

⁶ In BEEPS V, there is a module about information of top managers. But this module is only available for Turkey, which is not part of our final sample. However, using this module we can get some idea about if gender is related to differences in ability. Specifically, the module collects the top managers' highest level of formal education, for a sample of 1,299 firms in Turkey. Within this sample, we find no significant correlation between gender and the level of education. This preliminary correlation result can give us some confidence that the ability of top managers is not gender-specific.

⁷ The matching process is done in Stata by the "psmatch2" command, and the results are unaffected if we use the "teffects" command.

That is, we match each female managed/owned firm to a most similar male managed/owned firm.

To check if the matching is effective in eliminating observable differences in firm characteristics, we show the balancing of the samples both before and after our matching process in Table A2 of the appendix. We find that before matching, there are some significant differences between female and male firms in terms of firm characteristics. For instance, female managed/owned firms are significantly smaller, are less likely to be publicly listed in a stock exchange and are less often being audited. Female firms are also more likely to be founded under sole proprietorship, but less as part of a larger holding company structure. Foreign ownership is also less common in female firms. But these differences are eliminated by the propensity score matching and we end up with a more balanced sample.

Using the propensity score matched sample, together with firms that are simultaneously managed and owned by a female and a male, we re-estimate the baseline regressions and display the results in Panel A of Table 6. We continue to find that female managed and owned firms are more likely to be credit constrained and to pay higher loan rates. Economically, the results are also very similar, and even become a bit larger (female managed/owned firms are 6.6 percent more likely to be credit constrained and pay 2 percent higher loan rates). In addition, we also calculate and report the average treatment effect for the treated (ATT) and to take an extra step to get the treatment effects correct, we further use the double robust estimator to estimate the ATT.⁸ Both yield significantly positive and economically comparable treatment effects. As before, we do not find any discrimination if one of the top manager and owner is a male.

⁸ We utilize both the inverse-probability-weighted (IPW) estimator and the IPW-regression-adjustment (IPWRA).

The results are the same.

In addition, we also implement a placebo test in the matching. Specifically, after matching, we randomly assign the treatment (being a *Female Managed and Female Owned Firm*) across the matched firms (*Female Managed and Female Owned Firm* plus *Male Managed and Male Owned Firm*). We restrict the treated firms to be 50 percent of the matched sample to be comparable with our one-to-one matching. Then we utilize this randomly assigned treatment to re-estimate our results in Panel B of Table 6. We discover that in this random treatment setting, there is no significant discrimination against female firms anymore.

Overall, the results suggest that the observed discrimination against female entrepreneurs is not driven by differential skills between females and males that result in different firm characteristics (statistical discrimination).

[Insert Table 6 here]

Second, to investigate if female firms are indeed performing worse than male firms, we analyze the difference in firm growth across the dimensions of gender and credit access. In Table 7, we run a version of the main tests where the dependent variable is the realized firm sales growth in the past 3 fiscal years (*Past Performance*). In addition, we also focus on a subsample of credit constrained female firms and credit unconstrained male firms to further investigate this issue. Specifically, for female managed/owned firms, we only keep those that are credit constrained (*Credit Constrained* equals 1) and for male managed/owned firms, we keep the ones that are not constrained (*Credit Constrained* equals 0). The results in columns 1 and 2 imply no difference between female and male entrepreneurs in terms of firm performance. Therefore, we can exclude the possibility that banks' discrimination against female firms is due to the inferior skills of female entrepreneurs (banks discriminate female firms because these firms were performing worse in the past). It is also worth mentioning that even though female entrepreneurs are discriminated during the bank lending process, their firms still perform similar to male owned and managed firms. This indicates that if gender bias disappears,

female firms can perform even better than male firms, which will further contribute to economic growth.

[Insert Table 7 here]

Last, even though very unlikely, the omitted differential skills between females and males could materialize through non-performing related dimensions to affect the riskiness of their firms. For instance, some important determinants of borrower creditworthiness and loan performance might be correlated with borrower gender. To address these omitted variable potentials, we utilize a methodology developed by Oster (2019) to evaluate the potential bias from omitted variables.⁹ This test computes the share of variation omitted variables need to explain (relative to the variation explained by the control variables and fixed effects that are already included) in order to reduce the effect of interest to 0. This share is denoted as δ . For instance, $\delta=2$ would indicate that the omitted variables need to be twice as important as observables for the omitted variable bias to explain away the entire effect of gender bias and reduce the coefficient of interest to 0. Following Oster (2019), δ is measured as $\frac{\beta_{Full}}{\beta_{Restrict}-\beta_{Full}} *$

$\frac{R_{Full}-R_{Restrict}}{R_{Max}-R_{Full}}$, where $\beta_{Restrict}$ is the coefficient on *Female Managed and Female Owned Firm*

from the restricted model with no control variables and fixed effects, β_{Full} is the coefficient from the full model using a full set of controls and fixed effects. $R_{Restrict}$ and R_{Full} are the relevant R-squared from the restricted and full models. The implementation of Oster's (2019) test requires specifying the value of R_{max} which is the R-squared from a hypothetical regression that includes both the observed and the unobserved controls. Based on experimental evidence, Oster (2019) recommends $R_{max}=1.3R_{Full}$. An alternative approach to assess the robustness of the results is to estimate a set of possible ranges for the coefficient, which is $[\beta^*, \beta_{Full}]$, where the

⁹ The Oster (2019) approach has been applied in a lot of top journal papers including Gavazza, Nardotto, and Valletti (2019), Heimer, Myrseth, and Schoenle (2019), and Tabellini (2020).

bias-adjusted treatment effect is $\beta^* = \beta_{Full} - (\beta_{Restrict} - \beta_{Full}) * \frac{R_{Max} - R_{Full}}{R_{Full} - R_{Restrict}}$. If the range does not include 0, the estimations are considered to be robust.

The estimations are presented in Table 8. The value of δ ranges from 6.629 to 9.937, which is significantly higher than the robustness benchmark of 1 recommended by Oster (2019). The interpretation is that the omitted variables need to be at least 6.6 times as important as the observables to completely reduce the coefficient of interest to 0. However, this is highly unlikely given that our main regression specifications already include a large set of firm characteristics and fixed effects. In addition, all the estimated ranges for β do not include 0, giving us further confidence that omitted variables do not drive our results. Therefore, given that Altonji, Elder, and Taber (2005) argue that there is good reason to suspect that the relation between observables and the outcome is stronger than the outcome's relation with unobservables, the result appears unlikely to be driven by omitted variables that affect the creditworthiness of firms.

[Insert Table 8 here]

Taken together, there is no evidence suggesting females are having inferior skills to males, and females' inferior skills would be the factor that obstacles firms' credit access and be the rational of being undervalued in group work. Our results are, therefore, most consistent with a story of women receiving less credit, not only for their joint work with men, but also for bank lending, because of bias. Thus the lending discrimination we find in SME lending is more likely to be taste-based rather than statistical.

3.3. Heterogeneity Across Cities

We have found solid evidence that banks discriminate against firms that are both managed and owned by females. But would these findings represent a national-wide characteristic or be affected by the stage of economic development? To answer this question, we first exploit the heterogeneity of our results across cities with different sizes. Larger cities are normally more

developed in economics and as economic development progresses, there is a striking increase in women's labor force participation (Mammen and Paxson, 2000). As a result, stereotype-based negative expectations of women in work might be mitigated and so as to the taste-based discrimination against female entrepreneurs. Specifically, we divide our sample into two subsamples based on the size of the cities (large versus small). Large cities are those with a population of more than 250,000 and of course, we also define the capital city of a country as large city regardless of its population. Small cities are those with less than 250,000 residents. The results are presented in Table 9. We find that the discrimination against female-managed-and-owned firms is particular salient in small cities whereas in large cities, this discrimination is non-existence. The findings indicate that discrimination against female entrepreneurs is not a national characteristic but depends largely on the stage of local development. In other words, economic development is able to alleviate discrimination to a certain degree.

[Insert Table 9 here]

Second, the findings might also be affected by the structure of the local banking markets. Different banks and banks in different lending environments may treat loan discrimination differently, and this may ultimately affect the existence and the degree of lending discrimination. To examine whether and how the structure of the local banking market would moderate the gender gap in bank lending, we obtain bank information from BEPS II and match each firm in BEEPS V with existing bank branches within the same locality (city or town). Then we construct the structure of the local banking market around each firm. Specifically, we focus on two aspects of the local banking market, namely banking competition and the use of relationship lending.

As indicated by Berkovec, Canner, Gabriel, and Hannan (1998), taste-based discrimination should be less pronounced in more competitive lending environments. This is related to the literature on how market power affects discrimination (Becker, 1957; Alchian

and Kessel, 1962; Comanor, 1973). Intuitively, taste-based discrimination indicates that banks choose less qualified over more qualified borrowers for the sake of biased taste and this would forgo expected profits. This non-profit-maximizing behavior is less likely to survive in more competitive market. As a result, taste-based discrimination against females is supposed to be less common in more competitive loan market. This analysis also gives us another way to identify whether the discrimination we find is taste-based or statistical, as the degree of statistical discrimination would not be affected by the competitiveness of the local banking market. As suggested by Berkovec, Canner, Gabriel, and Hannan (1998), a main advantage of this analysis is that the omission of relevant determinants of creditworthiness cannot bias the test, unless, which is very unlikely, these omitted variables are systematically related to the competitiveness of the banking market in which the firm is located.

Following numerous previous studies, we use HHI to proxy the competitive environment in which the banks operate. Based on the US Department of Justice, we classify a market with HHI of higher (lower) than 0.18 as a *Less Competitive (More Competitive)* banking market. Using this classification standard, we divide our sample into two subsamples, the more versus the less competitive banking markets. Then we re-estimate model (1) for each market and the findings are presented in Table 10. Our findings are consistent with the expectation that lending discrimination against female entrepreneurs only exists in cities with less competitive banking market. In banking market that is less competitive, female managed/owned firms are found to be 8 percent more likely to be credit constrained and pay 2.2 percent higher loan rates, compared to the otherwise similar male managed/owned firms. Once competition among banks increases, discrimination against female entrepreneurs disappears as there is less room to do so. This heterogeneity further confirms that the discrimination we find is taste-based rather than statistical, where in the latter case we would expect no difference in discrimination between more and less competitive lending environments.

[Insert Table 10 here]

Relationship lending has long been recognized as the appropriate tool for banks to lend to informationally opaque borrowers, such as SMEs, and the role of relationship lending for firm financing has received ample attention in the literature (Degryse, Kim, and Ongena, 2009; Kysucky and Norden, 2016). Historically, banks have been a repository of information about borrowers' creditworthiness. This borrower information is collected over time through repeated interactions between banks and borrowers. Over time banks built up a more complete picture of borrowers than was available from public records. This proprietary information, most of it soft information, is valuable to banks (Liberti and Petersen, 2019). However, new technologies are changing the banking landscape that banks are relying more on hard information, those that can be easily reduced to numbers, and using these numerical data to construct their credit scoring system and automating the credit granting process. Therefore, the main difference between relationship and transaction lending is the using of soft versus hard borrower information in the loan granting process.

Hard information reduces the information that is used, and at the same time, maybe more importantly, it delegates the decision-making authority (Liberti and Petersen, 2019). The individual collecting the data does not make the decision. This role has been delegated to a higher up or to a computer algorithm. Clearly, demographical characteristics such as gender is not one dimension of hard information and is not included in banks' credit scoring systems. The using of the credit scoring system and the separation of these two roles would eliminate discretion and reduce the room for taste-based discrimination against demographical characteristics, such as gender. Therefore, we expect the gender bias in lending to be more (less) pronounced in local banking market with more relationship (transaction) banks.

The distinction between relationship and transaction banks is based on information on banks' lending techniques from face-to-face interviews with the ultimate bank insiders (Beck,

Degryse, De Haas, and van Horen, 2018). Using this information, we divide our firms into two subsamples based on the share of relationship banks in the local banking markets. Specifically, we define a local banking market as a *Relationship (Transaction) Bank* market if more (less) than 50 percent of the local branches are from banks using relationship lending. The estimates are shown in Table 11. We find that female managed/owned firms are discriminated in their lending only when these firms are located in a city dominated by relationship banks rather than transaction banks. Economically, compared to male firms, female firms are 8.8 percent more likely to be credit constrained and they also have to pay 1.5 percent higher interest rates for their loans (marginally insignificant at the 10 percent level). It seems that with the development of financial technology (more use of transaction lending), discrimination against certain groups of borrowers can be mitigated. But having said that, it could also go into the opposite way. Financial technology, and the algorithms behind it, might be developed and programmed in a way that contains implicit discrimination against certain people. Even worse, this kind of implicit discrimination is then hidden behind the codes that nobody, but the programming community, understands.

[Insert Table 11 here]

5. Conclusions

Studying credit granting to 7,467 SMEs across 22 Eastern European countries during 2013-14, we show that firms that are simultaneously managed and owned by females are discriminated against in bank lending. Compared to otherwise similar male firms, female firms are more likely to be credit constrained and to pay higher loan rates (explicit discrimination). In contrast, if a firm is managed and owned jointly by a female and a male, it does not face any discrimination by banks. In other words, banks both allocate less credit to the female and undervalue the female's role in the operation of the firm, and consequently treat these firms as comparable to the male managed/owned firms (implicit discrimination). This is consistent with

the story that banks cannot perfectly observe the top manager and the owner's influence on a firm's strategy, they must decide who is more likely to affect the future performance of the firm without having full information as to what each of them does. This could leave room for gender to influence the decision of their relative importance in the firm's operation.

Importantly, these findings are not driven by the omission of some important determinants of borrower creditworthiness that are correlated with borrower gender, such as inferior skills. With the increasing of competition in the local banking market, and with the development of transaction lending, the discrimination against female entrepreneurs becomes insignificant. In both ways, the room for taste-based discrimination against demographical characteristics, such as gender, would be significantly reduced, or even eliminated.

The findings of our paper should not be limited to the developing countries but could be extended to the more developed world. Using information from the Life in Transition Survey (LiTS III) conducted jointly by the World Bank and EBRD, we find our 22 sampling countries are comparable to the developed countries in terms of how people treat women in business. Specifically, in LiTS, there is a question asking "to what extent do you agree with the following statements: women are as competent as men to be business executives", and the answers range from strongly disagree and disagree to agree and strongly agree. This question captures how people in a certain country would treat women in business. The surveyed countries include our 22 sampling countries and also include two highly developed industrialized countries, namely Germany and Italy. We calculate the share of respondents that answer agree and strongly agree to this question for our 22 countries as a whole, plus Germany and Italy separately. The share is 87.8% in 22 sampling countries, 89.3% in Italy, and 97.9% in Germany. Though the number in our countries is lower than Germany, but it is quite close to Italy. In this sense, the treatment of women in business in these countries is comparable to the developed countries and thus our findings can also shed useful lights for the more developed world.

Our findings are also policy relevant. First, our results suggest that those firms that are jointly managed and owned by females and males do not face discrimination during the lending process. So a good mix of females and males within a corporation could help firms to better access to bank financing. Second, by encouraging banks to recruit more female loan officers that are less subject to a gender bias, credit constraints faced by female entrepreneurs could be mitigated and more female entrepreneurship could be encouraged. Last but not the least, promoting banking market competition and the development of financial technology may be helpful in reducing taste-based discrimination against certain groups of borrowers.

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TABLE 1 SUMMARY STATISTICS

Variable	Obs.	Mean	Std.	Min.	Max.
<i>Gender</i>					
Female Managed and Female Owned Firm	3,705	0.136	0.343	0.000	1.000
Female Managed and Male Owned Firm	3,705	0.064	0.245	0.000	1.000
Male Managed and Female Owned Firm	3,705	0.074	0.263	0.000	1.000
Male Managed and Male Owned Firm	3,705	0.722	0.448	0.000	1.000
<i>Credit Access</i>					
Credit Demand	7,467	0.496	0.500	0.000	1.000
Credit Constrained	3,705	0.375	0.484	0.000	1.000
Loan Rate	1,473	10.978	7.557	2.000	42.000
Loan Duration	1,726	35.302	34.911	1.000	360.000
Loan Collateral	1,932	0.816	0.388	0.000	1.000
<i>Firm Characteristics</i>					
Crime Experience	3,684	0.181	0.385	0.000	1.000
Product Losses	3,486	0.252	0.434	0.000	1.000
Past Performance	2,574	0.952	5.204	-0.883	55.355
Firm Age	3,705	0.162	0.120	0.010	1.480
Number of Employee	3,705	0.512	1.098	0.030	8.120
Publicly Listed Firm	3,705	0.023	0.151	0.000	1.000
Audited Firm	3,705	0.381	0.486	0.000	1.000
Sole Proprietorship Firm	3,705	0.107	0.309	0.000	1.000
Holding Firm	3,705	0.064	0.245	0.000	1.000
State Ownership	3,705	0.896	8.117	0.000	99.000
Foreign Ownership	3,705	5.080	19.813	0.000	100.000
<i>Local Banking Market</i>					
Herfindahl-Hirschmann Index	3,705	0.130	0.171	0.000	1.000
Share of Relationship Banks	3,705	0.338	0.272	0.000	1.000

Notes: This table reports the summary statistics for all the variables. Definitions and sources of the variables are provided in Table IA1.

TABLE 2 GENDER AND ACCESS TO CREDIT: ACROSS COUNTRIES

Country	Female Managed and Female Owned Firm	Female Managed and Male Owned Firm	Male Managed and Female Owned Firm	Male Managed and Male Owned Firm	Credit Constrained	Loan Rate
Albania	9.97%	4.12%	1.03%	84.19%	45.45%	11.16%
Armenia	8.62%	5.17%	4.60%	81.61%	21.65%	13.37%
Azerbaijan	2.20%	0.55%	1.10%	96.14%	54.30%	16.86%
Belarus	15.27%	17.96%	7.49%	59.28%	35.50%	25.88%
Bosnia and Herzegovina	8.57%	8.86%	6.00%	76.29%	27.54%	7.99%
Bulgaria	18.09%	6.03%	6.74%	69.15%	46.58%	8.58%
Croatia	18.44%	5.48%	8.93%	67.15%	44.44%	6.78%
Czech Republic	9.01%	4.29%	7.73%	78.97%	13.25%	5.67%
Estonia	21.31%	6.97%	8.20%	57.79%	19.79%	5.23%
Georgia	16.01%	12.08%	9.55%	61.24%	28.93%	15.03%
Hungary	16.49%	5.02%	8.60%	69.89%	34.78%	10.10%
Latvia	23.21%	7.17%	3.75%	64.85%	43.21%	5.90%
Lithuania	16.17%	8.94%	5.11%	69.79%	34.48%	5.39%
FYR Macedonia	10.23%	5.40%	9.09%	75.28%	35.71%	8.53%
Moldova	20.61%	4.85%	11.82%	62.42%	40.56%	15.35%
Montenegro	17.12%	3.60%	4.50%	74.77%	58.82%	10.96%
Poland	13.77%	5.93%	12.29%	66.95%	27.43%	10.44%
Romania	14.86%	6.67%	13.52%	64.95%	26.69%	10.70%
Serbia	14.94%	4.89%	9.77%	70.40%	33.18%	9.30%
Slovak Republic	11.06%	7.52%	7.96%	73.45%	26.44%	7.11%
Slovenia	12.60%	7.87%	8.27%	71.26%	15.87%	5.09%
Ukraine	17.00%	5.59%	2.80%	74.50%	59.18%	16.71%

Notes: This table shows the average percentages of firms managed/owned by females and credit access across countries.

Table IA1 contains all definitions and Table 1 the summary statistics for each included variable.

TABLE 3 GENDER AND CREDIT: UNIVARIATE RESULTS

	Credit Constrained	Obs.	Loan Rate	Obs.
Female Managed and Female Owned Firm	46.03%***	504	12.47%***	137
Female Managed and Male Owned Firm	33.33%	237	10.85%	92
Male Managed and Female Owned Firm	31.52%*	276	11.04%	118
Male Managed and Male Owned Firm	36.83%	2,688	10.22%	852
<i>Total</i>	37.46%	3,705	10.54%	1,199

Notes: This table reports univariate results on the relationship between the gender of firm manager/owner and access to credit. *, **, *** indicate significance at the 10%, 5% and 1% level, respectively, for a two-sample t-test of a difference in means with unequal variances. For the t-tests we compare the credit constraints among all firms with a female manager/owner with all firms that are both managed and owned by males. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable.

TABLE 4 GENDER AND CREDIT: MULTIVARIATE RESULTS

Dependent Variable Model	Credit Constrained	Loan Rate
	1	2
Female Managed and Female Owned Firm	0.062** (0.024)	1.591** (0.703)
Female Managed and Male Owned Firm	0.000 (0.031)	-0.734 (0.632)
Male Managed and Female Owned Firm	-0.016 (0.028)	1.059* (0.636)
Loan Duration		-0.013*** (0.005)
Loan Collateral		0.531 (0.418)
Firm Age	-0.149** (0.060)	-1.670 (1.309)
Number of Employee	-0.044*** (0.006)	-0.496*** (0.166)
Publicly Listed Firm	0.024 (0.051)	2.407* (1.395)
Audited Firm	-0.109*** (0.017)	-0.404 (0.369)
Sole Proprietorship Firm	-0.025 (0.026)	0.595 (0.884)
Holding Firm	-0.071** (0.032)	-1.503 (1.002)
State Ownership	0.000 (0.001)	0.022 (0.031)
Foreign Ownership	0.000 (0.000)	0.005 (0.007)
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.159	0.560
Observations	3,705	1,199

Notes: This table shows the multivariate regressions to estimate the relationship between the gender of firm manager/owner and credit constraints/interest rates. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 5 GENDER AND CREDIT: HECKMAN SELECTION

Dependent Variable	Credit Demand	Credit Constrained	Loan Rate
Model	1	2	3
Crime Experience	0.079*** (0.016)		
Product Losses	0.048*** (0.014)		
Female Managed and Female Owned Firm		0.052** (0.025)	1.593** (0.720)
Female Managed and Male Owned Firm		-0.002 (0.032)	-0.914 (0.671)
Male Managed and Female Owned Firm		-0.011 (0.029)	1.119* (0.659)
Loan Duration			-0.013** (0.005)
Loan Collateral			0.566 (0.421)
Inverse Mill's Ratio		0.077 (0.417)	0.435 (8.069)
Firm Controls	Yes	Yes	Yes
PSU Fixed Effects	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes
R-squared	0.082	0.165	0.555
Observations	6,953	3,469	1,150

Notes: This table shows the Heckman selection regressions to estimate the relationship between the gender of firm manager/owner and credit constraints. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 6 GENDER AND CREDIT: MATCHING RESULTS

<i>Panel A: Propensity Score Matching</i>		
Dependent Variable	Credit Constrained	Loan Rate
Model	1	2
Female Managed and Female Owned Firm	0.066** (0.030)	2.029** (0.858)
Female Managed and Male Owned Firm	0.030 (0.039)	-0.322 (0.900)
Male Managed and Female Owned Firm	-0.001 (0.036)	1.389 (0.856)
Loan Duration		-0.007 (0.010)
Loan Collateral		1.168 (0.773)
ATT	0.067** (0.031)	1.881* (1.063)
ATT (Double Robust Estimator)	0.063** (0.030)	2.234** (0.896)
Firm Controls	Yes	Yes
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.189	0.594
Observations	1,521	480
<i>Panel B: Random Treatment</i>		
Dependent Variable	Credit Constrained	Loan Rate
Model	1	2
Female Managed and Female Owned Firm	-0.014 (0.031)	-0.753 (0.844)
Female Managed and Male Owned Firm	-0.011 (0.039)	-1.665* (0.970)
Male Managed and Female Owned Firm	-0.042 (0.037)	-0.032 (0.835)
Loan Duration		-0.009 (0.010)
Loan Collateral		1.211 (0.782)
Firm Controls	Yes	Yes
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.186	0.580
Observations	1,521	480

Notes : Panel A shows the one-to-one propensity matching regressions to estimate the relationship between the gender of firm manager/owner and credit constraints/interest rates where each female managed and female owned firm is matched with the nearest male managed and male owned firm. Panel B shows a placebo test where we randomly assign our treatment. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 7 GENDER AND PERFORMANCE

Dependent Variable	Credit Constrained Female Firms and Credit Unconstrained Male Firms	
	All Firms	
Model	1	2
Female Managed and Female Owned Firm	0.035 (0.237)	-0.133 (0.614)
Female Managed and Male Owned Firm	0.342 (0.328)	-0.393 (0.358)
Male Managed and Female Owned Firm	0.181 (0.311)	0.309 (0.612)
Firm Controls	Yes	Yes
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.040	0.141
Observations	4,883	1,620

Notes: This table shows the relationship between the gender of firm manager/owner and the past performance of the firm. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, *

TABLE 8 GENDER AND CREDIT: OSTER TEST

Full models	Credit Constrained		Loan Rate	
	δ	β range	δ	β range
Control Variables, PSU and Sector Fixed Effects	6.629	[0.053, 0.062]	9.937	[1.431, 1.591]

This table reports the results of Oster's (2019) test for the amount of variation in unobservables relative to observables needed to bring the estimated effect on obstacles to zero. The restricted model does not include any fixed effects or control variables and the full models correspond to the specifications in Table 4. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 9 GENDER AND CREDIT: CITY SIZE

Dependent Variable	Credit Constrained		Loan Rate	
	Large Cities	Small Cities	Large Cities	Small Cities
Model	1	2	3	4
Female Managed and Female Owned Firm	0.046 (0.039)	0.066** (0.032)	-1.401 (1.061)	3.047*** (0.869)
Female Managed and Male Owned Firm	0.006 (0.046)	-0.008 (0.043)	-0.646 (1.389)	-0.030 (0.552)
Male Managed and Female Owned Firm	0.034 (0.050)	-0.037 (0.034)	0.404 (1.270)	1.140 (0.729)
Loan Duration			-0.037*** (0.011)	-0.003 (0.006)
Loan Collateral			0.121 (0.693)	0.717 (0.486)
Firm Controls	Yes	Yes	Yes	Yes
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.206	0.148	0.588	0.593
Observations	1,542	2,163	423	776

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities with different sizes. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 10 GENDER AND CREDIT: BANKING MARKET COMPETITION

Dependent Variable	Credit Constrained		Loan Rate	
	Less	More	Less	More
	Competitive	Competitive	Competitive	Competitive
Model	1	2	3	4
Female Managed and Female Owned Firm	0.084** (0.038)	0.046 (0.032)	2.207* (1.237)	0.388 (0.750)
Female Managed and Male Owned Firm	-0.033 (0.051)	0.023 (0.040)	-1.152 (1.343)	-0.253 (0.468)
Male Managed and Female Owned Firm	-0.044 (0.044)	0.012 (0.038)	1.964* (1.110)	0.636 (0.723)
Loan Duration			-0.017* (0.010)	-0.004 (0.005)
Loan Collateral			1.850** (0.823)	0.252 (0.442)
Firm Controls	Yes	Yes	Yes	Yes
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.207	0.166	0.623	0.524
Observations	1,464	2,241	518	681

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities with different levels of banking market competition. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 11 GENDER AND CREDIT: RELATIONSHIP VS TRANSACTIONAL LENDING

Dependent Variable	Credit Constrained		Loan Rate	
	Relationship	Transaction	Relationship	Transaction
	Bank	Bank	Bank	Bank
Model	1	2	3	4
Female Managed and Female Owned Firm	0.088* (0.045)	0.038 (0.036)	1.451 (0.892)	-0.152 (1.064)
Female Managed and Male Owned Firm	0.073 (0.058)	-0.009 (0.044)	-0.295 (0.668)	-0.840 (0.950)
Male Managed and Female Owned Firm	0.018 (0.050)	-0.026 (0.043)	-0.171 (0.738)	2.037 (1.411)
Loan Duration			-0.006 (0.006)	-0.029** (0.013)
Loan Collateral			0.654 (0.548)	0.539 (0.867)
Firm Controls	Yes	Yes	Yes	Yes
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.203	0.155	0.385	0.595
Observations	1,090	1,818	442	508

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities dominated by relationship vs transactional banks. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Appendix

TABLE A1 GENDER AND CREDIT: EXCLUDE SELF-RATIONING

Dependent Variable	Credit Constrained
Model	1
Female Managed and Female Owned Firm	0.060** (0.024)
Female Managed and Male Owned Firm	-0.002 (0.031)
Male Managed and Female Owned Firm	-0.016 (0.029)
Firm Age	-0.140** (0.059)
Number of Employee	-0.044*** (0.006)
Publicly Listed Firm	0.007 (0.050)
Audited Firm	-0.105*** (0.017)
Sole Proprietorship Firm	-0.023 (0.027)
Holding Firm	-0.079** (0.031)
State Ownership	0.000 (0.001)
Foreign Ownership	0.000 (0.000)
PSU Fixed Effects	Yes
Sector Fixed Effects	Yes
R-squared	0.161
Observations	3,599

Notes : This table shows the multivariate regressions to estimate the relationship between the gender of firm manager/owner and credit constraints while excluding possible self-rationing. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE A2 GENDER AND CREDIT: MATCHING BALANCE

<i>Panel A: Balancing Before Matching</i>			
	Female Managed and Female Owned Firm	Male Managed and Male Owned Firm	P-Value of Difference
Firm Age	0.152	0.162	0.102
Number of Employee	0.226	0.566	0.000***
Publicly Listed Firm	0.004	0.028	0.001***
Audited Firm	0.272	0.399	0.000***
Sole Proprietorship Firm	0.165	0.102	0.000***
Holding Firm	0.042	0.065	0.044**
State Ownership	0.343	0.855	0.159
Foreign Ownership	0.942	5.591	0.000***
<i>Panel B: Balancing After Matching</i>			
	Female Managed and Female Owned Firm	Male Managed and Male Owned Firm	P-Value of Difference
Firm Age	0.152	0.151	0.799
Number of Employee	0.226	0.232	0.833
Publicly Listed Firm	0.004	0.004	1.000
Audited Firm	0.272	0.298	0.365
Sole Proprietorship Firm	0.165	0.153	0.606
Holding Firm	0.042	0.036	0.625
State Ownership	0.343	0.083	0.164
Foreign Ownership	0.942	0.560	0.390

Notes: This table shows the balancing of the covariates before and after the one-to-one propensity matching where each female managed and female owned firm is matched with the nearest male managed and male owned firm. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Online Appendix

TABLE IA1 VARIABLE DEFINITIONS AND SOURCES

Variable	Definitions	Sources
<i>Gender</i>		
Female Managed and Female Owned Firm	= 1 if the top manager and the controlling owner of a firm are both female, = 0 otherwise	BEEPS V
Female Managed and Male Owned Firm	= 1 if the top manager of a firm is female and the controlling owner of a firm is male, = 0 otherwise	BEEPS V
Male Managed and Female Owned Firm	= 1 if the top manager of a firm is male and the controlling owner of a firm is female, = 0 otherwise	BEEPS V
Male Managed and Male Owned Firm	= 1 if the top manager and the controlling owner of a firm are both male, = 0 otherwise	BEEPS V
<i>Credit Access</i>		
Credit Constrained	= 1 if a firm either got a loan application rejected or was discouraged from applying any loan in the last fiscal year, = 0 otherwise	BEEPS V
Credit Demand	= 1 if a firm either applied for a loan or did not apply for a loan for reasons other than no need in the last fiscal year, = 0 otherwise	BEEPS V
Loan Rate	annual nominal interest rate (in percent) of the most recent line of credit or loan obtained within one year	BEEPS V
Loan Duration	original duration of the most recent line of credit or loan obtained within one year in months	BEEPS V
Loan Collateral	= 1 if the most recent line of credit or loan obtained within one year required collateral, = 0 otherwise	BEEPS V
<i>Firm Characteristics</i>		
Crime Experience	= 1 if a firm experienced losses as a result of theft, robbery, vandalism or arson in the last fiscal year, = 0 otherwise	BEEPS V
Product Losses	= 1 if a firm's product was lost in transit due to breakage or spoilage in the last fiscal year, = 0 otherwise	BEEPS V
Past Performance	realized firm sales growth rate (in percent) in the past 3 years	BEEPS V
Firm Age	number of years since a firm is first established	BEEPS V
Number of Employee	number of permanent full-time employees in the last fiscal year	BEEPS V
Publicly Listed Firm	= 1 if a firm is publicly listed in a stock exchange, = 0 otherwise	BEEPS V
Audited Firm	= 1 if a firm had its annual financial statements checked and certified by an external auditor in the last fiscal year, = 0 otherwise	BEEPS V
Sole Proprietorship Firm	= 1 if a firm is a sole proprietorship, = 0 otherwise	BEEPS V
Holding Firm	= 1 if a firm is 'T5!', = 0 otherwise	BEEPS V
State Ownership	share of equity that is owned by the government (in percent)	BEEPS V
Foreign Ownership	share of equity that is owned by foreign individuals or entities (in percent)	BEEPS V
<i>Local Banking Market</i>		
Herfindahl-Hirschmann Index	Herfindahl-Hirschmann index of bank branches within the same city of a firm	BEPS II
Share of Relationship Banks	share of bank branches that rely on relationship lending (in percent) within the same city of a firm	BEPS II

Notes: This table includes the variable definitions and sources. BEEPS V is the fifth wave of the Business Environment and Enterprise Performance Survey (BEEPS) conducted in 2013-2014. BEPS II is the second round of the Banking Environment and Performance Survey (BEPS).

TABLE IA2 GENDER AND CREDIT: HECKMAN SELECTION

Dependent Variable Model	Credit Demand	Credit Constrained	Loan Rate
	1	2	3
Crime Experience	0.079*** (0.016)		
Product Losses	0.048*** (0.014)		
Female Managed and Female Owned Firm		0.052** (0.025)	1.593** (0.720)
Female Managed and Male Owned Firm		-0.002 (0.032)	-0.914 (0.671)
Male Managed and Female Owned Firm		-0.011 (0.029)	1.119* (0.659)
Loan Duration			-0.013** (0.005)
Loan Collateral			0.566 (0.421)
Inverse Mill's Ratio		0.077 (0.417)	0.435 (8.069)
Firm Age	0.029 (0.053)	-0.119* (0.061)	-1.678 (1.393)
Number of Employee	0.011* (0.006)	-0.045*** (0.007)	-0.473*** (0.186)
Publicly Listed Firm	-0.012 (0.041)	0.018 (0.051)	2.217 (1.451)
Audited Firm	0.056*** (0.013)	-0.109*** (0.021)	-0.355 (0.450)
Sole Proprietorship Firm	-0.042** (0.020)	-0.021 (0.028)	0.458 (0.897)
Holding Firm	-0.085*** (0.024)	-0.077** (0.038)	-1.390 (1.139)
State Ownership	-0.000 (0.001)	-0.000 (0.001)	0.032 (0.037)
Foreign Ownership	-0.001*** (0.000)	0.000 (0.000)	0.004 (0.008)
PSU Fixed Effects	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes
R-squared	0.082	0.165	0.555
Observations	6,953	3,469	1,150

Notes: This table shows the Heckman selection regressions to estimate the relationship between the gender of firm manager/owner and credit constraints. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE IA3 GENDER AND CREDIT: MATCHING RESULTS

Dependent Variable Model	Credit Constrained	Loan Rate
	1	2
Female Managed and Female Owned Firm	0.066** (0.030)	2.029** (0.858)
Female Managed and Male Owned Firm	0.030 (0.039)	-0.322 (0.900)
Male Managed and Female Owned Firm	-0.001 (0.036)	1.389 (0.856)
Loan Duration		-0.007 (0.010)
Loan Collateral		1.168 (0.773)
Firm Age	-0.153 (0.103)	-1.432 (2.467)
Number of Employee	-0.073*** (0.014)	-1.215*** (0.451)
Publicly Listed Firm	0.201* (0.111)	7.182* (3.896)
Audited Firm	-0.084*** (0.028)	0.009 (0.765)
Sole Proprietorship Firm	0.021 (0.039)	0.511 (1.490)
Holding Firm	-0.147*** (0.056)	-0.050 (2.460)
State Ownership	-0.001 (0.002)	0.002 (0.071)
Foreign Ownership	-0.001 (0.001)	0.005 (0.010)
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.189	0.594
Observations	1,521	480

Notes: This table shows the one-to-one propensity matching regressions to estimate the relationship between the gender of firm manager/owner and credit constraints/interest rates where each female managed and female owned firm is matched with the nearest male managed and male owned firm. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE IA4 GENDER AND PERFORMANCE

Dependent Variable	Credit Constrained Female Firms and Credit Unconstrained Male Firms	
	All Firms	
Model	1	2
Female Managed and Female Owned Firm	0.035 (0.237)	-0.133 (0.614)
Female Managed and Male Owned Firm	0.342 (0.328)	-0.393 (0.358)
Male Managed and Female Owned Firm	0.181 (0.311)	0.309 (0.612)
Firm Age	-2.428*** (0.721)	-1.856 (1.182)
Number of Employee	0.242* (0.125)	0.153 (0.224)
Publicly Listed Firm	0.126 (0.399)	-0.019 (0.955)
Audited Firm	-0.232 (0.170)	-0.131 (0.327)
Sole Proprietorship Firm	-0.095 (0.255)	-0.181 (0.494)
Holding Firm	0.315 (0.353)	0.299 (0.489)
State Ownership	-0.008* (0.004)	-0.001 (0.006)
Foreign Ownership	-0.003 (0.004)	-0.011 (0.007)
PSU Fixed Effects	Yes	Yes
Sector Fixed Effects	Yes	Yes
R-squared	0.040	0.141
Observations	4,883	1,620

Notes: This table shows the relationship between the gender of firm manager/owner and the past performance of the firm. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, *

TABLE IA5 GENDER AND CREDIT: CITY SIZE

Dependent Variable	Credit Constrained		Loan Rate	
	Large Cities	Small Cities	Large Cities	Small Cities
Model	1	2	3	4
Female Managed and Female Owned Firm	0.046 (0.039)	0.066** (0.032)	-1.401 (1.061)	3.047*** (0.869)
Female Managed and Male Owned Firm	0.006 (0.046)	-0.008 (0.043)	-0.646 (1.389)	-0.030 (0.552)
Male Managed and Female Owned Firm	0.034 (0.050)	-0.037 (0.034)	0.404 (1.270)	1.140 (0.729)
Loan Duration			-0.037*** (0.011)	-0.003 (0.006)
Loan Collateral			0.121 (0.693)	0.717 (0.486)
Firm Age	-0.033 (0.107)	-0.190*** (0.073)	-2.791 (2.445)	-0.572 (1.338)
Number of Employee	-0.043*** (0.009)	-0.048*** (0.010)	-0.493* (0.269)	-0.338* (0.199)
Publicly Listed Firm	0.025 (0.096)	0.029 (0.061)	3.221* (1.876)	1.604 (1.860)
Audited Firm	-0.171*** (0.026)	-0.064*** (0.022)	-1.112* (0.668)	-0.224 (0.417)
Sole Proprietorship Firm	-0.001 (0.042)	-0.048 (0.036)	-0.775 (2.180)	0.980 (0.827)
Holding Firm	-0.094** (0.048)	-0.058 (0.044)	-1.223 (1.702)	-2.059* (1.085)
State Ownership	0.001 (0.001)	0.000 (0.001)	-0.013 (0.064)	0.027 (0.029)
Foreign Ownership	0.001 (0.001)	-0.000 (0.001)	0.001 (0.012)	0.004 (0.007)
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.206	0.148	0.588	0.593
Observations	1,542	2,163	423	776

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities with different sizes. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE IA6 GENDER AND CREDIT: BANKING MARKET COMPETITION

Dependent Variable	Credit Constrained		Loan Rate	
	Less	More	Less	More
	Competitive	Competitive	Competitive	Competitive
Model	1	2	3	4
Female Managed and Female Owned Firm	0.084** (0.038)	0.046 (0.032)	2.207* (1.237)	0.388 (0.750)
Female Managed and Male Owned Firm	-0.033 (0.051)	0.023 (0.040)	-1.152 (1.343)	-0.253 (0.468)
Male Managed and Female Owned Firm	-0.044 (0.044)	0.012 (0.038)	1.964* (1.110)	0.636 (0.723)
Loan Duration			-0.017* (0.010)	-0.004 (0.005)
Loan Collateral			1.850** (0.823)	0.252 (0.442)
Firm Age	-0.176** (0.078)	-0.114 (0.092)	-0.841 (1.972)	-0.430 (1.717)
Number of Employee	-0.042*** (0.012)	-0.046*** (0.007)	-1.044** (0.507)	-0.333*** (0.112)
Publicly Listed Firm	0.094 (0.114)	0.007 (0.059)	0.490 (2.339)	2.064 (1.662)
Audited Firm	-0.058** (0.028)	-0.139*** (0.022)	-0.526 (0.761)	-0.493 (0.361)
Sole Proprietorship Firm	-0.040 (0.039)	-0.018 (0.038)	1.332 (1.473)	-0.818 (0.934)
Holding Firm	-0.046 (0.051)	-0.092** (0.042)	-1.959 (2.435)	-1.326** (0.657)
State Ownership	-0.000 (0.001)	0.002 (0.001)	0.043 (0.056)	0.041 (0.033)
Foreign Ownership	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.014)	0.009 (0.007)
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.207	0.166	0.623	0.524
Observations	1,464	2,241	518	681

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities with different levels of banking market competition. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE IA7 GENDER AND CREDIT: RELATIONSHIP VS TRANSACTIONAL LENDING

Dependent Variable	Credit Constrained		Loan Rate	
	Relationship	Transaction	Relationship	Transaction
	Bank	Bank	Bank	Bank
Model	1	2	3	4
Female Managed and Female Owned Firm	0.088* (0.045)	0.038 (0.036)	1.451 (0.892)	-0.152 (1.064)
Female Managed and Male Owned Firm	0.073 (0.058)	-0.009 (0.044)	-0.295 (0.668)	-0.840 (0.950)
Male Managed and Female Owned Firm	0.018 (0.050)	-0.026 (0.043)	-0.171 (0.738)	2.037 (1.411)
Loan Duration			-0.006 (0.006)	-0.029** (0.013)
Loan Collateral			0.654 (0.548)	0.539 (0.867)
Firm Age	-0.168 (0.111)	-0.155* (0.086)	1.254 (1.185)	-1.725 (2.343)
Number of Employee	-0.067*** (0.010)	-0.028*** (0.009)	-0.686*** (0.232)	-0.808*** (0.253)
Publicly Listed Firm	0.174** (0.088)	-0.042 (0.069)	6.779* (3.553)	0.002 (1.293)
Audited Firm	-0.119*** (0.031)	-0.129*** (0.025)	-0.061 (0.508)	-0.596 (0.593)
Sole Proprietorship Firm	-0.021 (0.071)	-0.011 (0.036)	0.557 (1.352)	0.411 (1.343)
Holding Firm	0.083 (0.077)	-0.132*** (0.041)	-1.005 (0.937)	-0.843 (1.704)
State Ownership	-0.000 (0.002)	0.001 (0.001)	-0.015 (0.029)	0.078*** (0.028)
Foreign Ownership	0.001 (0.001)	-0.000 (0.001)	0.012 (0.010)	0.006 (0.012)
PSU Fixed Effects	Yes	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes	Yes
R-squared	0.203	0.155	0.385	0.595
Observations	1,090	1,818	442	508

Notes: This table shows the heterogeneous relationship between the gender of firm manager/owner and access to credit across cities dominated by relationship vs transactional banks. Table IA1 contains all definitions and Table 1 the summary statistics for each included variable. Coefficients are listed in the first row, robust standard errors are reported below in the brackets, and the corresponding significance levels are placed adjacently. *** Significant at 1%, ** significant at 5%, * significant at 10%.