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Discrimination, Social Capital, and Financial Constraints: The Case of Viet Nam

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SUMMARY

This paper examines the relationship among gender, social capital, and access to finance of micro, small, and medium enterprises in the manufacturing sector in Viet Nam. Our dataset is from the 2011, 2013, and 2015 results of the Micro, Small, and Medium Enterprise Survey in Viet Nam. Using the Heckman technique to control for sample selection bias, the estimates do not provide evidence for discrimination against female-owned enterprises in the formal lending market. Specifically, female entrepreneurs have a higher probability of getting a loan and they pay lower interest rates in comparison with male entrepreneurs. No discrimination in formal credit markets may arise from the preference for informal loans over formal loans as entrepreneurs tend to borrow informal loans before applying for formal ones. Further analysis shows that social capital could facilitate loan applications: firms that have a closer relationship with government officials and other business people can get loans of longer duration.

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1. Introduction

Access to finance is considered as one of the main drivers of firms' growth. However, firms, especially small and medium enterprises (SMEs), often report a lack of access to finance. This prevents firms from growing to their full potential and slows down economic development. Furthermore, if firms fail to gain loans from formal sources, they have to use their own funds or informal credit sources, which results in limited credit and paying higher interest rates. The issue of financial constraints is even more pronounced among female-owned enterprises because of gender-based stereotypes (Godwin, Stevens, & Brenner, 2006). Thus, a growing literature on female entrepreneurship has examined gender differences in credit markets and factors that can facilitate women entrepreneurs' access to finance.

However, results from systematic literature review have shown that the existing studies on female entrepreneurship face a number of challenges (e.g., De Bruin, Brush, & Welter, 2006, 2007). The first challenge is related to methodological shortcomings such as the issue of sample selection bias (Blanchard, Zhao, & Yinger, 2008). Although several studies have attempted to address this problem (e.g., Cavalluzzo, Cavalluzzo, & Wolken, 2002; Cavalluzzo & Wolken, 2005), choice of instruments is still one of the key challenges. We aim to contribute to the literature by introducing the alternative instruments accounting for the household and family background of female entrepreneurs which is an important factor in entrepreneurial research (Ahl, 2006; Brush, De Bruin, & Welter, 2009).

Secondly, existing studies conducted within a single-country context are limited to the US where there are strong anti-discriminatory policies. Hence, results from these explorations might not be relevant to other countries such as developing economies where gender inequality remains a problem in the society. Given the increasingly important role of emerging markets, there is a need for research on female entrepreneurship and gender differences in these countries (Hughes, Jennings, Brush, Carter, & Welter, 2012). This study is designed to meet this demand by investigating financial constraints faced by female entrepreneurs in the context of an emerging country.

Viet Nam represents an appropriate field of study for a number of reasons. First, despite the significant growth of SMEs in the economy, many SMEs in Viet Nam face difficulties in raising external finance, especially funds from formal sources. According to the World Bank's Enterprise Surveys for Viet Nam (World Bank, 2015), access to finance is one of the top business obstacles for firms. Second, Viet Nam is a network-oriented economy, where social capital plays an important role in running business (Meyer & Nguyen, 2005). Collectivism and the value of group membership are more

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important than individualism in Vietnamese culture (Swierczek, 1994). This therefore makes Viet Nam an interesting case for investigating the impact of social networks on obtaining finance. Third, although the gender gap in Viet Nam has been narrowed, gender inequality still remains in the society and in the economy (World Bank, 2016).

This study offers an in-depth understanding of obstacles in the financing of SMEs in Viet Nam in general and female-owned SMEs in particular, which may help firms get better access to finance in the future and guide policy implications. First, firms could invest in their social capital, particularly in their relationship with government officials, bankers, and business networks, to facilitate loan applications. Second, women-owned firms could extend the partnership with male-owned firms to benefit from male entrepreneurs' social capital. Third, credit programs targeting SMEs with low interest rates and longer loan maturity terms might be expanded. This is because the current lending programs for SMEs are limited to specific sectors and conditions that discourage SMEs from borrowing from the formal sector.

Our paper provides new evidence for the issue of financial constraints regarding the effect of female ownership and the role of social capital in a developing country context. More specifically, we do not observe the presence of discrimination against women entrepreneurs by Vietnamese financial institutions. This result is in line with previous studies which found that there is no difference in loan approval rates between male- and female-owned firms (Blanchflower, Levine, & Zimmerman, 2003; Cavalluzzo & Cavalluzzo, 1998; Madill, Riding, & Haines, 2006). This study also sheds light on the relationship between social capital and access to finance that better social capital may partially help firms relax their financial constraints (e.g., Ahlstrom & Bruton, 2006; Le, Venkatesh, & Nguyen, 2006; Talavera, Xiong, & Xiong, 2012). For instance, firms with better social networks are more likely to have access to longer loan terms.

The remainder of the paper is organized as follows. The next section reviews the related literature about discrimination, social capital, and access to finance. Section 3 provides an overview of institutional frameworks of SMEs in Viet Nam. Section 4 presents the descriptive statistics and the identification strategy. Section 5 provides the main empirical results and robustness checks. Section 6 concludes and provides the policy implications.

2. Literature review

(a) Studies on discrimination

(i) Gender discrimination

The economics of discrimination has been well developed in the past few decades and can be divided into two main models: a taste-based model and a statistical model. These models can be distinguished through the causes, nature, and economic effects. The taste-based preference model, or Becker-type model of discrimination, has suggested that discrimination arises from a personal prejudice, or taste, against certain individuals or groups (Becker, 1957). Thus, individuals who hold a taste for discrimination against a particular class of people are willing to pay a financial price to avoid interactions with that class. In the lending market context, this can be implied by higher interest rates charged to the disadvantaged group, i.e., lenders require an interest rate premium to compensate for having to associate with the disadvantaged group. Discrimination in the lending markets can also be demonstrated through fewer loans being held by disadvantaged borrowers.

From the statistical perspective, discrimination against women might arise from the fact that women-owned firms tend to have smaller amount of equity capital (Riding & Swift, 1990; Verheul & Thurik, 2001). Consequently, loan approval is problematic as banks are often reluctant to lend to low-capital firms (Coleman, 2000). Further, statistical discrimination can also be the result of imperfect information. Lack of information leads to stereotypes that group-level characteristics can be proxies for characteristics of individuals belonging to that group (Arrow, 1973; Phelps, 1972). Hence, individuals can be treated differently depending on what groups they belong to. Regarding lending markets, statistical discrimination may be induced when lenders are imperfectly informed about some borrower characteristics that are relevant to decision making. Moreover, acquiring information is costly. Thus, lenders tend to use characteristics of the applicants' groups when making loan decisions.

Recent research on discrimination has employed the intersectionality approach that considers both between- and intra-group differences in documenting gender inequality. It is suggested that discrimination against women might be a combination of gender bias and other demographic characteristics such as race, ethnicity, or social status. For example, Beal (2008) has found that Black women face a higher level of discrimination compared to White women because they face both gender and racial biases. Additionally, working-class Black females suffer from triple discrimination including race, gender, and poverty. The interaction between gender and ethnicity could also lead to more harassment at work experienced by minority women as they belong to both disadvantaged groups (Berdahl & Moore, 2006).

(ii) Gender discrimination and access to finance

A growing economic literature investigates the presence of gender discrimination in the credit markets in the context of developed countries and provides an ambiguous picture. For example, Cavalluzzo *et al.* (2002) have acknowledged that female-owned firms in the US tend to have higher loan denial rates in comparison with male-owned peers. Further, men-owned businesses are more likely to get larger loans and pay lower interest rates compared to women-owned businesses (Alesina, Lotti, & Mistrulli, 2013; Coleman, 2000; Treichel & Scott, 2006). However, other studies did not observe discrimination against women in lending markets (e.g., Blanchflower *et al.*, 2003; Bostic & Lampani, 1999; Madill *et al.*, 2006). Asiedu, Freeman, and Nti-Addae (2012) have found that White women-owned firms pay lower interest rates compared to White men-owned peers. Additionally, despite the lower number of loans held by female entrepreneurs, there is no difference in loan denial rates between female- and male-owned firms (Cavalluzzo & Cavalluzzo, 1998). Moreover, female-owned businesses located in more concentrated banking markets indeed have more benefits in relation to loan applications compared to their male-owned counterparts.

Limited studies about gender discrimination in the context of developing countries also provide mixed results. For example, there is no evidence for gender discrimination in access to finance in Trinidad and Tobago (Storey, 2004). Documenting women's disadvantages in raising external capital in Sub-Saharan Africa, Aterido, Beck, and Iacovone (2013) have suggested that the gender gap in lending markets can be explained by firms' characteristics and selection bias rather than by pure gender discrimination. More specifically, women-owned firms tend to be smaller, resulting in lower probability of getting loans. Further analysis shows that female entrepreneurs face higher barriers in loan applications in the first place compared to male peers. Focusing on credit access differentials between men- and women-owned manufacturing enterprises, Hansen and Rand (2014) have found evidence for gender discrimination against women for medium-sized firms in Sub-Saharan Africa while the opposite results are found for small enterprises. Furthermore, female-owned firms in Sub-Saharan Africa are

more likely to face financial constraints compared to male-owned firms (Asiedu, Kalonda-Kanyama, Ndikumana, & Nti-Addae, 2013). Employing a cross-country sample, Muravyev, Talavera, and Schäfer (2009) have observed the existence of gender discrimination in the credit markets: firms owned by female entrepreneurs experience higher denial rates and pay higher interest rates. However, the discrimination differs across countries. Female-owned firms in more financially developed countries are more likely to get loans and receive lower collateral requirements compared to those in less developed countries. These inconclusive results might be explained by country-specific characteristics like different levels of gender inequality (Bandiera & Natraj, 2013) or different levels of female entrepreneurship (Baughn, Chua, & Neupert, 2006).

(b) Studies on social capital

(i) Social capital and access to finance

Issues related to the role of social capital have been documented with reference to different types of networks: networks with government officials and bankers, business-related networks (e.g., networks with customers and suppliers or membership in business associations), networks with social organizations or networks with relatives and friends. A better social embeddedness is indicated by the higher number of ties in the networks such as being a member of more business associations (Nguyen & Luu, 2013). Better social capital could be also shown through the closeness with the network ties like having frequent contacts and interactions (Davidsson & Honig, 2003).

These types of networks can affect firms' access to finance in different ways. For example, Ahlstrom and Bruton (2006) have documented that the relationship with government officials is positively related to venture capital financing in East-Asian transition countries. This can be explained by the considerable power and influence of government officials in project approval and resource allocation (Meyer & Nguyen, 2005). Furthermore, it has been documented that asymmetric information is the major problem in undeveloped financial markets (Nguyen, Le, & Freeman, 2006). To learn more about loan applicants, bankers might seek extra information from the relevant government officials or applicants' other networks. As a result, firms with stronger social ties are more likely to get loans or get better loan terms (Le & Nguyen, 2009; O'Connor, 2000; Tenev, Carlier, Chaudry, & Nguyen, 2003). Examining a sample of 282 Argentinean entrepreneurs, Fornoni, Arribas, and Vila (2012) have acknowledged that social capital can facilitate firms' access to finance. The positive impact of the relationship with key customers on venture capital financing is also found in Ahlstrom and Bruton (2006). Moreover, membership of a business association or political party is one way of spreading knowledge about a firm's existence, as well as being an indicator of reputation (Coleman, 1988). This, in turn, may also help firms gain access to credit. Talavera *et al.* (2012) have shown that in China, the owners' Communist Party membership is positively related to the probability of getting loans from state-owned banks. Furthermore, they found that business associations can assist private enterprises with commercial bank loan applications by recommending good enterprises to banks.

Nevertheless, some studies suggested that firms with better social networks are less likely to rely on bank financing. Le *et al.* (2006) have shown that close ties with government officials may help firms get financial support from the government and therefore firms may no longer need bank loans. Similarly, it might be the case that a close relationship among firms, suppliers, and customers could promote trade credit that distorts the need for funding from formal sector. For instance, trade credit is quite common in Viet Nam with 57% of ongoing customer relationships and 53% of ongoing supplier relationships having some sort of trade credit (McMillan & Woodruff, 1999). Another argument is that firms might rely on informal loans instead of formal ones as informal loans from family and friends are more convenient, with lower interest rates, longer duration, and no collateral or guarantee requirements. Hussain, Millman, and Matlay (2006) have also observed that SMEs in China rely exclusively on financial support from their immediate family at the start-up stage and also during the development of firms. The reliance of SMEs on informal loans is also documented in Viet Nam. For example, Nguyen *et al.* (2006) have found that informal loans are the principal sources of external finance of many private SMEs. As a result, social networks lead to a reduction in the need and use of formal credit (Le & Nguyen, 2009).

(ii) Gender inequality in social capital

Males and females do not acquire social networks uniformly because former have advantages over latter in terms of social capital. Particularly, men tend to have greater business and official-related networks while family and friends often dominate women's social networks (Marsden, 1987; Moore, 1990; Stenbacka & Tillberg Mattsson, 2009). The large difference in the proportion of kin in males' and females' networks remains even if other factors such as employment, family, and wage are taken into account. Moreover, men are more likely to be the member of large business or economic associations. By contrast, women are more exposed to the groups of domestic and community relationships (McPherson & Smith-Lovin, 1982). There is also evidence for gender bias within a network as individuals tend to select themselves into same-sex networks. For instance, males often enter male-dominated organizations while females are more likely to join female-dominated associations (Straits, 1998). These differences in men's and women's network structures could be explained by the gender differences in networking ability and skills. More specifically, women are less willing to invest in social capital compared to men (Jensen, 2014; Moog & Backes-Gellner, 2009). Further, gender stereotypes, structural position, and membership in a minority group could also prevent women from networking efficiently (Timberlake, 2005).

Additionally, men benefit from their networks more than women do. Advice achieved through networking could improve growth expectancy of Bulgarian male-owned firms but not those owned by females (Manolova, Carter, Manev, & Gyoshev, 2007). Similarly, better social capital is positively related to men's career development (Dreher & Cox, 1996, 2000). For example, entrepreneurial networks could help senior men but not women get early promotion (Burt, 1998). However, there is evidence that females could benefit from men's heterogeneous networks through male–female partnership (Godwin *et al.*, 2006). In particular, female entrepreneurs who partner with men could diversify their networks with a higher number of non-kin contacts such as business contacts or contacts with higher status persons. As a result, women entrepreneurs would have access to a wider range of information and opportunities that are important to the success in business.

3. Vietnamese SMEs' institutional framework

Since the *Doi moi* (Reform) policy came into effect in 1986, Viet Nam has achieved remarkable results in socio-economic development. Liberalization of the economy and adoption of the market economy have resulted in a significant increase in private enterprises. The introduction of micro, small, and medium enterprises

in Viet Nam has followed the approval of the Law on Enterprises in 2000.[1] Since then, SMEs in Viet Nam have grown dramatically. According to the White Book on SMEs in 2009, from 2000 to 2008, the average registered capital of small and medium enterprises increased by around eight times. The increases were USD68,714.29, USD196,250.00, USD506,250.00, and USD543,750.00 in 2000, 2006, 2007, and 2008, respectively.[2]

As Viet Nam has been undergoing an economic transition process toward a market economy with a socialist orientation, obstacles to the development of the private sector remain. Many SMEs report that financial constraint is one of the major difficulties for firms (World Bank, 2016) and they, therefore, need to seek external capital such as formal loans, government financial support, or informal credit from different sources. Given that the Vietnamese banking sector is heavily regulated, government officials at all levels still have considerable influence on banking operations. Moreover, since the late 1990s, the Vietnamese government has provided financial support programs—so-called 'policy loans'—which have been channeled through the state-run Social Policy Bank and Viet Nam Development Bank. Thus, SMEs can make use of their close ties with government officials to facilitate commercial loan applications and get access to these support programs. Other credit sources widely used in Viet Nam are: (1) loans from family and friends; (2) loans from private lenders; and (3) trade credit from suppliers and customers. Each of these informal credit sources has its own pros and cons. For example, loans from family and friends are inexpensive but limited, while loans from private lenders are costly with high interest rates. Moreover, given that finding customers is the most critical challenge for Vietnamese SMEs (Nguyen, Stromseth, Hoang, Nguyen, & Tran, 2002) and the use of trade credit depends on firms' creditworthiness, only firms which already have a good credit history and long-term relationship with suppliers and customers can use trade credit.

In the area of social development, Viet Nam has made some achievements in narrowing the gender gap (Wells, 2005). Following the implementation of the Law on Gender Equality and the National Strategy on Gender Equality, gender disparities in primary and secondary education have been reduced. From 2007 to 2016, the ratio of female/male in educational attainment has increased from 0.89 to 0.98 (World Economic Forum, 2007, 2016). Further, women also play an increasingly important role in economics and politics with the ratios of female/male in economic participation and political empowerment in 2016 being 0.74 and 0.14, respectively (World Economic Forum, 2016). However, despite the government's efforts to mitigate discrimination against women, gender inequality still exists in different aspects of economic and social life (Oxfam, 2017). For example, according to the 2009 Labor Force Survey, women's average wages are about 75% of men's average wages. The wage disparity seems to be more severe in rural Viet Nam as women living in rural areas are overrepresented among the poor (Newman, 2017; World Bank, 2016) while women in urban areas have a higher income level compared to men (Thuy, Toan, Hien, & Van Trang, 2015). Women are also exposed to more vulnerable jobs such as own-account work[3] and unpaid family labor (World Bank, 2011). Moreover, women in Viet Nam are not encouraged to start their own businesses as there is still resistance to women taking up leadership positions. According to the 2006 National Survey conducted by International Finance Corporation, women entrepreneurs do face difficulties in seeking external capital (Greig, Weeks, & Nguyen, 2006). These include: (1) a complicated lending process; (2) high interest rates; and (3) lack of collateral. Although gender discrimination is not reported as a major difficulty, three per cent of respondents report that they have perceived some sort of discrimination.

Data from the Enterprise Surveys conducted by the World Bank in 2005, 2009, and 2015 have provided an overview of access to finance of SMEs in Viet Nam. In general, about 60% of small and medium enterprises reported that access to finance is an obstacle for their operation and growth. In terms of level of impact, most firms judged this to be a moderate or major obstacle. Furthermore, of those firms that reported they required a loan, the number of discouraged borrowers made up about 50%. The major reason given for not applying for a loan was that the application procedures are too complex. Other reasons include: (1) collateral requirements are too high; (2) interest rates are unfavorable; (3) the size of loan and maturity are insufficient; and (4) an expectation that their application would be rejected.

4. Empirical strategy

(a) Data and sample

This study is based on the data from the 2011, 2013, and 2015 results of the Micro, Small, and Medium Enterprise Survey in Viet Nam. The surveys are conducted by the United Nations University World Institute for Development Economics Research (UNU-WIDER) in collaboration with two Vietnamese partners (UNU-WIDER, 2016). The 2015 survey provides detailed information about 2,650 formal and informal micro SMEs in the private manufacturing sector in nine provinces of Viet Nam.

The surveys consist of three modules: (1) a main enterprise questionnaire whose respondents are either the owners or managers; (2) an employee questionnaire; and (3) an economic accounts questionnaire (UNU-WIDER, 2016). In this study, we focus on (1) the enterprise questionnaire that provides detailed information on firm performance, enterprise history, employment, business environment, and owner background characteristics, and (2) the economic accounts questionnaire which contains information on firms' revenues, costs, assets, and liabilities.

The original sample includes 2,512 firms in 2011, 2,542 firms in 2013, and 2,650 firms in 2015. The data-screening process is as follows. First, we only include firms whose legal status is household owned, private/sole proprietorship, partnership, limited liability company, or joint stock company without state control. Second, for the purpose of our identification strategy, we only keep firms whose owners are survey respondents. Third, preliminary analysis shows that some formal loans have either zero interest rates or zero loan maturity. We denote these interest rate and loan duration values as missing. Finally, we drop the observations that have suspicious returns on assets (e.g., ROA > 100%) which could mislead the results if included. After screening, our final sample includes 4,961 observations in which, the total number of firms is 1,722, 1,652, and 1,587 in 2011, 2013, and 2015, respectively.[4]

We follow the loan application process specified in Cole and Sokolyk (2016). Firms reporting no need for a loan are classified as non-borrowers. The complementary group (potential borrowers) consists of firms that do not apply because of lending conditions, approval, or process (discouraged) and firms that apply for loans (loan applicants). The latter group then consists of unsuccessful borrowers, whose applications are rejected, and successful

[1] Based on the classification in Government Decree 56/2009/ND-CP, there are two criteria for defining the type of SME i.e., scale of total assets and annual average number of employees. Accordingly, micro, small, and medium enterprises in Viet Nam are firms with less than 10, 10–200, and more than 200–300 employees, respectively.

[2] These increases are equivalent to VND0.962 billion, VND3.14 billion, VND8.1 billion, and VND8.7 billion in 2000, 2006, 2007, and 2008, respectively. Historical exchange rates are taken from https://tradingeconomics.com/vietnam/currency.

[3] Own-account workers are entrepreneurs without any employees.

[4] According to the classification in Government Decree 56/2009/ND-CP, most firms participating in the surveys are micro firms.

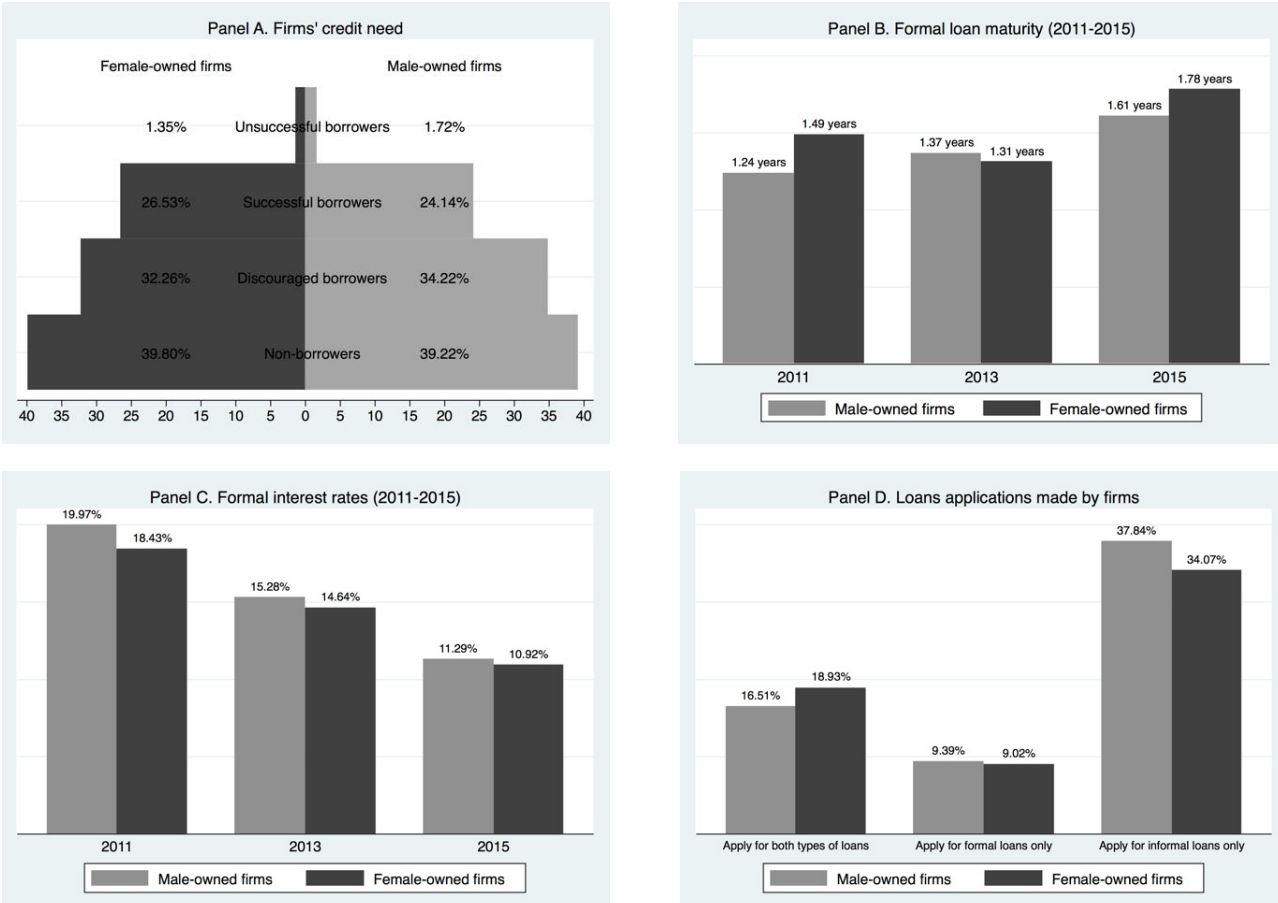

Figure 1. Differences between male- and female-owned firms in credit needs and formal loan conditions. *Notes*: This figure shows the differences between male- and female-owned firms in credit needs and loan conditions. Panel A presents the differences in credit needs as well as formal loan approval rates between female- and male-owned firms. Panel B compares formal loan maturity (measured in years) of female- and male-owned firms over time. Panel C compares formal loan interest rates (%) charged to female- and male-owned firms over time. Panel D shows the number of informal and formal loan applications as the share of firms made by female- and male-owned firms.

borrowers. Panel A of Figure 1 summarizes data on loan applications across different groups. We observe the presence of non-borrowers among both male and female business owners in our sample. In particular, 39.22% of male entrepreneurs do not apply for formal loans, while this number is 39.80% for females. The share of discouraged borrowers among male-owned firms is slightly higher (34.22%) than the share of discouraged borrowers among female counterparts (32.26%). In terms of loan approval, the approval rate for male-owned businesses is lower (24.14%) than the approval rate for female entrepreneurs (26.53%). This difference could be explained by a number of factors. First, it could be the case that female-owned firms have better applications, thus are more likely to obtain loans. Second, women are often perceived as being less risk-taking than men in making financial decisions (Dwyer, Gilkeson, & List, 2002), which makes them less risky borrowers. Data from the surveys allow us to identify reasons why firms in need of external finance do not apply for formal loans. The top three reasons include: (1) firms do not want to incur debt; (2) interest rates are too high; and (3) the process is too difficult.

Table 1 displays detailed descriptive statistics for all firms. Although the number of female-owned firms is lower compared to male-owned enterprises, still about 28% of the SMEs are owned by women. The average age of owners is about 50 years and most are from the ethnic majority. While most owners have completed high school education, only a few have college or higher education degrees. Regarding firms' characteristics, most of firms operate in less-developed provinces rather than in large developed cities. Interestingly, we observe that informal loans have longer loan maturity terms and lower interest rates compared to formal loans. This suggests that most informal loans in the sample are provided by family and friends. In addition, from 2011 to 2015, the formal interest rates charged to SMEs in Viet Nam have dropped steadily while loan maturity terms have been extended (Panels B-C, Figure 1).

Table 2 shows the descriptive statistics by gender. Male entrepreneurs tend to have a higher demand for external finance compared to female counterparts. Subsequently, male-owned firms are more likely to apply for formal loans but are less likely to obtain one compared to their female counterparts. Furthermore, we do not observe any significant differences in terms of informal loan terms between female-owned and male-owned firms while male-owned firms tend to pay higher formal interest rates. Regarding social capital, women appear to have better access to business networks while men are more likely to have close relationships with government or bank officials. We also observe that the number of informal loan applications is considerably higher compared to the number of formal loan applications (Panel D, Figure 1). The distribution of informal and formal interest rates charged to SMEs is shown in Figure 2, while the sources of informal loans are presented in Figure 3. As can be seen, firms can borrow interest-free loans from family and friends. This, coupled with the reasons for being discouraged to borrow through formal loans, possibly explains the domination of informal loans in the sample.

Regarding owners' characteristics, the differences in ethnicity as well as education level and work experience are quite strong. Most male business owners are of the ethnic majority and have higher levels of education compared to women entrepreneurs. Further, most of them worked before as waged employees while women's previous work is mainly self-employed. While many male owners are members of the Communist Party or war veterans, this number is small among females. With regard to firms' characteristics, although men-owned firms are bigger in size, on average those firms perform worse than women-owned firms, with lower average returns on assets.

(b) Methodology

(i) Loan applications

Previous studies about financial constraints mainly focus on the probability of obtaining loans and differences in loan terms (e.g., Blanchard *et al.*, 2008; Cavalluzzo *et al.*, 2002). Unlike those studies, we first aim to investigate the disparities in loan applications made by women and men. This analysis is conditional on the need for loans. As our identification strategy, we employ the probit response model with sample selection (Van de Ven & Van Praag, 1981). Loan application, a binary variable, is our dependent variable. Our model is as follows:

$$Probit(Apply_{it} = 1) = \phi(\alpha + \beta Female_{it} + \gamma Social\ capital_{it} + \theta Female_{it} \times Social\ capital_{it} + X_{it}\delta + \varepsilon_{it}) \quad (1.1)$$

$$Probit(Need_{it} = 1) = \phi(\tilde{\alpha} + \tilde{\beta} Female_{it} + \tilde{\gamma} Social\ capital_{it} + \tilde{\theta} Female_{it} \times Social\ capital_{it} + X_{it}\tilde{\delta} + \tilde{\psi}_1 Share\ of\ jobs_{it} + \tilde{\psi}_2 Innovation_{it} + \tilde{\varepsilon}_{it}) \quad (1.2)$$

where i indexes firm and t indexes year; (1.1) is the main equation while (1.2) is the sample selection equation.

In Eqn. (1.1), *Apply* takes the value of one if firms apply for a formal loan, zero otherwise. The key variable of our analysis, *Female*, is the binary variable indicating whether the owner is female. *Social capital* is the dummy variable that equals one if an entrepreneur has one of the social networks. Social networks are proxied by relationship with government/bank officials and relationship with business people.[5] The interaction terms between female and social network proxies are also included.

Vector X captures firms' creditworthiness, and other owners' characteristics that may affect creditors' decisions. Other characteristics of the owners are captured by: *Age* (natural logarithm of the owner's age); *Ethnicity* (one if the owner belongs to ethnic majority, zero otherwise); *Education* (first component of principal component analysis of basic education and professional education); *Veteran/Communist* (one if the firm owner is a war veteran or is a member of the Communist Party, zero otherwise); and *Previous wage employee* (one if the owner's previous job is waged employee, zero otherwise). From the behavioral perspective, younger owners have greater incentives to take on riskier projects, therefore, they are less favorable during loan application process. In addition, owners with higher education levels and more relevant work experience are expected to manage their firms better. Furthermore, being a member of the Communist Party, being war veteran, or being of the ethnic majority may help firms have better access to bank loans.

Firms' characteristics are indicated by *Size* (natural logarithm of firm's assets measured in million VND), *Firm age* (natural logarithm of the firm's age), *Export* (one if the firm has direct export activity, zero otherwise), and *Accounting* (one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise). It is widely accepted that a bigger and older firm may have a better credit history as well as a better reputation and longer term relationship with creditors. Moreover, firms that export and maintain a formal accounting book in accordance with government guidelines are likely to be trustworthy and have higher chances of getting loans. Return on assets (*ROA*) proxies for firms' profitability, a key factor in firms' potential to repay from the point of view of banks. *Bad credit history* (equals one if the firm fails to service its debt, zero otherwise) is another main factor that banks use to screen applicants' profiles and therefore it is also included in our regressions.[6]

In Eqn. (1.2), we consider selection into firms reporting that a loan is needed. Hence, the main equation identifies the differences between those who actually need a loan and those who do not need extra finance. There is an assumption of joint normality and non-zero correlation ρ between error terms. If $\rho \neq 0$, the standard model without selection produces biased and inconsistent estimates.

Identification of the selection equation requires instruments that affect the need for a formal loan but do not affect the decision to apply. In this study, we employ two instruments. It has been shown that firms tend to use internal finance before seeking external finance (Myers, 2000). Moreover, the owner's private wealth is found be to one of the main internal finance sources for SMEs (e.g., Ughetto, 2008; Vos, Yeh, Carter, & Tagg, 2007). Hence, the first instrument employed is jobs as share of working-age adults in the owner's household (*Share of jobs* is the ratio of number of jobs over total number of working-age adults in the household).[7,8] More jobs generating more income can be used as internal finance for firms, thus reducing the need for external finance. The second instrument is innovation activities of the firms, *Innovation*, which equals one if the firm has introduced new technology or new product, zero otherwise. It has been argued that firms, especially small firms, often face financial constraints when they conduct research and development and innovation projects (e.g., Beck & Demirguc-Kunt, 2006; Hyytinen & Toivanen, 2005). In other words, if the firms adopt new technology or introduce new products, they will need extra funding to finance these activities. These instruments are valid since the final decision as to whether firms apply for a formal loan depends on other factors. For example, firms might get funding from informal sources before applying to formal sources.[9]

(ii) Loan approval

The second part of our analysis focuses on the possible differences in loan approval rates for female- and male-owned firms. The dependent variable, *Loan approval*, equals one if the firm gets at least one formal loan, zero otherwise. Since this analysis is conditional on actual loan applications, sample selection bias may arise because some firms may have chosen not to apply for a formal loan in anticipation of being rejected or being offered unfavorable loan conditions due to discrimination. Panel A of Figure 1 shows that the discouraged borrowers (firms needing loans but

[5] Although business association membership could be important social capital, we only observe a low proportion of firms that take part in business associations. For this reason, we do not analyze this aspect of the data.

[6] Details of the variables and their definition can be found in Table 1.

[7] The working-age range is from 15 to 60.

[8] We also decompose jobs in the household into jobs in firms, waged jobs elsewhere, and self-employed. Our results are quantitatively similar.

[9] Descriptive statistics and definition of instruments are shown in Table 7.

Table 1
Descriptive statistics for whole sample and variable definition

	Mean (1)	SD (2)	Obs. (3)	Definition (4)
Need	0.591	0.492	4,868	One if the firm reports a need of loan, zero otherwise
Formal loans				
Apply	0.238	0.426	4,868	One if the firm applies for a formal loan, zero otherwise
Loan approval	0.933	0.249	1,157	One if the firm gets at least one formal loan, zero otherwise
Duration	1.423	1.246	1,083	Loan maturity (in years)
Interest	15.738	5.383	1,080	Annual interest rate charged (%)
Informal loans				
Apply	0.540	0.498	4,869	One if the firm applies for an informal loan, zero otherwise
Loan approval	0.374	2.229	2,631	One if the firm gets at least one informal loan, zero otherwise
Duration	1.800	3.792	781	Loan maturity (in years)
Interest	8.499	16.108	780	Annual interest rate charged (%)
Business network	0.379	0.485	4,869	One if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise
Official network	0.331	0.471	4,869	One if the firm has regular contacts with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise
Female	0.282	0.450	4,869	One if the owner is female, zero otherwise.
Age	50.063	9.864	4,869	Owner's age (in years)
Veteran/Communist	0.020	0.141	4,869	One if the owner is a war veteran or a member of the Communist Party, zero otherwise
Ethnicity	0.933	0.249	4,869	One if the owner belongs to ethnic majority, zero otherwise
Education	−0.155	1.086	4,868	First component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) professional education which equals one if the owner has college or university degree, zero otherwise
Previous wage employee	0.462	0.499	4,869	One if the owner's previous job is wage employee, zero otherwise
Bad credit history	0.037	0.189	3,166	One if the firm fails to service its debt, zero otherwise
ROA	0.201	0.213	4,869	Return on assets (%)
Firm age	17.544	9.808	4,867	Firm's age (in years)
Size	7.020	1.530	4,869	Natural logarithm of firm's assets measured in million VND
Export	0.043	0.203	4,856	One if the firm has direct export activity, zero otherwise
Accounting	0.288	0.453	4,869	One if the firm follows the accounting standard in accordance with government guidelines, zero otherwise

Notes: Columns (1)–(4) show mean, standard deviation, number of observations, and variable definition, respectively.

which do not apply) do exist in our sample. To address this problem, we employ the following model:

$$Probit(Loan\ approval_{it} = 1) = \phi(\alpha + \beta Female_{it} + \gamma Social\ capital_{it} + \theta Female_{it} \times Social\ capital_{it} + X_{it}\delta + \varepsilon_{it}) \quad (2.1)$$

$$Probit(Apply_{it} = 1) = \phi(\tilde{\alpha} + \tilde{\beta} Female_{it} + \tilde{\gamma} Social\ capital_{it} + \tilde{\theta} Female_{it} \times Social\ capital_{it} + X_{it}\tilde{\delta} + \tilde{\psi} Apply\ for\ informal\ loans_{it} + \tilde{\varepsilon}_{it}) \quad (2.2)$$

where the independent variables in Eqn. (2.1) are defined as the same way as the ones in Eqn. (1.1).

In the selection Eqn. (2.2), *Apply* equals one if the firm applies for a formal loan and zero otherwise. This equation is estimated for the sample of firms that apply for a bank loan. Again, we need to find instruments that affect the likelihood of applying for a formal loan but do not affect loan approval. The substitution between informal credit and formal credit has been well documented in a number of studies. While informal credit may have a positive impact on the accessibility of microcredit programs (Khoi, Gan, Nartea, & Cohen, 2013), informal loans are a type of supplement to fill the gap left by the formal sector and are preferred (e.g., Duong & Izumida, 2002; Guirkinger, 2008). In our sample, we observe that the number of informal loans is higher than the number of formal loans while firms reported facing difficulties in formal loan applications. Thus, we use *Apply for informal loan* (equals one if the firm applies for an informal loan, zero otherwise) as the instrument in this selection. Our argument is, if firms apply for a loan from informal sources, they are less likely to apply for loans from formal sources. This instrument is valid, as banks cannot observe informal loan applications to make decisions on formal loan applications.

(iii) Loan terms

In the third part of the analysis, we consider the disparities in loan maturity terms and interest rates charged to female-owned firms and male-owned firms. Conditional on successful loan applicants, the main equation identifies the differences in loan terms between successful borrowers and unsuccessful borrowers. Our empirical model is as follows:

$$Loan\ terms_{it} = \alpha + \beta Female_{it} + \gamma Social\ capital_{it} + \theta Female_{it} \times Social\ capital_{it} + X_{it}\delta + \varepsilon_{it} \quad (3.1)$$

$$Probit(Loan\ approval_{it} = 1) = \phi(\tilde{\alpha} + \tilde{\beta} Female_{it} + \tilde{\gamma} Social\ capital_{it} + \tilde{\theta} Female_{it} \times Social\ capital_{it} + X_{it}\tilde{\delta} + \tilde{\psi}_1 Managerial\ time_{it} + \tilde{\psi}_2 Main\ income\ source_{it} + \tilde{\psi}_3 Bribe_{it} + \tilde{\varepsilon}_{it}) \quad (3.2)$$

In selection Eqn. (3.2), *Loan approval* equals one if the firm gets at least one formal loan and zero otherwise. This equation is estimated for the sample of firms applying for a bank loan. In the model proposed by Kon and Storey (2003), better preparation of loan applications is one determinant of good applicants. If a firm is less prepared, it is less likely to get a loan. Thus, we employ *Managerial time* and *Firm is main income* (one if the owner reports that firm is the main income source, zero otherwise) as our instruments to control for loan preparation. If the firms are not the main income source of the owners, they might not spend time on loan application. This results in a lower probability of getting one. *Managerial*

Table 2
Descriptive statistics by gender

	$Mean_M$ (1)	SD_M (2)	Obs. (3)	$Mean_F$ (4)	SD_F (5)	Obs. (6)	$Mean_M - Mean_F$ (7)	
Need	0.613	0.487	3,495	0.533	0.499	1,373	0.080	***
Formal loans								
Apply	0.257	0.437	3,495	0.192	0.394	1,373	0.065	***
Loan approval	0.925	0.263	895	0.962	0.192	262	−0.037	**
Duration	1.394	1.232	830	1.517	1.287	253	−0.123	
Interest	15.890	5.384	829	15.236	5.360	251	0.654	*
Informal loans								
Apply	0.554	0.497	3,496	0.505	0.500	1,373	0.049	***
Loan approval	0.395	2.512	1,936	0.318	1.103	695	0.077	
Duration	1.856	4.091	619	1.583	2.316	162	0.274	
Interest	8.262	15.281	618	9.402	18.959	162	−1.140	
Business network	0.366	0.482	3,496	0.410	0.492	1,373	−0.044	***
Official network	0.338	0.473	3,496	0.312	0.464	1,373	0.026	*
Age	48.083	9.892	3,496	47.838	9.659	1,373	0.245	
Veteran/Communist	0.025	0.157	3,496	0.008	0.089	1,373	0.017	***
Ethnicity	0.941	0.235	3,496	0.913	0.281	1,373	0.028	***
Education	−0.098	1.041	3,495	−0.299	1.181	1,373	0.200	***
Previous wage employee	0.496	0.500	3,496	0.377	0.485	1,373	0.119	***
Bad credit history	0.040	0.197	2,355	0.028	0.166	811	0.012	
ROA	0.195	0.208	3,496	0.215	0.226	1,373	−0.020	***
Firm age	15.415	9.657	3,494	15.697	10.430	1,373	−0.282	
Size	7.084	1.504	3,496	6.859	1.582	1,373	0.225	***
Export	0.044	0.205	3,485	0.041	0.198	1,371	0.003	
Accounting	0.284	0.451	3,496	0.299	0.458	1,373	−0.015	

Notes: This table presents descriptive statistics by gender. Columns (1)–(3) show mean, standard deviation, and number of observations for male-owned firms, respectively. Columns (4)–(6) show mean, standard deviation, and number of observations for female-owned firms, respectively. Columns (7) shows mean difference between two groups. 'Need' equals one if the firm reports a need of loans, zero otherwise. 'Apply' equals one if the firm applies for a loan, zero otherwise. 'Loan approval' equals one if the firm gets at least one loan, zero if all loan applications are rejected. 'Duration' is the loan maturity (in years) of the reported loan. 'Interest' is annual interest rate of the reported loan. 'Business network' equals one if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise. 'Official network' equals one if the firm has regular contacts with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise. 'Veteran/Communist' equals one if the owner is a war veteran or a member of the Communist Party, zero otherwise. 'Ethnicity' equals one if the owner belongs to ethnic majority, zero otherwise. 'Education' is the first component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) professional education, which equals one if the owner has college or university degree, zero otherwise. 'Previous wage employee' equals one if the owner's previous job is waged employee, zero otherwise. 'ROA' is return on assets. 'Age' is the owner's age (by the survey year). 'Firm age' is the firm's age (by the survey year). 'Size' is the natural logarithm of firms' assets measured in million VND. 'Export' equals one if the firm has direct export activity, zero otherwise. 'Accounting' equals one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise. *, **, and *** denote significance for *t*-tests of mean equality of two groups at 10%, 5%, and 1%, respectively.

time is the percentage of the owner's working time spent each month dealing with government regulations and officials. As managerial time is limited, the owners who spend significant amounts of time in dealing with government officials might not have enough time to prepare all the formalities related to loan applications. Hence, they are less likely to obtain a formal loan (Muravyev *et al.*, 2009). Furthermore, lending corruption has remained in collectivist societies, especially for small and medium enterprises (El Ghoul, Guedhami, Chuck, Kwok, & Zheng, 2016; Zheng, El Ghoul, Guedhami, & Kwok, 2013). Thus, we employ *Bribe* (one if the firm pays informal fees, zero otherwise) as our third instrument and argue that if a firm pays informal fees, the likelihood of loans being approved is higher.

5. Results

(a) Gender, social capital, and financial constraints

Tables 3 and 4 report our regression results with *Business network* and *Official network* as the indicator of social capital, respectively. Column (1) shows the marginal effects estimated around mean points for the differences in loan applications. Column (2) shows the marginal effects estimated around mean points for the differences in the outcomes of actual loan applicants, that is, whether the loan applications are approved or rejected. The dependent variables in columns (3) and (4) are loan duration and interest rates charged, respectively. Conditional on the need for external finance, we do not observe significant differences in the likelihood of applying for formal loans between male- and female-owned firms. However, firms with closer ties to government officials or bankers are more likely to apply for bank loans. This supports the argument that firms with better official relationships are encouraged to apply for formal loans in the hope that they can get loans due to these relationships. Furthermore, as expected, firms that introduce new technology or new products need extra funding for innovation while the need for finance would be reduced by the internal finance generated from within the household.

Regarding the differences in loan approvals, firms with female ownership are more likely to obtain a formal loan compared to firms with male ownership. More specifically, conditional on actual loan applications, women-owned firms have a 33–42% higher probability of getting loans than male-owned firms. This number is statistically and economically significant. Regarding the employed instrument in the selection equation, we observe that firms are more likely to apply for loans from the informal sector before applying for formal ones.

We also find significant differences in terms of interest rates charged to male and female entrepreneurs, i.e., women pay 0.69 percentage points lower interest rates than men do. However, there is no difference between the loan maturity terms given to

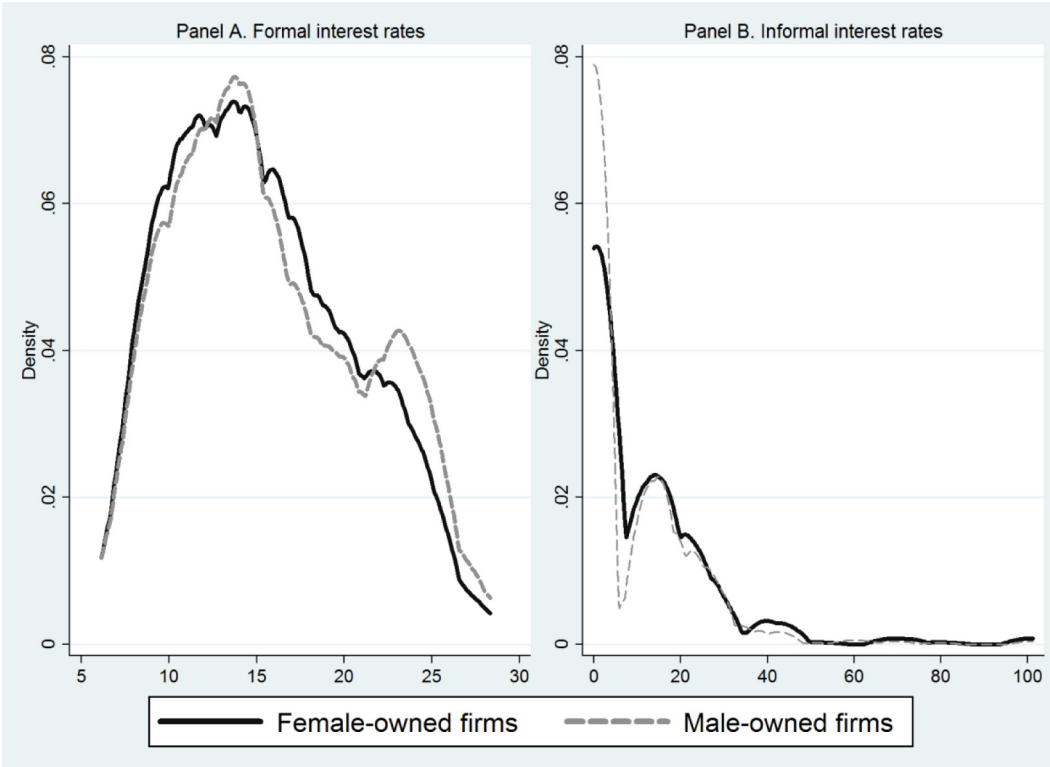

Figure 2. Distribution of interest rates charged to male-owned and female-owned firms. *Notes*: This figure shows the distribution of interest rates charged to male-owned and female-owned firms. Panel A shows the distribution of formal interest rates. Panel B shows the distribution of informal interest rates.

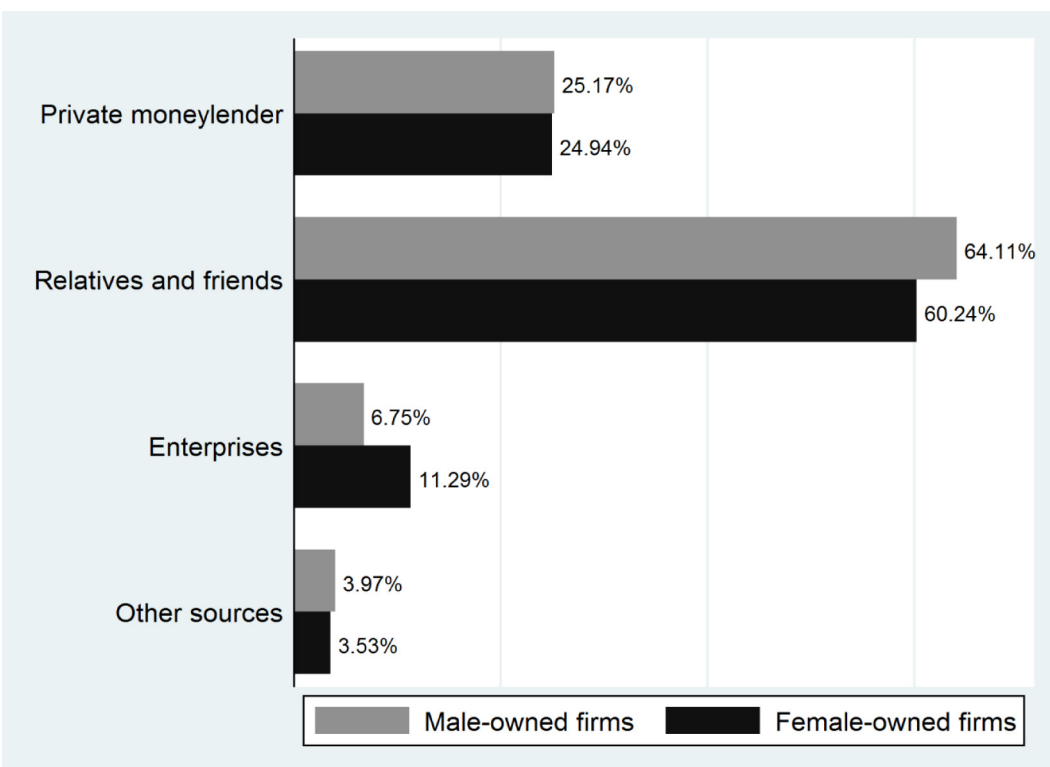

Figure 3. Sources of informal loans. *Notes*: This figure shows the proportions of informal loan sources from which male-owned and female-owned firms borrow.

Table 3
Gender discrimination, business network, and access to finance

	Apply (1)	Loan approval (2)	Duration (3)	Interest (4)
Female	0.011	0.329**	0.049	−0.687*
	(0.070)	(0.142)	(0.058)	(0.365)
Business network	0.059	0.001	0.085*	0.099
	(0.062)	(0.119)	(0.047)	(0.292)
Female × Business network	−0.035	0.011	0.035	−0.357
	(0.056)	(0.154)	(0.045)	(0.281)
Ethnicity	0.281	−0.271	−0.305*	−0.370
	(0.174)	(0.335)	(0.164)	(1.022)
Education	−0.021	−0.030	0.023	−0.021
	(0.032)	(0.072)	(0.025)	(0.155)
Bad credit history	0.227	−0.468**	−0.104	0.088
	(0.152)	(0.203)	(0.096)	(0.595)
Veteran/Communist	0.457**	−0.019	−0.065	−0.770
	(0.208)	(0.330)	(0.131)	(0.805)
ROA	0.264	−0.170	−0.012	0.011
	(0.173)	(0.321)	(0.126)	(0.789)
Age	−0.157	−0.154	−0.078	−0.665
	(0.168)	(0.296)	(0.119)	(0.743)
Firm age	−0.027	−0.013	−0.030	0.095
	(0.048)	(0.089)	(0.037)	(0.230)
Size	0.237***	0.103	−0.069***	0.298**
	(0.041)	(0.069)	(0.023)	(0.142)
Export	0.160	−0.428**	0.040	−0.218
	(0.128)	(0.210)	(0.087)	(0.543)
Accounting	0.151*	0.167	0.044	0.301
	(0.082)	(0.182)	(0.064)	(0.398)
Selection equation instruments				
	Need	Apply	Loan approval	Loan approval
Innovation	0.191***			
	(0.064)			
Share of jobs	−0.140**			
	(0.061)			
Apply for informal loan		−0.801***		
		(0.073)		
Firm is main income			−0.013	−0.010
			(0.366)	(0.365)
Managerial time			−0.068**	−0.067**
			(0.033)	(0.033)
Bribe			0.017	0.023
			(0.203)	(0.203)
Observations	3,102	2,254	2,247	2,249

Notes: This table presents regressions results with sample selection. Social capital is indicated by 'Business network'. Regressions in columns (1) and (2) are estimated using Heckprobit estimation while regressions in column (3) and (4) are estimated using Heckman's estimations. Marginal effects estimated around mean points are reported in Columns (1) and (2). Robust standard errors are reported in parentheses. In all regressions, a constant term, sector, region, and time dummies are included but not reported. 'Need' equals one if the firm reports a need of loans, zero otherwise. 'Apply' equals one if the firm applies for a loan, zero otherwise. 'Loan approval' equals one if the firm gets at least one loan, zero if all loan applications are rejected. 'Duration' is the natural logarithm of the reported loan's duration in months. 'Interest' is annual interest rate of the reported loan. 'Business network' equals one if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise. 'Official network' equals one if the firm has regular contacts with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise. 'Veteran/Communist' equals one if the owner is a war veteran or a member of the Communist Party, zero otherwise. 'Ethnicity' equals one if the owner belongs to ethnic majority, zero otherwise. 'Education' is the first component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) professional education, which equals one if the owner has college or university degree, zero otherwise. 'Previous wage employee' equals one if the owner's previous job is waged employee, zero otherwise. 'ROA' is return on assets. 'Age' is the natural logarithm of owners' age (by the survey year). 'Firm age' is the natural logarithm of firm's age (by the survey year). 'Size' is the natural logarithm of firms' assets measured in million VND. 'Export' equals one if the firm has direct export activity, zero otherwise. 'Accounting' equals one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise. 'Apply for informal loan' is a dummy variable that equals one if the firm applies for an informal loan, zero otherwise. 'Share of jobs' is the ratio of number of jobs over total number of working-age adults in the household. 'Innovation' is a dummy that equals one if the firm has introduced new technology or new product, zero otherwise. 'Firm is main income' is a dummy that equals one if the owner reports that firm is the main income source, zero otherwise. 'Managerial time' is the percentage of working time spent on dealing with government regulations and officials. 'Bribe' is a dummy that equals one if the firm pays informal fees, zero otherwise. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

male- and female-owned firms. Interestingly, although better social capital does not guarantee a bank loan for firms, relationships with government officials and other business people may help firms get longer loan terms. In other words, we do find support for the roles of social capital in relaxing financial constraints. Regarding the employed instrument, if the owners spend more time on dealing with government officials, they have less time to prepare for loan applications, resulting in a lower probability of getting a loan.

Overall, our results provide no evidence for gender differences in loan applications. This might be explained by entrepreneurs' ability to get zero interest-rate loans from families and friends. Consequently, business owners, regardless of gender, do not have incentives to seek formal credits. It could also be the case that the gender non-difference is driven by the lower number of loan applications made by female entrepreneurs. Women often do not consider themselves as entrepreneurs (Verheul, Uhlaner, & Thurik, 2005) or perceive themselves and the entrepreneurial

Table 4
Gender discrimination, official network, and access to finance

	Apply (1)	Loan approval (2)	Duration (3)	Interest (4)
Female	−0.039	0.421***	0.041	−0.529
	(0.074)	(0.154)	(0.056)	(0.360)
Official network	0.241***	0.030	0.105*	−0.242
	(0.072)	(0.117)	(0.061)	(0.393)
Female × Official network	0.165***	0.247	−0.014	−0.466
	(0.059)	(0.185)	(0.050)	(0.322)
Ethnicity	0.349*	−0.363	−0.115	−0.775
	(0.183)	(0.339)	(0.155)	(0.984)
Education	−0.028	−0.011	0.031	0.020
	(0.033)	(0.073)	(0.024)	(0.156)
Bad credit history	0.234	−0.495**	0.029	−0.431
	(0.155)	(0.202)	(0.091)	(0.581)
Veteran/Communist	0.440**	−0.052	−0.001	−0.749
	(0.208)	(0.335)	(0.140)	(0.892)
ROA	0.287	−0.200	−0.018	0.045
	(0.177)	(0.332)	(0.127)	(0.818)
Age	−0.124	−0.082	−0.090	−0.161
	(0.169)	(0.308)	(0.121)	(0.777)
Firm age	−0.037	−0.029	−0.019	−0.066
	(0.049)	(0.093)	(0.035)	(0.227)
Size	0.243***	0.100	−0.031	0.024
	(0.040)	(0.068)	(0.045)	(0.290)
Export	0.146	−0.484**	0.080	−0.559
	(0.130)	(0.218)	(0.080)	(0.514)
Accounting	0.135	0.148	0.026	0.127
	(0.083)	(0.183)	(0.064)	(0.409)
Selection equation instruments				
	Need	Apply	Loan approval	Loan approval
Innovation	0.161**			
	(0.067)			
Share of jobs	−0.140**			
	(0.063)			
Apply for informal loan		−0.846***		
		(0.075)		
Firm is main income			−0.010	−0.007
			(0.365)	(0.364)
Managerial time			−0.059*	−0.058*
			(0.033)	(0.033)
Bribe			0.004	0.008
			(0.199)	(0.199)
Observations	3,102	2,254	978	979

Notes: This table presents regression results with sample selection. Social capital is indicated by 'Official network'. Regressions in columns (1) and (2) are estimated using Heckprobit estimations while regressions in columns (3) and (4) are estimated using Heckman's estimations. Marginal effects estimated around mean points are reported in Columns (1) and (2). Robust standard errors are reported in parentheses. In all regressions, a constant term, sector, region, and time dummies are included but not reported. 'Need' equals one if the firm reports a need of loans, zero otherwise. 'Apply' equals one if the firm applies for a loan, zero otherwise. 'Loan approval' equals one if the firm gets at least one loan, zero if all loan applications are rejected. 'Duration' is the natural logarithm of the reported loan's duration in months. 'Interest' is annual interest rate of the reported loan. 'Business network' equals one if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise. 'Official network' equals one if the firm has regular contacts with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise. 'Veteran/Communist' equals one if the owner is a war veteran or a member of the Communist Party, zero otherwise. 'Ethnicity' equals one if the owner belongs to ethnic majority, zero otherwise. 'Education' is the first component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) professional education, which equals one if the owner has college or university degree, zero otherwise. 'Previous wage employee' equals one if the owner's previous job is waged employee, zero otherwise. 'ROA' is return on assets. 'Age' is the natural logarithm of owners' age (by the survey year). 'Firm age' is the natural logarithm of firm's age (by the survey year). 'Size' is the natural logarithm of firms' assets measured in million VND. 'Export' equals one if the firm has direct export activity, zero otherwise. 'Accounting' equals one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise. 'Apply for informal loan' is a dummy variable that equals one if the firm applies for an informal loan, zero otherwise. 'Share of jobs' is the ratio of number of jobs over total number of working-age adults in the household. 'Innovation' is a dummy that equals one if the firm has introduced new technology or new product, zero otherwise. 'Firm is main income' is a dummy that equals one if the owner reports that firm is the main income source, zero otherwise. 'Managerial time' is the percentage of working time spent on dealing with government regulations and officials. 'Bribe' is a dummy that equals one if the firm pays informal fees, zero otherwise. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

environment in a less positive light than men (Langowitz & Minniti, 2007). As a result, female entrepreneurs tend to have a lower level of entrepreneurial activity that might demotivate them to seek additional capital. In addition, women are more likely to be risk averse due to gender-specific characteristics (Dwyer *et al.*, 2002) or due to the economic conditions and the non-economic goals in running business (Herslund & Tanvig, 2012; Murthy & Gopinath, 2013). Thus, they are less likely to apply for bank loans.

Further, we find that better social capital could assist entrepreneurial activities through relaxing financial constraints. This supports the literature on the positive impact of the number and strength of social ties on firm-founding activities (e.g., Kreiser, Patel, & Fiet, 2013). One possible explanation is that, due to information asymmetry, banks tend to seek additional information about the firms through firms' social networks. Therefore, better social ties may facilitate loan applications (Tenev *et al.*, 2003). Another possible explanation is that social networks are beneficial

Table 5
Robustness check: *Share of job* as an instrument in selection equation in loan approval model

	Loan approval (1)	Loan approval (2)
Female	0.341**	0.418***
	(0.143)	(0.157)
Business network	0.054	
	(0.120)	
Female × Business network	−0.003	
	(0.150)	
Official network		0.006
		(0.119)
Female × Official network		0.249
		(0.183)
Ethnicity	−0.242	−0.326
	(0.324)	(0.335)
Education	−0.047	−0.033
	(0.071)	(0.074)
Bad credit history	−0.479**	−0.500**
	(0.199)	(0.203)
Veteran/Communist	−0.036	−0.071
	(0.330)	(0.338)
ROA	−0.098	−0.119
	(0.333)	(0.338)
Age	−0.071	−0.010
	(0.298)	(0.309)
Firm age	0.009	−0.010
	(0.086)	(0.092)
Size	0.093	0.096
	(0.067)	(0.069)
Export	−0.468**	−0.520**
	(0.212)	(0.221)
Accounting	0.197	0.169
	(0.179)	(0.185)
Selection equation instruments		
	Apply	Apply
Apply for informal loan	−0.803***	−0.846***
	(0.074)	(0.075)
Share of jobs	−0.072	−0.083
	(0.071)	(0.072)
Observations	2,226	2,226

Notes: This table presents robustness checks for loan approval model. Regressions are estimated using Heckprobit estimations. Marginal effects estimated around mean points are reported. Robust standard errors are reported in parentheses. In all regressions, a constant term, sector, region, and time dummies are included but not reported. 'Apply' equals one if the firm applies for a loan, zero otherwise. 'Loan approval' equals one if the firm gets at least one loan, zero if all loan applications are rejected. 'Business network' equals one if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise. 'Official network' equals one if the firm has regular contact with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise. 'Veteran/Communist' equals one if the owner is a war veteran or a member of the Communist Party, zero otherwise. 'Ethnicity' equals one if the owner belongs to ethnic majority, zero otherwise. 'Education' is the first component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) 'professional education' which equals one if the owner has college or university degree, zero otherwise. 'Previous wage employee' equals one if the owner's previous job is waged employee, zero otherwise. 'ROA' is return on assets. 'Age' is the natural logarithm of the owner's age (by the survey year). 'Firm age' is the natural logarithm of firm's age (by the survey year). 'Size' is the natural logarithm of firms' assets measured in million VND. 'Export' equals one if the firm has direct export activity, zero otherwise. 'Accounting' equals one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise. 'Apply for informal loan' is a dummy variable that equals one if the firm applies for an informal loan, zero otherwise. 'Share of jobs' is the ratio of number of jobs over total number of working-age adults in the household. *, **, and *** denote significance at 10%, 5%, and 1%, respectively.

to all network members in terms of widening and combining social ties as well as collective learning within networks (Lehto & Oksa, 2004). All these above factors could make firms better off in applying for loans.

An additional finding is that women are more likely to obtain a loan with more favorable terms. We interpret this result in a number of ways. First, although it is not evident in our data, previous studies document that women are more likely to become social rather than commercial entrepreneurs (e.g., Estrin, Mickiewicz, & Stephan, 2013). Following the revised Vietnam's Enterprise Law in 2014, social entrepreneurs could get support from the government in obtaining funding. Taken together, it could explain why Vietnamese female-owned firms can get better loan deals. Second, social networks, especially networks related to economic institutions, are more likely to be male-biased (Stenbacka & Tillberg Mattsson, 2009). Thus, female entrepreneurs might benefit from male–female partnering by accessing male entrepreneurs' networks (Godwin *et al.*, 2006).

In terms of the impacts of other owners' characteristics and firms' characteristics, most results are consistent with expectations, i.e., firms whose owners are war veterans or Communist Party members, or firms that follow the accounting standard are encouraged to apply for bank loans. Bigger firms are also more likely to apply for loans but are more likely to get less favorable loan terms with shorter loan duration terms and higher interest rates. Firms that failed to repay debts in the past have poor credit records and are less likely to get new loans. Interestingly, export firms are less likely to get loans. This may be explained by the fact that export firms are not on the list of SMEs that can apply for favorable credit programs provided by state-owned banks.

(b) Robustness checks

Since sample selection bias remains one of the key challenges in studies about discrimination in lending markets, it is difficult to find a good instrument. One might argue that the instrument *Share of jobs*, employed in the model consisting of Eqns. (1.1), (1.2), could also affect the likelihood of applying for a bank loan. To check this possibility, we add this variable as another instrument in Eqn. (2.2) and perform Heckman's regressions. The results reported in Table 5 show that the coefficients on this instrument are statistically insignificant in the selection equation, while the effect of gender on loan approval is consistent with our main results.

Since paying bribes may also help firms to get better loan deals, the use of this variable as an instrument in Eqn. (3.2) might be invalid. To rule out this possibility, we add this variable into Eqn. (3.1) and re-estimate the Heckman estimations. The results reported in Table 6 are quantitatively consistent with previous findings. That is, interest rates charged to females are lower than those charged to males and social capital helps firms to get longer loan maturity terms. Moreover, the coefficients on *Bribe* are statistically insignificant, suggesting little evidence for lending corruption in the sample.

6. Conclusions and implications

In recent years, the number of SMEs in Viet Nam as well as their role in the development of the economy has been growing. However, SMEs in Viet Nam still face some obstacles, particularly in relation to access to finance. Further, because of gender differences, SMEs with female ownership might face more difficulties in raising external capital compared to their male-owned counterparts. Thus, the main aim of this paper is to explore the issues relating to female-owned SMEs' access to finance in Viet Nam, i.e., whether female-owned firms are discriminated in lending markets. Since Viet Nam is a network-oriented economy (Meyer & Nguyen, 2005), this paper also investigates the role of social capital on access to credit. Given that there could be gender differences in social capital and networking ability (e.g., Aldrich, 1989), we further document the interaction between the social capital and firm

Table 6
Robustness check: Impact of *Bribe* on loan terms

	Duration (1)	Duration (2)	Interest (3)	Interest (4)
Female	0.049	0.099	−0.687*	−0.619
	(0.058)	(0.067)	(0.365)	(0.402)
Business network	0.081*		0.099	
	(0.047)		(0.293)	
Female × Business network	0.035		−0.357	
	(0.045)		(0.281)	
Official network		0.052		0.382
		(0.046)		(0.273)
Female × Official network		−0.052		−0.142
		(0.045)		(0.268)
Ethnicity	−0.298*	−0.294*	−0.370	−0.373
	(0.163)	(0.171)	(1.023)	(1.019)
Education	0.023	0.026	−0.021	−0.023
	(0.025)	(0.026)	(0.155)	(0.156)
Bad credit history	−0.103	−0.132	0.088	0.081
	(0.096)	(0.100)	(0.595)	(0.594)
Veteran/Communist	−0.071	−0.071	−0.769	−0.813
	(0.131)	(0.137)	(0.806)	(0.809)
ROA	−0.015	−0.023	0.012	0.058
	(0.126)	(0.132)	(0.789)	(0.793)
Age	−0.077	−0.091	−0.665	−0.593
	(0.119)	(0.125)	(0.743)	(0.746)
Firm age	−0.030	−0.034	0.095	0.092
	(0.037)	(0.039)	(0.230)	(0.231)
Size	−0.070***	−0.057**	0.298**	0.294**
	(0.023)	(0.024)	(0.142)	(0.141)
Export	0.041	0.020	−0.218	−0.261
	(0.087)	(0.091)	(0.543)	(0.544)
Accounting	0.031	0.050	0.302	0.266
	(0.065)	(0.068)	(0.406)	(0.409)
Bribe	0.052	0.053	−0.003	−0.078
	(0.053)	(0.056)	(0.331)	(0.335)
Selection equation instruments				
	Loan approval	Loan approval	Loan approval	Loan approval
Firm is main income	−0.013	−0.010	−0.010	−0.007
	(0.366)	(0.365)	(0.365)	(0.364)
Managerial time	−0.068**	−0.059*	−0.067**	−0.058*
	(0.033)	(0.033)	(0.033)	(0.033)
Observations	978	978	979	979

Notes: This table presents robustness checks for loan terms model. Regressions in columns (1)–(4) are estimated using Heckman estimations. Robust standard errors are reported in parentheses. In all regressions, a constant term, sector, region, and time dummies are estimated but not reported. 'Loan approval' equals one if the firm gets at least one loan, zero if all loan applications are rejected. 'Duration' is the natural logarithm of the reported loan's duration in months. 'Interest' is annual interest rate of the reported loan. 'Business network' equals one if the firm has regular contacts with at least 20 business people and gets assistance from them in the last three months; zero otherwise. 'Official network' equals one if the firm has regular contacts with at least ten bank officials or government officials and gets assistance from them in the last three months; zero otherwise. 'Veteran/Communist' equals one if the owner is a war veteran or a member of the Communist Party, zero otherwise. 'Ethnicity' equals one if the owner belongs to ethnic majority, zero otherwise. 'Education' is the first component of principal component analysis of two variables: (1) basic education, which equals one if the owner finishes high school, zero otherwise; and (2) 'professional education' which equals one if the owner has college or university degree, zero otherwise. 'Previous wage employee' equals one if the owner's previous job is waged employee, zero otherwise. 'ROA' is return on assets. 'Age' is the natural logarithm of owners' age (by the survey year). 'Firm age' is the natural logarithm of firm's age (by the survey year). 'Size' is the natural logarithm of firm's assets measured in million VND. 'Export' equals one if the firm has direct export activity, zero otherwise. 'Accounting' equals one if the firm follows the accounting standard in accordance with government guidelines, zero otherwise. 'Firm is main income' is a dummy that equals one if the owner reports that firm is the main income source, zero otherwise. 'Managerial time' is the percentage of working time spent on dealing with government regulations and officials. 'Bribe' is a dummy that equals one if the firms pay informal fees, zero otherwise. *, **, and *** denote significance at 10%, 5% and 1%, respectively.

ownership to test the interrelationship among gender, social networks, and bank financing.

We employ data from the 2011, 2013, and 2015 results of the Micro, Small and Medium Enterprise Survey in Viet Nam in our analysis. The problems of sample selection bias are addressed by employing the Heckman sample-correction methodology. Particularly, we use the Heckman regressions to distinguish the disparities in: (1) probability of applying for formal loans; (2) loan approval between actual loan borrowers and discouraged borrowers; and (3) loan conditions between successful borrowers and unsuccessful borrowers. In contrast to our expectations, we do not observe the disparity in the number of loan applications made by female- and male-owned firms. This finding could be explained by two reasons. Firstly, entrepreneurs tend to borrow from the informal sector before borrowing from formal credit institutions. Secondly, women entrepreneurs might not apply for bank loans due to their risk-averse behavior (Herslund & Tanvig, 2012) or firm-specific characteristics (Estrin *et al.*, 2013). Thus, gender differences in the number of formal loan applications might not be observed.

We also find that the likelihood of female-owned firms obtaining a bank loan is higher than the male-owned ones. Moreover, interest rates charged to female-owned firms are lower than the ones charged to male-owned firms. Regarding the impact of social capital, firms with closer relationships with government and bank officials are encouraged to apply for bank loans. While there is no evidence that these firms can get bank loans, a good relationship with officials and other business people may help firms to obtain

better deals. Our estimates could be explained by the effects of social capital and female–male partnership. Particularly, better social capital can help firms get better loan conditions as bankers tend to search for extra information about loan applicants through their social ties (Tenev *et al.*, 2003). However, business and official networks are likely to be male-biased. Hence, it could be the case that women entrepreneurs do not benefit from their own social capital but from the heterogeneous networks of their male business partners (Godwin *et al.*, 2006).

These results provide some policy and practice implications. More specifically, firms could make use of their ties with government and bank officials as well as their relationship with other business people to get better loan terms. In addition, female entrepreneurs should extend their partnership with male counterparts to get the most benefit from the social networks. Furthermore, current credit programs with favorable terms targeting SMES are limited to some specific sectors and provinces. Therefore, credit programs should be open to all SMEs in all sectors while loans with favorable terms (e.g., lower interest rates or longer maturity) could be extended.

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Appendix A.

See Table 7.

Table 7
Descriptive statistics for instruments

	Mean (1)	SD (2)	Obs. (3)	Definition (4)
Innovation	0.308	0.462	4,869	One if the firm has introduced new technology or new product, zero otherwise
Share of jobs	0.959	0.439	4,791	Ratio of number of jobs over total number of working-age adults in the household
Apply for informal loan	0.540	0.498	4,869	One if the firm applies for an informal loan, zero otherwise
Firm is main income	0.893	0.309	4,869	One if the owner reports that firm is the main income source, zero otherwise
Managerial time	1.890	2.205	4,852	Percentage of the owner's working time spent each month dealing with government regulations and officials
Bribe	0.471	0.499	3,921	One if the firm pays informal fees, zero otherwise

Notes: This table shows descriptive statistics and definition of instruments used in selection equations. Columns (1)–(4) show mean, standard deviation, number of observations, and variable definition, respectively.

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