Gender and Access to Finance:
Perceived Constraints of Majority Female-owned Indian Firms

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Abstract

Does majority female ownership of firms differ from firms with minority female ownership or male owned firms in terms of perceived constraints about accessing finance? Using World Bank Enterprise Survey (WBES) data for Indian firms, our results show that there is no significant difference in male- and female-owned firms in terms of their perceptions about accessing finance. Yet, this is only true for firms with minority female ownership (less than 50 percent). Firms with majority female ownership do perceive more constraints in accessing finance relative to firms with minority female ownership or zero female ownership. Based on demand and supply side factors relating to business inexperience, weaker networking and lender perceptions as suggested by signaling and gender congruity theories, the results imply that majority female owned firms need to negotiate more for financing access, as they need to display positive signals for those investors who might possess stereotypical and gendered beliefs about abilities of entrepreneurs. We also find in the presence of funding sources being one's own retained earnings or money from family and friends or advances from clients, majority female owned firms do not perceive financial barriers differently relative to male owned firms or firms with minority female ownership.

Keywords: perceptions; accessing finance; female ownership; Indian firms; majority female-owned firms; logit; propensity score matching.

1. INTRODUCTION

A growing literature has looked into the evidence of a possible gender gap in accessing finance for women-owned or women-led businesses (Aristei and Gallo, 2016; Asiedu, Kalonda-Kanyama, Ndikumana, and Nti-Addae, 2013; World Bank, 2011; Becker–Blease and Sohl, 2007). The gendered aspect of entrepreneurial activity specifically as it relates to accessing financial capital has also been explored in studies such as Minniti (2009) and Marlow and Patton (2005). In a broader context, Klapper and Parker (2011) provide an extensive literature survey on gendered differences in business entry (also see Oppedal Berge et al., 2020). What has not been adequately explored is the role that perceived barriers can play in terms of accessing finance among different firms based on gendered ownership. Rather than the actual institutional environment, on many occasions it is the perception of the environment that might affect ventures (Kwapisz, 2019; Shepherd et al., 2015; Krueger, 2008). Shepherd et al. (2015: 35) in this context argue that "it is not so much the objective environment that is an input to entrepreneurial decisions but, rather, the entrepreneur's perception of that environment". Thus, this paper investigates if perceived obstacles in accessing finance can be different among firms with varied levels of female and male ownership.

An upcoming extensive literature is bestowing greater attention to what constitutes the perception of obstacles to innovation for firms' likelihood to innovate and the degree to which firms engage in innovation activities (Chatterjee and Ramu, 2018; Pellegrino and Savona, 2017; Hölzl and Janger, 2014; Mancusi and Vezzulli, 2014; and Iammarino *et al.*, 2009). Yet, as stated by Kwapsiz (2019), we lack a comprehensive understanding of the different perceived obstacles that can affect an entrepreneur (Kollmann et al., 2017). Especially, when it comes to studying obstacles, the access to credit has received attention (Alesina et al., 2013; Muravyev et al., 2009; Treichel and Scott, 2006; to mention a few), but all such studies have considered *actual* obstacles

in terms of accessing finance and not *perceived* obstacles in the context of the same. Yet, studies like Krueger (2008:5) have emphasized that "barriers were clearly in the eye of the beholder." A few studies have tried to find answers in this regard. For example, Roper and Scott (2009) provide empirical evidence based on UK firms that women are more likely to perceive financial barriers relative to men when it comes to business startups.

We contribute to the growing literature on perceived obstacles in the context of entrepreneurship and examine if the perceptions differ based on female or male ownership of firms. Such differences in perception in terms of financial barriers can result out of demand or supply side factors. Women can seek less finance and, thus, perceive barriers differently relative to men due to believing in less need (Orser et al., 2006), lack of business experience including weaker networking (Manolova et al., 2006; Carter et al., 2007; Carter and Shaw, 2006; Heilbrunn, 2004) or not having strong relationships with the lender (Madill et al., 2006). The supply side factors can be associated with established theories of signaling and gender congruity. As shown in the literature including socio-linguistic research, signaling has gender being embedded in them (Talbot, 2010). The importance of signals sent by entrepreneurs is intricately linked with how they are interpreted by the receiver. Male and female entrepreneurs seeking finance might be perceived differently (Croucher et al., 2020; Greene et al., 2001). Studies stressing on signaling theory as well gender congruity theory have suggested that investors may have gendered perceptions and, thus, expect the entrepreneurs seeking funding to be males (Eddleston et al., 2016; Hughes et al., 2012). Investors and venture capitalists are predominantly men (Brush et al., 2002) which can strengthen gender bias. In this context, a vast strand of studies have shown that bank financing obtained by entrepreneurs is dependent on signaling, which, in turn, is contingent on a venture's viability and the entrepreneurs' commitment to business (Mascia and Rossi, 2017; Ozmel et al.,

2013; Busenitz, Fiet and Moesel, 2005; Reuber and Fischer, 2005; Prasad et al., 2000). Related to this, as suggested by the signaling and gender congruity theories, the gendered and stereotypical beliefs can differ about the abilities of male and female entrepreneurs (see, for example, Balachandra, Briggs, Eddleston and Brush, 2019; Eddleston, Ladge, Mitteness and Balachandra, 2016; Gupta et al., 2009; Ahl, 2006; Eagly and Karau, 2002).

The combination of these factors can potentially result in female owned firms perceiving more constraints in accessing finance compared to male owned firms. But the difference might only be meaningful or significant in the context of female majority firms. In the presence of minority female ownership, both demand and supply side factors can still work in favor of those firms as they can potentially send similar signals as firms with all male ownership. When females occupy the majority in ownership, it is reasonable to assume that they play a prominent role in decision making and, thus, might be facing the gendered constraints arising out of demand or supply side factors.

Our paper focuses on the extent of female ownership matters when it comes to perceiving financial barriers. As recent studies have pointed out, a fine-grained analysis is called for when studying the role of gender in the context of entrepreneurial hurdles. Jennings and Brush (2013) point out that a fine grained analysis has provided evidence of a 'more subtle, residual and 'second order' form of gender-based differential treatment" (Jennings and Brush, 2013, p 23). Our paper stresses that it is important to consider the degree of female ownership and it is only when females own majority ownership (>50%), a significant difference in perceived financial barriers appears. Perceiving such differences may not be contingent on male and female ownership of firms as investigated so far in the literature. Minority female owned firms may not experience the demand and supply side constraints due to gaining experience from their majority male counterparts,

benefitting from networking and not necessarily experiencing gendered perceptions from investors as females might be taking decisions along with males who are seen as able entrepreneurs. But for majority female owned firms, the demand and supply side constraints can become more prominent. Since females might be involved in greater part of the decision making, inadequate experience, lacking networking and facing gendered perceptions about abilities of an entrepreneur along their commitment to business (Ozmel et al., 2013; Busenitz, Fiet and Moesel, 2005; Reuber and Fischer, 2005; Prasad et al., 2000). Thus, such firms facing difficulties while acquiring finance are likely to perceive more constraints.

As part of our secondary analysis, we investigate funding sources of firms and how that interacts with majority female ownership to affect perceived constraints. Fraser (2005), for example, has shown that for UK SMEs, the dominant source of funding is personal loans. Studies have also shown that males in general benefit from social capital ties since they tend to have more business and official-related networks relative to females for whom family and friends dominate (Stenbacka and Tillberg Mattsson, 2009; Moore, 1990). Accordingly, women might rely more on funding from family or friends or their own savings when it comes to funding their businesses. Barclays (2001) point out that lack of support may act as a barrier for female entrepreneurs including financial obstacles (Brüderl and Preisendörfer, 1998). We consider different sources of funding – one's own retained earnings, support from family or friends or advances from clients – to explore if that alleviates the perceived financial barriers of firms with majority female ownership.

Summarizing the main contributions, our paper re-investigates the relationship between access to finance and gendered outcomes. First, building on the literature that have explored actual outcomes with respect to financial barriers, our paper adds to the scant upcoming literature

investigating *perceived* outcomes. As mentioned by Kwapsiz (2019), we are yet to achieve a rigorous understanding of *perceived obstacles* in affecting entrepreneurial outcomes. Second, we emphasized the need of a nuanced fine-grained analysis in the context of gendered outcomes as pointed out by earlier studies (Jennings and Brush, 2013). We stress the need to consider the degree of female majority ownership rather than just comparing male and female owned firms. Our findings imply that firms with majority female ownership perceive more financial barriers relative to not only male owned firms but also for firms with minority female ownership. Third, our paper adds to the set of studies on India that have documented evidence of gendered inequality and gendered norms in several outcomes (Rammohan and Vu, 2018; Milazzo, 2018; Kugler and Kumar, 2017; Banerjee, 2014). Very few studies like Belitski and Desai (2021), Chaudhuri, Shashidharan and Raj (2020), Moro et al. (2017) and Kantor (2005) have looked into gendered outcomes with regard to accessing credit. But we differ from those studies since we consider perceived outcomes and not actual outcomes. Additionally, they also consider male and female ownership without getting into the nuances of the degree of female ownership.

Finally, in recent years, the new Companies Act was introduced that has mandated at least one woman on the board of directors, and the companies are required to comply by March 2015 (Kishore, 2015). While our data does not extend till 2015, it definitely spans over a period after the mandate was passed that might have changed ownership structure for many firms included in our sample. The empirical analysis of Indian firms in terms of gendered outcomes becomes necessary covering time periods post mandate to assess if the directive is having any real impact. In the face of such directives, majority female owned firms perceiving greater constraints might also imply more women getting the confidence to speak up and expressing their concerns. Following the literature on sources of funding, we do provide support to existing findings that in

the presence of funding sources being one's own retained earnings or money from family and friends or advances from clients, majority female owned firms do not perceive financial barriers differently relative to male owned firms or firms with minority female ownership.

Section 2 elaborates on the literature and hypothesis building. In Section 3, we talk about the data sources and our sample. The empirical specifications along with methodology are clarified in Section 4. Benchmark results are described in Section 5, followed by the robustness analysis including identification in Section 6. Section 7 summarizes the paper.

2. THEORY AND HYPOTHESIS

A recent literature has focused on investigating firm and market attributes that can shape perceptions about different types of barriers for firms (Cole, Cumming and Li, 2016; D'Este et al., 2014; Hölzl and Janger 2013, 2014; D'Este et al. 2012; Iammarino et al. 2009). Pellegrino (2018) points out that perceived obstacles form a significant part of revealed barriers for firms in the context of innovation. Pellegrino explains that revealed barriers are the ones faced by firms that provide hindrances or blockages in firm's activities like innovation but does not stop it altogether. Among such perceived obstacles as revealed barriers, financial barriers constitute a significant part (Morsy, 2020; Pellegrino, 2018; D'Este et al., 2012).

What constitutes such perceptions about financial barriers in the context of firms? We bring in the role of female and male ownerships and use Indian firm level data to explore this missing link in the literature. The empirical literature has ambiguous findings as far as financial constraints, and the role of gender are concerned. According to Brown et al. (2011), the mixed evidence can be the result of country-specific attributes and institutional factors. The measure of credit constraint can also determine the gender gap in the same context (Hansen and Rand, 2014;

Muravyev et al., 2009). Presbitero et al. (2014) have also pointed to the importance of firm's gender structure in this context.

Existing literature on gender and access to finance are mostly limited to the developed country context like the US (Pham and Talavera, 2018). Since both formal and informal institutions differ significantly in the developed countries relative to developing countries, more research is needed employing data from developing countries (Pham and Talavera, 2018; Hughes, Jennings, Brush, Carter, & Welter, 2012). More recent studies have looked into the relationship between firm performance and gender for developing countries. Wang, Wilson and Li (2021) show for Chinese firms that gender diversity in the board of governors of firms is associated with better corporate environmental responsibility. Employing data from developing economies, Islam, Gaddis, Palacios-Lopez and Amin (2020) find labor productivity gap between female owned and male owned firms. Essers, Megersa and Sanfilippo (2021) find similar differences in productivity between female and male owned firms for Ethiopian manufacturing firms, whereas Johan and Valenzuela (2021), using Chilean evidence, show that, in order to grow, an entrepreneur needs to (or is advised to) cut female employment. On the other hand, Strøm, D'Espallier and Mersland (2022) find that in the presence of a female CEO of the lending institution, women face less problems with regard to acquiring finance. Adding to these recent strand of studies, this paper uses firm level data from India to explore how the extent of female ownership of firms affects perceived obstacles about accessing finance.

Perceptions about financial barriers in the context of firms can arise from both demand and supply side factors for females. In a pioneering work, Becker (1971) emphasized taste-based discrimination arising from cultural and institutional factors (also see Cosh, Cumming, and Hughes, 2009, for several factors that affect rejection rates in applications for external finance).

Various studies have extended this argument to bank-level discrimination against loan applications from women-led businesses. Further, lenders might engage in statistical discrimination (Arrow, 1973) by using personal characteristics like gender and believe that women are more likely to default. The demand-side factor stresses the lower number of credit applications from women-led businesses due to the fear of refusal (see Wilson et al., 2007). Lower demand for credit by women-owned firms arises due to certain characteristics such as small size of business, "risk aversion," "perceiving themselves to be less creditworthy" (Watson and Robinson 2003), "perceiving financial barriers that do not exist," "lack of self-confidence" (Roper and Scott, 2009), and sector of activity.

This study adopts a signaling theory approach to investigate how women and men present their venture concepts when approaching investors and how these signals are interpreted by the receiver. Signaling theory focuses on the credible communication of information to convey positive organizational attributes in situations with asymmetric information (Spence, 2002) and has been applied in studies on entrepreneur–investor relationships (Busenitz, Fiet, & Moesel, 2005; Davila, Foster, & Gupta, 2003; Elitzur & Gavious, 2003). Entrepreneurs can communicate credible signals regarding the venture's prospects and their commitment to attract the interest of venture capitalists and other potential investors (Busenitz et al., 2005). For instance, important signals to investors are the founder's individual reputation based on previous performance (Ebbers and Wijnberg, 2012), their own investment (Prasad, Bruton, and Vozikis, 2000), the perceived legitimacy of their top management team (Cohen and Dean, 2005), their social capital (Khoury, Junkunc, & Deeds, 2013), and engagement in trust-building behaviors (Maxwell and Levesque, 2014).

Using India's firm-level cross-sectional survey dataset that can reveal the perceived constraints that firms encounter, we provide evidence for gender congruity and signaling theories. Based on these theories, the stereotypical beliefs can differ about the abilities of male and female entrepreneurs (see, for example, Balachandra, Briggs, Eddleston and Brush, 2019; Eddleston, Ladge, Mitteness and Balachandra, 2016; Gupta et al., 2009; Ahl, 2006; Eagly and Karau, 2002). Thus, even with some form of female ownership, male majority ownership may not be susceptible to biased perceptions. But it can be the reverse in the case of firms dominantly owned by females. Due to gender stereotypes, such firms might fail to successfully send positive signals and, thus, face increasing difficulty in accessing finance.

Hypothesis 1: Majority female owned firms perceive greater obstacles in accessing finance relative to male owned firms or firms with minority female ownership

Our secondary hypothesis considers sources of funding for finance as channels and explore if that can affect the relationship in our primary hypothesis. Literature has shown that retained earnings[1] constitute a significant portion of financing for female owned firms (Muravyev, Talavera and Schäfer, 2009). In the context of SMEs, Galli et al. (2020) test the existence of possible gender biases affecting firm behavior in demanding and obtaining bank finance using a cross-country sample of European SMEs. In the Indian scenario, Baker, Kumar and Rao (2020) explore the role of one's own funds or retained earnings for SMEs. Using data for Jiangsu Province of China, Zhang et al. (2016) have shown that more than 80% of venture capital funding belong to the female entrepreneurs. The other sources of funding for female entrepreneurs that have been explored in the literature are finances acquired from family and friends. Cai et al (2005) show that starts ups for businesses by females are often supported by family and friends. Other studies have also shown that due to fear of borrowing, female entrepreneurs prefer to seek funding from family and friends

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[1] Literature has shown that firms with self or internal funds can have better performance (Mallick and Yang, 2011).

(Verheul and Thurik, 2001). A more recent paper has also shown that female entrepreneurs are less likely to seek external financing (Wang, Cai, Zhu and Deng, 2020). Other than considering one's own funds or retained earnings and funds from family or friends, we also consider advances from clients as another funding source. In the presence of availability of internal funds (own funds or retained earnings), financial support from family or friends and even advances from clients, majority female ownership firms are likely not to experience the demand and supply side constraints of acquiring external finance and, thus, will perceive less or no constraints. This should make those firms not different from male owned firms or firms with minority female ownership.

Hypothesis 2: Sources of funding in the form of internal funds and support from family, friends or clients should mitigate perceived financial barriers for female majority firms.

The above hypotheses between gender and financing constraints can reveal whether lenders discriminate against women solely on the basis of gender or there are mitigating factors as discussed above that women-run firms can take advantage of, in accessing formal financial market.

3. DATA DESCRIPTION AND THE SAMPLE

3.1. The Data Source

All our data come from World Bank Enterprise Surveys (WBES) which is a popular data source in the entrepreneurship literature for empirical analysis based on firm level data (Williams and Kedir, 2019; Adegboye and Iweriebor, 2018; Page and Söderbom, 2015; Eifert, Gelb and Ramachandran, 2008). The surveys are conducted at the firm-level consisting of representing sample of an economy's private sector (World Bank Enterprise Surveys, 2021). Information on firm performance and firm characteristics are included in the surveys. These can range from questions on firm's age, size, location, sales, infrastructure, management practices, business-government relations, regulations and competition. Other than these topics, a broad range of

questions are asked on firms' perception about different kinds of obstacles in terms of accessing finance, corruption, and other infrastructure related obstacles. As stated by Enterprise Surveys (2021), any formal private sector business with more than 1 percent private ownership and having greater than five employees are included.

The Enterprise Survey (ES) methodology constitutes a consistent definition of the universe of inference along with a uniform methodology of implementation as well as a standard sampling methodology (Islam, Muzi and Meza, 2018). In each country, the selection of firms is based on stratified random sampling with three levels of stratification: sector of activity, firm-size, and location within a country. To correct for unequal probability of selection as well as to account for ineligibility and non-response, sampling weights have been used (Islam, Muzi and Meza, 2018).

3.2. Our sample

For our empirical analysis, we consider the most recent wave of data covering a cross section of Indian firms across 23 major Indian states for the year 2014. A panel firm level analysis will be ideal, but the incompatibility or non-availability of our questions of interest over the years makes it challenging to consider a panel dataset. WBES has survey data available for firms in India for years 2005, 2009 and 2010. The year 2014 is the first wave of data where the interviewers asked the specific question – "how much of an obstacle is access to finance" – which is our dependent variable and the respondents reply with different degrees of difficulties. In the 2010 wave, respondents were asked to mention any obstacle they face. While obstacle in accessing finance is an answer provided by the respondents in 2010, the degree of the perceived obstacle is not mentioned and, thus, we are unable to use 2010 along with 2014 data. Additionally, there is data for 67 firms only who mentioned 'yes' in 2010 dataset. So not only our variable of interest is not comparable over the years, the number of observations drops significantly too, which prevents us

from creating a panel. For the 2005 data, there are about 2275 firms in the survey and out of that, about 11% have female ownership. While the percent of female ownership is not drastically different between 2014 and 2005, 12% of the total observations come to just about 272 data points which also make a panel analysis challenging. Among the 272 observations, defining majority based on variation in female ownership will shrink the number of observations drastically further. Thus, we stick to the firm level data for the year 2014.

As stated by the World Bank, the firm level data in India has been collected between June 2013 and December 2014. The data sample includes firms in the manufacturing and the service sectors and aims to quantitatively assess firm performance, firm structure and firms' perceptions of the obstacles in their growth process. A three level stratified random sampling method has been employed for data collection, making sure that the collected sample provides unbiased estimates for the whole population and that the sample is representative of industries, sectors and regions (WBES, 2014).

Private contractors are hired by the World Bank to conduct the surveys. Due to the sensitive nature of questions relating to business-government relations, private contracts are preferred to government agencies conducting the surveys. The interviews are conducted in local languages. A two-stage procedure is implemented while collecting the responses. The first stage consists of a screening questionnaire, applied over the phone to schedule appointments and also to assess eligibility. A face to face interview is conducted in the second stage with either the manager, owner or the director of the firm (establishment). The sample, consisting of 9281 firms, spans across 23 states and 26 industries. Major manufacturing and service industries like food, textiles, garments, leather, wood, paper, chemicals, hotels and restaurants are included.

3.3. Dependent Variable

Based on our hypothesis, the main dependent variable of interest measures perceived difficulties in accessing finance by firms. It is constructed based on the question "how much of an obstacle is access to finance". As the survey report states, access to finance includes availability as well as cost, interest rates, fees[2] and collateral requirements. Based on the degree of perceived obstacle, the answers can be - no obstacle, minor obstacle, moderate obstacle, major obstacle and very severe obstacle. The mean of the variable is around 1.2. For our benchmark analysis, we construct a dummy assigned 1 for firms whose magnitude of perceived obstacle in accessing finance is above sample average. Based on the responses, we can think of the responses to be ranging from 0 to 4, with 0 being *no obstacle*, 1 being *minor obstacle*, 2 being *moderate obstacle*, 3 being *severe obstacle* and 4 being *very severe obstacle*. Our sample mean is 1.15. Our constructed dummy for firms' perception about difficulties in accessing finance is assigned 1 for values above 1.15, and 0 otherwise. As part of robustness analysis, we also check the results with the ordered dummy ranging from 0 to 4. The summary statistics of our variables of interest is presented in Appendix 1. We present means, medians, standard deviations along with minimum and maximum values of our main variables of interest. About 14% of the firms in our sample

[Insert Appendix 1 about here]

report having *very severe or severe obstacle*, and about 20% of firms in the sample report having *moderate obstacle*.

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[2] We are aware that since, based on the definition provided in the database, access to finance includes factors like cost, interest rates, fees and collateral requirements, it specifically implies access to credit. However, since the database uses the terminology finance, we stick to that term as well. Other papers like Adegboye and Iweriebor (2018) have also used the same variable from WBES labeling it as 'access to finance'.

3.4. Independent Variables

Our hypothesis aims at testing if, compared to firms with majority female ownership, firms with minority female ownership perceive less constraints in accessing finance. This also encompasses assessing empirically if majority female owned firms view obstacles to be severe relative to male owned firms. Based on our hypothesis, we expect majority female-owned firms to perceive greater constraints in accessing finance compared to firms with male ownership, along with female owned firms with minority female ownership. To test this, we consider the variable female ownership from the database which is a dummy indicating if a firm has female ownership or not. Since the dummy does not give us information about the breakdown of female-male ownership within a firm, we consider the variable percent of female ownership which provides the information on the extent of female ownership in a firm. Based on our sample of 9097 firms, about 13.6 percent of firms have more than zero percent of female ownership. As evident from the 'percent female ownership variable', female ownership can vary from 1% to 100% for firms with female ownership. Among firms with female ownership, about 11 percent of firms are 1005 female owned, relative to the full sample of 9097 firms.

To address the question specifically if majority and minority female ownerships matter in terms of perceiving obstacles differently, we construct several dummies with different thresholds indicating majority or minority female ownership. The dummies considered are firms with 60% or more female ownership, firms with 70% or more female ownership, firms with 80% or more female ownership, firms with 90% or more female ownership and firms with 100% female ownership. To make sure that our results hold for male owned firms and firms with minority female ownership, we also construct those dummies accordingly. Minority female ownership is considered for firms with 50 percent or less female ownership. As we can see from Appendix 1,

the average percentage of female ownership in firms is about 5%. About 1.7% firms have female ownership to be above 60%.

3.5. Control Variables

Actual outcomes related to access to finance is significantly explored in the literature. As mentioned earlier, another strand of recent literature is investigating how perceptions about accessing finance is affected by different factors. We take into account both these literatures while choosing the controls. Many studies have suggested that small firms face stronger growth obstacles and have less access to external finance (Beck and Demirguc-Kunt, 2006; Galindo and Schiantarelli, 2003; Berger and Udell, 1998). While controlling for firm size in terms of employees will be meaningful, WBES survey for India does not provide that information. Instead, it categories firms into small - having more than 5 but less than 19 employees, medium – more than 20 but less than 99 employees, and large – more than 100 employees. Existing studies have also controlled for size categories (Lee, Sameen and Cowling, 2015). We have about 22 percent large firms, 44 percent medium firms and about 33 percent small firms in the sample. We also control for firm age. As mentioned by Lee, Sameen and Cowling (2015), older firms are likely to have rooted business models and, thus, can be less risky. Also, older firms are able to access finance easier especially during recessions (Cowling et al., 2012). In order to account for yet another variable indicating an established firm, we include the number of full time employees since the firm started operating.

The WBES does not provide direct information on profitability of firms. Studies have shown that there is a positive association between sales and profitability (Mallick and Yang, 2011). We control for what percent of sales constitutes national sales. Additionally, better performing

firms are more likely to export (Webster and Piesse, 2018). We, thus, control for the percent of sales meant for exports. The relationship between firm exports and profitability is ambiguous in the literature with the findings ranging from being positive, negative or insignificant (Yang and Mallick, 2014, 2010; Vu, Holmes, Lim and Tran, 2014; Fryges and Wagner, 2010; Lu and Beamish, 2006). Studies have also suggested that for firms with quality certification, the probability of facing financial constraints is lower (Gopalan and Sasidharan, 2020). We control for a dummy indicating if the firm has international quality recognition or not. Being part of a larger establishment should also alleviate financial constraints of firms. Thus, we control for such a dummy as well. For all our specifications, we control for industry fixed effects and state fixed effects. Such fixed effects should take into account heterogeneity across industries and states that might have better access to finance. Also, geographical advantages like being located in a capital or in the main business location of the establishment should also be accounted for in state fixed effects.

Finally, we control for characteristics of the respondent. Specific characteristics like sex of the respondent, education level, rank and years of experience should affect the responses and, thus, the degree of perceived constraint in accessing finance (Galli, Mascia and Rossi, 2020). The survey does not provide information on education of the respondent. Since there are missing responses with regard to the rank of the respondent, for our benchmark analysis we control for gender of the respondent as well as the number of years the respondent is associated with the firm. We present correlation matrix in Appendix 2. We also check the Variance Inflation Factor (VIF) for all our co-variates to make sure that our estimates are not compromised due to multicollinearity issues. All variables are described in Appendix 3.

[Insert Appendix 2 and 3 about here]

4. Empirical Specifications and Methodology

4.1. Estimated Specifications

Our baseline specification consists of testing the following

$$\text{Accefin}_{ijs} = \alpha_0 + \alpha_1 \text{femown}_{ijs} + \sum_{k=1}^{K} \beta_k X_{kij} + \alpha_2 \rho_i + \alpha_3 \theta_s + \epsilon_{ij} \qquad (1)$$

where Accefin_{ijs} is the dummy variable representing perceptions about accessing finance, as described above, for firm i in industry j in state s. A binary variable is constructed and assigned 1 for values greater than our sample average[3] in terms of perceived financial barriers, 0 otherwise. Femown represents the dummy indicating female ownership, 0 otherwise. Note that female ownership being more than zero percent female owners in a firm does not take into account the extent of female ownership. X_{kij} denotes the matrix of control variables. The benchmark controls are firm size (dummies for medium and large firms using small firm dummy as the baseline), age of the firm, percent of sales as national sales, percent of sales for exports, whether the firm has international quality certification, number of full time employees the firm had since it started operating, if the firm is part of a larger firm (establishment), gender of the respondent and number of years the respondent is working in the firm. ρ_i represents the industry fixed effects and θ_s represent the state fixed effects.

Our benchmark specification is as follows

$$\text{Accefin}_{ijs} = \alpha_0 + \alpha_1 \% \text{femown}_{ijs} + \sum_{k=1}^{K} \beta_k X_{kij} + \alpha_2 \rho_i + \alpha_3 \theta_s + \epsilon_{ij} \qquad (2)$$

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[3] Based on the question asked in the survey, the variable ranges from 0 to 4 with 0 being no perceived barrier for a firm in terms of accessing finance and 4 will mean the strongest perceived obstacle. Based on the mean of this variable, we construct the binary variable for our baseline and benchmark results. As part of robustness analysis, we do check our findings with the ordered dummy variable as well.

Here we consider percentage of female ownership in a firm as our main variable of interest. Based on our hypothesis, it is not just female ownership but the percentage of female ownership that matters in terms of perceiving financial barriers.

To further explore our conjecture, we consider the following specification

$$\text{Accefin}_{ijs} = \alpha_0 + \alpha_1 \text{majfemown}_{ijs} + \sum_{k=1}^{K} \beta_k X_{kij} + \alpha_2 \rho_i + \alpha_3 \theta_s + \epsilon_{ij} \qquad (3)$$

In equation (3), we consider dummies indicating majority female ownership. As stated earlier, these dummies consider different thresholds - >60%, >70%, >80% and >90%. We also consider 100 percent female ownership and 0 percent female ownership to make sure our results are consistent. Finally, to add further to the robustness, we consider minority female ownership dummies indicating <50% and <30% ownership.

$$\text{Accefin}_{ijs} = \alpha_0 + \alpha_1 \text{majfemown}_{ijs} + \alpha_2 (\text{majfemown} * \text{fund})_{ijs} + \alpha_3 \text{fund}_{ijs} + \sum_{k=1}^{K} \beta_k X_{kij}$$
$$+ \alpha_2 \rho_i + \alpha_3 \theta_s + \epsilon_{ij} \qquad (4)$$

As explained we interact funding sources with the female majority ownership dummies to show heterogeneity among these female majority firms who could be unconstrained.

4.2. Empirical Methodology

To empirically assess the relationship, we start with logit specifications following studies (using firm level data) such as Wellalage and Thrikawala (2021), Dutta, Kar and Beladi (2021), Webster and Piesse (2018) and Swamy et al. (2001). In the presence of binary dependent variables, ordinary least squared (OLS) method is likely to suffer from challenges like predicted probabilities lying outside the unit interval. Logit estimators, similar to Probit, use Maximum Likelihood Estimation (MLE) but use a logistic distribution function of the error terms.

The initial specification can be written as

$$\Pr(Accefin = 1) = F(\hat{X}\,\Omega) \qquad\qquad (5)$$

$\Pr(Inno = 1)$ is the probability whether a firm perceives financial barrier or not. The success event can be considered to be a firm perceiving financial barrier. As mentioned in the data section, success will imply perceiving above average levels of financial barrier based on the sample mean. F is the cumulative standard logistic distribution, X is the vector of explanatory variables and Ω is the vector of coefficients to be estimated. Firm's probability to perceive financial barriers will depend on an unobservable latent (disutility) index I_i which, in turn, is determined by an array of explanatory variables. The model we estimate can be written as $\Pr(Accefin_{ijs} = 1|X_{ijs}) = \Phi(\beta X_{ijs})$. Our hypothesis is formulated in equations (1) to (4) that is empirically tested via a logit fixed effect model. Fixed effects take into account invariant industry and state fixed effects. As part of robustness analysis, we elaborate on identification strategies for our empirical analysis.

5. Benchmark Results

Table 1 presents the first set of our benchmark results consisting of logit estimates. As mentioned earlier, we start our analysis considering a dummy assigned 1 for firms perceiving greater than average perceived constraint in accessing finance, 0 otherwise. The average is based on the ordered dummy variable ranging from 0 to 4 with higher values suggesting stronger perceptions. Considering a binary dependent variable makes the interpretations easier in terms of the comparison groups and, thus, clarifying the hypothesis. As part of the robustness analysis, we do present the results with the ordered dummy variable.

In Table 1, we present the results for specifications (1) and (2). Based on our hypothesis, the percent of female ownership matters in terms of perceiving stronger constraints and not just if

a firm has any female ownership or not. Since the starting point for many studies in defining female ownership is to have at least one female owner (Hansen and Rand, 2014; Aterido, Beckand Iacovone, 2013), we do check our hypothesis with female owned firms versus male owned firms in columns (1) and (2). The coefficient of *fem-owned* is not significant which conforms to our hypothesis. Firms with male ownership may not perceive constraints in accessing finance since they are likely to experience less information asymmetry when it comes to evaluating the commitment, viability and stability of ventures (Balachandra, Briggs, Eddleston and Brush, 2017; Eddleston, Ladge, Mitteness, and Balachandra, 2016; Connelly, Certo, Ireland, and Reutzel, 2011). This can be true also for firms with some female ownership but, with majority male ownership, males might still be the ones who are seen as able and competent entrepreneurs (Powell and Butterfield, 2003; Powell, Butterfield and Parent, 2002). Thus, such firms are likely to acquire the needed finance without facing significant hardship.

[Insert Table 1 about here]

To delve into the focus of our hypothesis, we consider percent of female ownership as the independent variable in columns (3) and (4). We find the variable to be positive and significant. The findings, supporting our hypothesis, suggest that as firms have increased their female ownership, they might need to signal stronger relative to firms with all male ownership or minority female ownership, to reduce information asymmetry when they are being evaluated in terms of their commitment, viability and stability of ventures (Balachandra, Briggs, Eddleston and Brush, 2017; Eddleston, Ladge, Mitteness, and Balachandra, 2016; Connelly, Certo, Ireland, and Reutzel, 2011; Jain et al., 2008; Busenitz et al., 2005; and Spence, 2002). The female owners might need

to try harder to break gender stereotypes about their abilities of being entrepreneurs compared to their male counterparts (Powell and Butterfield, 2003; Powell, Butterfield and Parent, 2002).

As we know, in the presence of logit regressions, the estimated coefficients cannot be meaningfully interpreted (Webster and Piesse, 2018; Fernández-Val, 2009). Keeping space constraint in mind, we only report the marginal estimates for our main variable of interest at the bottom of the table. We do this for all our Tables. The marginal estimates for our control variables are available upon request[4]. The marginal effects for the variables based on the results of the remaining tables are also available upon request. Based on the marginal effects, we find that for one percent rise in female ownership, firms' probability to perceive stronger obstacles goes up by less than 1%. Economically, the impact is small but we expect that since the extent of female ownership matters – we hypothesize the impact to be stronger for female majority firms which we describe in the subsequent analysis below.

Given that the percent of female ownership does not define a majority, we continue our analysis by constructing dummies categorizing different comparison groups and thus, to be able to define counterparts in terms of our findings clearly. This consists of different degrees of female ownership including 100 percent female ownership, minority female ownership and no-female ownership. In Table 2A, we compare the polar opposite groups – 100 percent female ownership and zero female ownership or male owned firms. Column (1) considers firms with 100 percent

[Insert Table 2A about here]

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[4] We once again remind our readers that the economic significance of the controls cannot be interpreted based on the presented coefficients. For logit models, marginal effects need to be estimated. The marginal effects of control variables are available upon request for all our results.

female ownership, while column (2) presents results for male owned firms or firms with zero female ownership. The marginal effects for the female ownership dummies are included in the table. The results further support our conclusions. For 100% female owned firms, perceived constraints in accessing finance are almost 10% stronger compared to firms having some male ownership (greater than zero) as well as 100 percent male owned firms. Based on column (2) results, we find that male owned firms do not perceive such constraints significantly.

In Table 2B, we check our results with additional dummies representing different levels of female ownership. We construct a dummy representing greater than 60% female ownership in column (1). In columns (2), (3) and (4), we consider dummies representing greater than 70%, greater than 80% and greater than 90% female ownership respectively. The marginal effects are reported at the end of the table. We find that the marginal effects are significant for all the specifications. For 60% female ownership, the impact is the smallest compared to the magnitude in columns (2), (3) and (4). Firms with 60% female ownership perceive accessing finance difficulties about 7% more than firms with less than 60% female ownership. Based on marginal effects in columns (2), (3) and (4), the impact is between 8% and 8.5%. This is to be expected since we expect the magnitude of perceived constraints to increase with higher percentage of female ownership. Thus, the results support our hypothesis.

[Insert Table 2B about here]

Finally, in Table 2C we consider dummies indicating minority female ownership. The dummies represent less than 50%, less than 40% and less than 30% female ownership in columns (1), (2) and (3) respectively.

[Insert Table 2C about here]

6. ROBUSTNESS ANALYSIS

6.1. Source of Funding

Our secondary hypothesis consists of checking if sources of funds mitigate or take away the perceived constraints of firms with female majority – the sources, as discussed in our hypothesis, are capital borrowed from friends or family, one's own funds and/or retained earnings or being able to acquire capital in advance from clients or customers. We explore specification (3) stated in Section 4. The results are presented in Table 3. In columns (1), (2) and (3), we consider greater

[Insert Table 3 about here]

than 60% female ownership. The source of funds considered in the three columns are one's own funds or retained earnings, finance taken from friends or family and advances from clients or suppliers respectively. In columns (4), (5) and (6), the same three funding sources are considered for 100% female ownership. We interact majority ownership dummies with source of funds to test our secondary hypothesis. The interaction term is not significant in any of the specifications. As explained before, it is to be noted that in the presence of an interaction term, both the interpretations and statistical significance levels are no longer as straightforward. A stand-alone variable and a variable appearing in the interaction term produce a combined effect that could have a different level of significance than either of the variables individually. This significance may also depend on the level of the underlying conditioning variable – in this case, the source of funding (Hainmueller, Mummolo, and Xu, 2019; Berry, Golder, and Milton, 2012; Brambor, Clark, and Golder, 2006; and Braumoeller, 2004). The estimated marginal effect is given by $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}} = =$ $\alpha_1 + \alpha_2 \text{fund}_{ijs}$. We present the marginal effects for 10% and 90% value of the funding source. The idea is to see if the sign and significance of $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$ changes for the entire range of the

conditioning variable for all sources of funding and for both majority female ownership dummies. We find that at the 10% level of each source of funding, $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$ is positive and significant suggesting that majority female ownership firms continue to perceive such barriers significantly when funding sources like one's own funds or retained earnings, funds from family and friends or advances from clients are low. In terms of economic significance, for example, when firms have low levels of such funding (own funds) the impact is about 14% for firms with 60% majority female ownership. But the significance of $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$ goes away as percentage of this funding type goes up. In the context of source of funds being family or friends or advances from clients, 60% majority female-owned firms perceive 7 and 9% stronger perceptions respectively when such funds are relative to firms that do not have such level of female ownership. The marginal effects as we see from the Table for 100% female owned firms are qualitatively similar. This provides support to existing findings (Roper and Scott, 2009; Cai et al, 2005; Verheul and Thurik, 2001). Keeping space constraint in mind, we do not report the results for the remaining majority ownership dummies but they are available upon request.

6.2. Other Robustness tests

Our results can be biased due to the presence of outliers. We consider robust regression to take this into account. We consider greater than 60% female majority dummy as well as 100% female ownership dummy. We also check the results with the other majority ownership dummies. Keeping space constraint in mind, we do not report the results but they are available upon request. Our results remain robust. For all majority female ownership dummies, firms perceive greater financial constraints.

Throughout the analysis, we have considered the binary dummy as our dependent variable as a measure of perceived financial barrier. We check our benchmark results with the actual variable based on which the dummy variable is constructed. The variable varies from 0 to 4 with 0 indicating firms expressing no perceived constraint in accessing finance and 4 indicates the maximum perceived barrier. We consider ordered logit regressions for all our majority female ownership dummies as well as 100% female ownership and 0% female ownership dummies. Our results remain robust. Further, we also consider robust regressions for the alternate dependent variable. The results remain robust. Finally, we also check our results by winsorizing the data to take into account missing observations. We consider the 10th percentile to be our trimming threshold. This implies that extreme values in the sample are replaced by the 10th percentile instead. We check our results for 60% majority ownership along with 100% female ownership dummies. Our results remain robust.

6.3. Identification

6.3.1. Identification issues and Challenges with IV estimates

Our main variable of interest can suffer from endogeneity. If perceived financial barriers change, that can affect the extent of female ownership in firms. Thus, female ownership can suffer from bias arising from reverse causality. Further, endogeneity can also arise because of omitted variable bias. Not controlling for variables that can affect perceived financial barriers will result in omitted variable bias and our main estimates can be biased. Although we have controlled for a vast array of variables, omitted variable bias can still arise due to factors that can affect firms' perceptions about access to finance. Additionally, as pointed out in Mallick and Yang (2013), models like logit or probit do not allow sufficient heterogeneity of firms. They impose the same behavioral model on all firms. Propensity score matching helps mitigate sample selection bias by creating a carefully

matched sample group (Webster and Piesse, 2018; Mallick and Yang, 2013). Perceptions about financial barriers and the extent of female ownership can be simultaneously determined and, thus, Borin and Mancini (2016) also advocate the use of propensity score matching under such circumstances. We talk about addressing such endogeneity concerns below.

To resolve biases arising out of reverse causality, Instrumental Variable (IV) estimation is the ideal estimation methodology. Yet, such estimation needs efficient instruments that should fulfill the externality conditions. We need to find instruments that are correlated with female ownership dummies but should not affect perceptions about financial barriers and, thus, should be independent of the error term. Some studies on female leadership at the firm level and the impact of firm related outcomes have provided us with credible instruments. For example, Flabbi et al (2019) use beginning of the period female leadership measures and interact those with growth in female leadership measures at the regional level. Given that our data is not a panel, we are unable to employ any lagged instruments by year. Additionally, we do not have any information on firm leadership over period. Another study by Amore, Garofalo and Minichilli (2014) investigating profitability and performance of female-led Italian companies, uses family characteristics as instruments. We also do not have such information in our database. Thus, for our present empirical analysis we are unable to employ IV estimation. We address endogeneity concerns arising out of omitted variable bias and sample selection bias below.

6.3.2. Omitted Variable Bias

As mentioned, not controlling for variables that affect perceptions about financial barriers can bias our main results. To maximize sample size, we stick to the benchmark set of controls mentioned above. In this section, we control for additional variables.

One such set of variables is the firm's need for loans. Whether the firm has an outstanding loan or not should definitely affect the firm's perceptions about financial barriers. The survey asks if the firm has a line of credit or loan from a financial institution or not. We check our benchmark results controlling for a dummy assigned 1 if the firm does have a line of loan or credit, 0 otherwise. We further control for a dummy assigned 1 if the firm has applied for a loan last year, 0 otherwise. A recent need for a loan might strengthen the perceived barriers. We consider the dummies indicating >60% female majority and 100% female ownership. At the same time, we also consider zero female ownership dummy as well. Additionally, we check our results with all other majority female ownership dummies. Keeping space constraint in mind, we do not report the results, but they are available upon request. Our results remain robust. The marginal effects provide us with the same conclusions. Both greater than 60% female ownership and 100 percent female ownership variables are positive and significant. The dummies indicating greater than 70% or 80% or 90% are also positive and significant. 0% female ownership is not significant. This confirms our benchmark findings.

We further control for years of education of a typical firm worker. Years of education should also affect perception about financial barriers. We do not include the education variable in columns (1), (2) and (3) because of lower number of observations. We do not have information for education for our entire sample. Thus, we control for education in columns (4), (5) and (6). Results remain robust.

To further make sure our estimates are not subject to omitted variable bias, we consider additional control variables. Cardoso and Winter-Ebmer (2010) find in the context of Portuguese firms that female managers are more effective in reducing gender wage gap relative to male managers. Yet, at the same time studies have shown that women in leadership do not fit the image

of a typical leader (Heilman, 2012; Eagly and Karau, 2002). Thus, firms with majority female leadership might be facing greater perceived constraints due to having a female as the top manager who might be handling all the negotiations with regard to acquiring finance. To make sure our results are not picking up such effects, we control for a dummy indicating if the firm has a female as a top manager or not. We again consider >60% female ownership, 100% female ownership and zero % female ownership. The results remain robust. Keeping space constraint in mind, we do not report the findings but they are available upon request.

6.3.3. Propensity score matching

Endogeneity can also arise due to the extent of female ownership and perceptions about financial barriers being co-determined. As stated by Webster and Piesse (2018), limitations of models like probit or logit are of not allowing sufficient heterogeneity among firms. In other words, such models impose the same behavioral model on all firms. To handle such bias, matching techniques have been proposed that can mitigate sample selection bias by helping create a carefully matched control group (Borin and Mancini, 2016; Mallick and Yang, 2013).

Ideally, for our case, we want to observe the same firm in two different scenarios – having majority female ownership and not having the same. Randomizing the treatment is a classic solution. Yet, due to costs or ethical issues, treatment status of observational data cannot be randomized. So in our case, we cannot randomly assign firms with majority female ownership. Matching techniques resolve this problem by helping us create a counter-factual that is similar in all characteristics among treatment and control groups except the specific treatment effect we are interested in – in our case, the extent of female ownership in firms. As Webster and Piesse (2018) point out, matching techniques help us with replicating experimental random sampling employing non-experimental observed data. The three components of a standard matching approach are ATE

(the average treatment effect in the population), the ATET (the average treatment effect for treated firms) and ATENT (the average treatment effect for untreated firms).

As explained above, a simplest estimator to assess the effect of the treatment is to compare the means of the treated firms (majority female owned firms) with untreated firms (non-majority female owned firms that can be minority female owned firms or male owned firms). Yet, such an approach results in possible biases. One such bias is from selection on observables. The other bias results from selection on unobservable variables. The latter bias results in what we term as omitted variable bias. We have clarified in previous sections how we have tried to take into account omitted variables and to mitigate the concerns. To mitigate the first bias and thus, to estimate the ATET, it is important to make sure that no bias from selection on unobservables is present and that all treated and untreated observations have shared attributes.

Our results are presented in Table 4. While many matching techniques are available, we resort to the two commonly used ones – *nearest-neighbor matching and propensity-score matching* (Webster and Piesse, 2018; Mallick and Yang, 2013). In the case of Nearest-neighbor matching (NNM), 'distance' between pairs with regard to a set of covariates is done and then 'matching' is achieved for each subject based on comparable observations that are closest to it. In other words, 'nearest' is determined based on a weighted function of the covariates for each

[Insert Table 4 about here]

observation. We make sure using the appropriate Stata command to make sure the NNM estimator is augmented with a bias correction term (Stata, 2013). We consider majority ownership dummies for >60% female ownership as well as 100% female owned firms as our treatment groups in Table 4. We present both ATE and ATET for both treatment groups. Propensity score matching (PSM)

on the other hand, matched on the estimated predicted probabilities of treatment that are known as propensity scores. In columns (1) and (2), we consider NNM estimates and present the ATE and ATET for the treatment groups >60% female ownership and 100% female ownership. For NNM estimates, we are using the Mahalanobis distance. In columns (3) and (4), we consider the same but instead consider the PSM matching.

Based on our results we can see that coefficients in the treatment groups are positive and significant in all cases suggesting that the treated groups perceive significantly more perceived barriers than untreated groups.

8. Conclusions

Using enterprise-level data from WBES for India representing different sectors across 23 states, we show that the composition of firm ownership in terms of gender matters. Firms that are dominantly managed by females perceive more difficulty in accessing finance compared to firms that have minority female ownership or have no female ownership. Our results support supply and demand side factors in the literature that hinge on lack of networking, inadequate experience and abilities as well as commitments of entrepreneurs based on their gender in the context of female entrepreneurs. As shown in our paper, minority female owned firms, along with male owned firms, are less likely to experience the demand and supply side constraints due to gaining experience from their majority male counterparts, benefitting from networking and not necessarily experiencing gendered perceptions from investors as females would be taking decisions along with males who are seen as able entrepreneurs. Firms that are dominantly owned by females need to negotiate more for finance since women might not be able to generate the positive signals when seeking financing. To establish identification, we resort to mitigating omitted variable bias and resolving sample section bias via propensity score matching. Certain factors like different sources

of funds in the form of internal funds, funds from family or friends and advances from clients can help mitigate the perceived financial barriers of majority female owned firms.

In view of our finding on the link between women entrepreneurship and their financial access considering the role of gender in driving their demand for credit and bank's supply of credit, our study implies that majority female-run firms are constrained in gaining financial access, and they tend to rely on internal funds to alleviate difficulties in accessing finance. The study concludes that firms with more than 60% of female entrepreneurs are constrained in terms of accessing finance while firms below 50% women-leaders are less constrained. Also our empirical estimates suggest that small firms are more constrained relative to medium and large size firms.

Given that female entrepreneurship can have important implications for inclusive banking and growth, reducing any bias on the supply side from bank's perspective along with public policy initiatives providing entrepreneurial assistance and alternatives to formal finance can help enhance women entrepreneurship. Our results point to the importance of removing barriers to entrepreneurship development via gender-led public policies in order to promote access to finance that can help overcome gender discrimination and achieve greater financial inclusion.

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Table 1: Logit Specifications: Perceived Constraints in Accessing Finance and Female Ownership

Logit Specifications: All data are considered from World Bank Enterprise Surveys. *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership* is a dummy representing if a firm has any female ownership or not. *% Female ownership* is the percent of the firm owned by females. The controls are *firm size* (medium and large), *Large firm* (if the firm is part of a larger firm), *International* (if the firm has international recognition), *Fem(Res)* (if the respondent is female or not), *Sales-national* (% of sales that is national), *Sales-exports* (% of sales that is direct exports), *Workers (since start)* (number of full time employees since it started operating) and *Years (Res)* (number of years the respondent is working in the firm). We control for industry and state fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

	Female Ownership		*% of Female Ownership*	
	(1) No controls	(2) With Controls	(3) No controls	(4) With Controls
Fem owned	-0.088	-0.048	---	---
	(0.073)	(0.075)		
%female-owned	---	---	0.002*	0.002*
			(0.001)	(0.001)
Firm (medium)	---	-0.242***	---	-0.237***
		(0.060)		(0.059)
Firm (large)	---	-0.410***	---	-0.406***
		(0.083)		(0.081)
Age (log)	---	0.008	---	0.001
		(0.034)		(0.034)
Large Firm	---	0.192***	---	0.203***
		(0.065)		(0.064)
International	---	-0.186***	---	-0.127**
		(0.059)		(0.058)
Sales – National	---	-0.00001	---	0.001
		(0.002)		(0.002)
Sales – exports	---	0.002	---	0.002
		(0.003)		(0.003)
Fem(Res)	---	-0.019	---	0.032
		(0.174)		(0.172)
Workers (since start)	---	-0.001***	---	-0.001*
		(0.0004)		(0.0004)
Years (Res)	---	-0.002	---	-0.002
		(0.003)		(0.003)
Constant	-1.708***	-1.099***	-1.675***	-1.212***
	(0.210)	(0.388)	(0.190)	(0.373)
Observations	9,061	8,976	9,188	9,103
Marginal Effects $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$ / $\frac{\partial accfin_{ijs}}{\partial \%femowned_{ijs}}$	-0.018	-0.009	0.001*	0.001*
	(0.014)	(0.015)	(0.0003)	(0.0003)

Table 2A: Logit Specifications: Perceived Constraints in Accessing Finance – 100% and 0% female owned firms

Logit Specifications: All data are considered from World Bank Enterprise Surveys. *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership is a dummy* indicating *100%* female ownership in (1) and *0%* female ownership in (2). The controls are *firm size* (medium and large), *Large firm* (if the firm is part of a larger firm), *International* (if the firm has international recognition), *Fem(Res)* (if the respondent is female or not), *Sales-national* (% of sales that is national), *Sales-exports* (% of sales that is direct exports), *Workers (since start)* (number of full time employees since it started operating) and *Years (Res)* (number of years the respondent is working in the firm). We control for industry and state fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

	(1) 100%	(2) 0%
Female ownership	0.384*	0.036
	(0.211)	(0.070)
Firm (medium)	-0.221***	-0.227***
	(0.060)	(0.059)
Firm (large)	-0.370***	-0.379***
	(0.082)	(0.082)
Age (log)	0.0103	0.009
	(0.034)	(0.034)
Large Firm	0.162**	0.161**
	(0.064)	(0.064)
International	-0.183***	-0.183***
	(0.058)	(0.058)
Sales – National	0.0001	0.0001
	(0.002)	(0.002)
Sales – exports	0.002	0.002
	(0.003)	(0.003)
Fem(Res)	-0.069	-0.042
	(0.174)	(0.173)
Workers (since start)	-0.001***	-0.001***
	(0.0004)	(0.0004)
Years (Res)	-0.003	-0.003
	(0.003)	(0.003)
Constant	-1.165***	-1.177***
	(0.383)	(0.387)
Observations	9,152	9,152
Marginal Effects		
$\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$	0.095**	0.007
	(0.004)	(0.014)

Table 2B: Logit Specifications: Perceived Constraints in Accessing Finance – different thresholds of majority female ownership

Logit Specifications: All data are considered from World Bank Enterprise Surveys. *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership is a dummy* indicating different thresholds of majority female ownership - >60%, >70%, >80% and >90%. The controls are *firm size* (medium and large), *Large firm* (if the firm is part of a larger firm), *International* (if the firm has international recognition), *Fem(Res)* (if the respondent is female or not), *Sales-national* (% of sales that is national), *Sales-exports* (% of sales that is direct exports), *Workers (since start)* (number of full time employees since it started operating) and *Years (Res)* (number of years the respondent is working in the firm). We control for industry and state fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

	(1) >60%	(2) >70%	(3) >80%	(4) >90%
Female ownership	0.321*	0.368*	0.395*	0.387*
	(0.187)	(0.195)	(0.208)	(0.210)
Firm (medium)	-0.227***	-0.226***	-0.226***	-0.226***
	(0.059)	(0.060)	(0.060)	(0.060)
Firm (large)	-0.381***	-0.380***	-0.380***	-0.381***
	(0.082)	(0.082)	(0.082)	(0.082)
Age (log)	0.008	0.008	0.008	0.008
	(0.034)	(0.034)	(0.034)	(0.034)
Large Firm	0.172***	0.172***	0.171***	0.171***
	(0.064)	(0.064)	(0.064)	(0.064)
International	-0.189***	-0.189***	-0.189***	-0.188***
	(0.058)	(0.058)	(0.058)	(0.058)
Sales – National	-0.0001	-0.0001	-0.0001	-0.0001
	(0.002)	(0.003)	(0.002)	(0.003)
Sales – exports	0.001	0.002	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Fem(Res)	-0.070	-0.073	-0.065	-0.064
	(0.173)	(0.174)	(0.173)	(0.173)
Workers (since start)	-0.001***	-0.001***	-0.001***	-0.001***
	(0.0004)	(0.0004)	(0.0004)	(0.001)
Years (Res)	-0.003	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-1.340***	-1.343***	-1.340***	-1.336***
	(0.379)	(0.379)	(0.379)	(0.379)
Observations	9,152	9,152	9,152	9,152
Marginal Effects $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$	0.069*	0.080*	0.086*	0.085**
	(0.040)	(0.045)	(0.048)	(0.038)

Table 2C: Logit Specifications: Perceived Constraints in Accessing Finance – different thresholds of minority female ownership

Logit Specifications: All data are considered from World Bank Enterprise Surveys. *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership is a dummy* indicating different thresholds of minority female ownership - <50% and <30%. The controls are *firm size* (medium and large), *Large firm* (if the firm is part of a larger firm), *International* (if the firm has international recognition), *Fem(Res)* (if the respondent is female or not), *Sales-national* (% of sales that is national), *Sales-exports* (% of sales that is direct exports), *Workers (since start)* (number of full time employees since it started operating) and *Years (Res)* (number of years the respondent is working in the firm). We control for industry and state fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

	(1) <50%	(2) <30%
Female ownership	-0.115	-0.234*
	(0.080)	(0.139)
Firm (medium)	-0.229***	-0.220***
	(0.060)	(0.060)
Firm (large)	-0.384***	-0.369***
	(0.082)	(0.082)
Age (log)	0.007	0.010
	(0.034)	(0.034)
Large Firm	0.171***	0.160**
	(0.064)	(0.064)
International	-0.188***	-0.181***
	(0.058)	(0.058)
Sales – National	-0.0002	-0.0002
	(0.002)	(0.002)
Sales – exports	0.001	0.002
	(0.003)	(0.003)
Fem(Res)	-0.041	-0.048
	(0.172)	(0.172)
Workers (since start)	-0.001***	-0.001***
	(0.0004)	(0.0004)
Years (Res)	-0.003	-0.003
	(0.003)	(0.003)
Constant	-1.293***	-1.101***
	(0.380)	(0.383)
Observations	9,152	9,152
Marginal Effects		
$\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$	-0.023	-0.045*
	(0.015)	(0.122)

Table 3: Logit Specifications: Perceived Constraints in Accessing Finance – Source of Funds

Logit Specifications: All data are considered from World Bank Enterprise Surveys. *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership is a dummy* indicating different thresholds of majority female ownership - >60%, and 100%. The controls are *firm size* (medium and large), *Large firm* (if the firm is part of a larger firm), *International* (if the firm has international recognition), *Fem(Res)* (if the respondent is female or not), *Sales-national* (% of sales that is national), *Sales-exports* (% of sales that is direct exports), *Workers (since start)* (number of full time employees since it started operating) and *Years (Res)* (number of years the respondent is working in the firm). The sources of funds are retained earnings/one's own funds, funds from family or friends and advances from clients. We control for industry and state fixed effects. Robust standard errors are reported in parentheses. ***, ** and * denote significance at 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	>60%			100%		
	Own funds/retained earnings	Family/friends	Clients	Own funds/retained earnings	Family/friends	Clients
Female ownership	0.656*	0.438**	0.434**	0.603	0.552**	0.497**
	(0.381)	(0.218)	(0.214)	(0.429)	(0.247)	(0.245)
Source of funds	-0.007***	0.001	0.016***	-0.007***	0.001	0.015***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.001)	(0.003)
Fem own*funds	-0.005	-0.005	0.001	-0.002	-0.011	0.009
	(0.005)	(0.014)	(0.023)	(0.005)	(0.014)	(0.025)
Firm (medium)	-0.221***	-0.246***	-0.225***	-0.248***	-0.245***	-0.224***
	(0.059)	(0.064)	(0.065)	(0.058)	(0.064)	(0.065)
Firm (large)	-0.399***	-0.443***	-0.423***	-0.427***	-0.442***	-0.422***
	(0.086)	(0.093)	(0.093)	(0.086)	(0.093)	(0.093)
Age (log)	-0.086**	0.019	0.022	-0.083**	0.019	0.023
	(0.035)	(0.038)	(0.038)	(0.035)	(0.038)	(0.038)
Large Firm	0.216***	0.236***	0.235***	0.210***	0.235***	0.234***
	(0.065)	(0.069)	(0.069)	(0.065)	(0.069)	(0.069)
International	-0.111*	-0.178***	-0.194***	-0.119**	-0.176***	-0.193***
	(0.058)	(0.064)	(0.064)	(0.057)	(0.064)	(0.064)
Sales – National	-0.003	-0.0003	0.00001	-0.003	-0.0003	0.0001
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)
Sales – exports	-0.001	0.002	0.002	-0.001	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Fem(Res)	0.017	-0.105	-0.142	-0.008	-0.096	-0.132
	(0.170)	(0.188)	(0.188)	(0.168)	(0.188)	(0.188)
Workers (since start)	-0.001***	-0.001**	-0.001**	-0.001***	-0.001**	-0.001**
	(0.0004)	(0.001)	(0.001)	(0.0004)	(0.0004)	(0.001)
Years (Res)	-0.002	-0.003	-0.003	-0.002	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.181	-1.430***	-1.493***	0.705**	-1.424***	-1.486***
	(0.355)	(0.422)	(0.423)	(0.301)	(0.421)	(0.422)
Observations	8,385	7,654	7,614	8,385	7,654	7,614
Marginal Effects $\frac{\partial accfin_{ijs}}{\partial femown_{ijs}}$						
Fund = 10%	0.141*	0.079*	0.092*	0.125*	0.090*	0.121**
	(0.077)	(0.044)	(0.052)	(0.082)	(0.050)	(0.059)
Fund = 90%	0.029	-0.006	0.132	0.068	-0.903	0.275
	(0.042)	(0.244)	(0.436)	(0.049)	(0.207)	(0.439)

Table 4: NNM and PSM: Female Ownership, majority female ownership and perceived difficulties in accessing finance

We consider both NNM and PSM matching. Propensity Score Matching (PSM): *Access to finance* is the dependent variable coded 1 for above average perceived constraint in accessing finance; 0 otherwise. *Female ownership is a dummy* indicating different thresholds of majority female ownership - >60%, and 100%. These are the considered treatment groups for both types of matching. All benchmark controls are included. We report both ATE and ATET.

	NNM		PSM	
	(1)	(2)	(3)	(4)
	>60% fem. ownership	100% fem. ownership	>60% fem. ownership	100% fem. ownership
ATE	0.188**	0.237**	-0.107***	0.237**
	(0.079)	(0.071)	(0.027)	(0.071)
ATET	0.060*	0.087*	0.050***	0.144**
	(0.010)	(0.024)	(0.009)	(0.064)

Appendix 1: Summary Statistics of the main variables

Variables	Obs.	Mean	Median	S.D.	Min.	Max.
Accessfin (dummy)	9,244	0.337	0.000	0.473	0.000	1.000
Fem-owned (dummy)	9,097	0.137	0.000	0.344	0.000	1.000
% fem-owned	9,224	5.095	0.000	16.575	0.000	100.000
% fem-owned (>60%)	9,281	0.017	0.000	0.130	0.000	1.000
Firm (medium)	9,281	0.437	0.000	0.496	0.000	1.000
Firm (large)	9,281	0.226	0.000	0.419	0.000	1.000
Age (log)	9,241	2.645	2.708	0.852	0.000	7.612
Large Firm	9,281	0.215	0.000	0.411	0.000	1.000
International	9,228	0.446	0.000	0.497	0.000	1.000
Sales – National	9,281	92.754	100.000	21.964	0.000	100.000
Sales – Exports	9,281	6.181	0.000	20.340	0.000	100.000
Fem(Res)	9,281	0.023	0.000	0.149	0.000	1.000
Workers (since start)	9,281	38.270	15.000	87.068	1.000	1100.000
Years (Res)	9,281	12.317	10.000	8.917	1.000	58.000

Appendix 2: Correlation Matrix

	Fin. Dummy	Fem 100%	Fem 0%	Fem (>70%)	Fem (>60%)	Fem (>80%)	Fem (>90%)	Firm (medium)	Firm (large)	Age (log)	Larg. Firm	Interntnal.	Sales (nat)	Sales (export)	Res (fem)	workers (start)	Res (years)
Fin. Dummy	1																
Fem 100%	0.03*	1															
Fem 0%	0.01	-0.27*	1														
Fem (>70%)	0.03*	0.92*	-0.29*	1													
Fem (>60%)	0.03*	0.88*	-0.31*	0.95*	1												
Fem (>80%)	0.03*	0.98*	-0.28*	0.94*	0.90*	1											
Fem (>90%)	0.03*	1.00*	-0.27*	0.92*	0.88*	0.98*	1										
Firm (med)	-0.01	-0.02*	0.01	-0.02*	-0.021*	-0.028*	-0.02*										
Firm (large)	-0.06*	-0.05*	-0.07*	-0.05*	-0.06*	-0.05*	-0.05*	-0.47*	1								
Age (log)	-0.05*	-0.01	-0.06*	-0.01	-0.01	-0.01	-0.01	0.003	0.06*	1							
Larg. Firm	0.02*	-0.01	-0.03*	-0.01	-0.019	-0.01	-0.01	-0.08*	0.31*	-0.02*	1						
Interntnal.	-0.08*	-0.03*	-0.05*	-0.03*	-0.02*	-0.03*	-0.04*	0.03*	0.29*	0.07*	0.16*	1					
Sales (nat)	-0.01	0.0002	0.09*	-0.01	-0.01	0.001	0.0002	0.013	-0.19*	-0.04*	-0.08*	-0.15*	1				
Sales (export)	0.01	0.001	-0.09*	0.007	0.01	0.0002	0.001	-0.02	0.19*	0.04*	0.08*	0.15*	-0.93*	1			
Res (fem)	-0.002	0.08*	-0.05*	0.10*	0.10*	0.08*	0.08*	-0.01	0.02*	-0.005	0.05*	0.01	-0.01	0.01	1		
Wks.(start)	-0.06*	-0.03*	-0.01	-0.03*	-0.02*	-0.02*	-0.03*	-0.11*	0.38*	-0.01	0.21*	0.18*	-0.11*	0.12*	0.01	1	
Res (years)	0.002	-0.003	-0.06*	-0.01	-0.001	-0.004	-0.003	-0.02*	-0.01	0.43*	-0.01	0.01	-0.02*	0.02*	-0.06*	0.006	1

Note 1: Our specifications consist of firms (medium) and firms (large) with firms (small) being the benchmark. So we report firms (medium) and firms (large) in our correlation matrix.

Note 2: We report the significance level at 5% .

Appendix 3: Definition of main variables

Name	Description
Accessfin (dummy)	Dummy; 1 if firms perceived above average levels of constraints in accessing finance, 0 otherwise (average is based on the ordered dummy variable ranging from 0 to 4 with higher numbers indicating greater constraints)
Fem-owned (dummy)	Dummy; 1 if a firm has more than zero percent female ownership, 0 otherwise
% fem-owned	A variable suggesting the percentage of female ownership in the firms.
% fem-owned (>60%)	Dummy; 1 if the percentage of female ownership is greater than 60%.
Firm (medium)	Dummy; 1 if a firm has more than 20 employees but less than 99 employees.
Firm (large)	Dummy; 1 if a firm has more than 99 employees.
Age	A variable indicating the age of the firm.
Sales – National	Percent of firm's sales that are national.
Sales – Export	Percent of firm's sales that are exports
Workers (since start)	Number of full time employees the firm had since it started operating
Large Firm	Dummy; 1 if the firm is part of a Large firm.
International	Dummy; 1 if the firm has international quality recognition
Fem (Res)	Dummy; 1 if the respondent is a female or not.
Years (Res)	Number of years the respondent has been working for the firm.

Note1: D denotes a dummy.
Note 2: Firm (small) is considered as the baseline.