GENDER DIFFERENCE IN ACCESS TO FINANCE: DOES IT MATTER IN VIETNAMESE SMALL AND MEDIUM ENTERPRISES?

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Abstract

The ZINB regression model is applied in this research to examine determinant factors regarding the number of denying on formal credit applications. The findings indicate that female enterprises encounter higher likelihood to be denied compared with male enterprises. Indeed, gender bias is different regarding industry specifics. In particular, female enterprises face no more financial constraints than male enterprises in Food & Beverage, and Apparel industries where female are dominant, but they experience more denied times than male in Wood, Metal product, Electronics, Rubber and Plastics where there exists smaller share of female labors and female leaders. Apart from industry specifics, the change in the monetary policy results in the increase of gender bias after the recession. Although there are no differences in finance access before the recession in 2008, female enterprises face higher possibility to be denied than male firms after this period as a result of the stricter monetary policy. Also, firm size becomes one of the determinant factors for finance access whereas there is no discrimination between female and male enterprises for micro-sized firms, discrimination does exist in small and medium sized firms.

The findings from this study become an important framework for policy suggestions which are expected to improve the credit accessibility of female enterprises. Two effective solutions should be practiced such as enhancing non-collateral credit, reducing the discrimination among regions.

Key words: Credit accessibility, small and medium enterprises.

1. Introduction

1.1. Problem statement

Small and medium enterprises (SMEs) in Vietnam, accounting for 97.5% of the total firms (GSO, 2014), hold a crucial role in the economy regarding creating jobs for low skilled labors, meeting the urgent local demand and growing rapidly (Hallberg, 1999).

Although the possibility of formal credit accessibility of SMEs increases over time, enterprises consider the credit accessibility as the hardest barrier in Vietnam (CIEM, DoE, ILSSA and UNU-WIDER, 2016).

In line with the trend in the increasing number of SMEs, the role of women in small and medium enterprises appears to have risen significantly. According to UNIDO (2010), half of the labors in manufacturing enterprises are women, and over one-fourth of small manufacturing enterprises have female leaders. In SMEs, the ratio of female leaders also increases from 30% in 2005 (CIEM, DoE, ILSSA and UNU-WIDER, 2006) to 40% in 2012 (CIEM, DoE, ILSSA and UNU-WIDER, 2013). As the role of women has increased, especially in business, women entrepreneurs receive important support from the government and banks. For instance, the Association of Women Owned Business of Ho Chi Minh City signed the Capital Assistance Agreement with Standard Chartered Bank[1]. Also, SMEs Development Fund provides many privileges for female firms and firms with a large share of female labors[2]. Furthermore, the Draft of Enterprise Law is considered to add the definition of female enterprises and regulate more privileges for female-owned enterprises[3]. However, the author of technical support of Hampel-Milagrosa (2010) finds that gender bias does remain in Vietnamese women entrepreneurs. Similarly, the Association of SMEs has reported that female enterprises face more constraints on production resources' accessibility than male recently[4]. Besides, Ha et al. (2016) find that gender does not impact on the credit accessibility. From above problems, a comprehensive study should be conducted to serve a detailed understanding for researchers and potential suggestions for the government.

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[1] https://www.sc.com/global/av/vn-support-women-entrepreneurs-en.pdf

[2] http://en.business.gov.vn/tabid/166/catid/590/item/12501/the-sme-development-fund-established.aspx, [2] http://enternews.vn/doanh-nghiep-nho-va-vua-duoc-vay-2-000-ty-dong-voi-lai-suat-55.html

[3] http://business.gov.vn/L%E1%BB%9Dikhuy%C3%AAnkinhdoanh/tabid/106/catid/10/item/31754/d%E1%BB%B1-th%E1%BA%A3o-lu%E1%BA%ADt-h%E1%BB%97-tr%E1%BB%A3-dnnvv-phien-b%E1%BA%A3n-thang-10-2016.aspx

[4] http://hoanhap.vn/bai-viet/doanh-nghiep-nu--con-nhieu-rao-can-tren-thuong-truong-13837

1.2. Research objective

This research aims to investigate gender difference in access to finance in the case of small and medium enterprises in Vietnam.

1.3. Research questions

Two questions are designed to achieve the above objective:

(i)   Whether there is gender difference in application for a formal loan?

(ii)   Whether there is gender difference in number of formal loans being denied when the SMEs have applied for a formal loan?

1.4. Research structure

The research is constructed as following structure: (i) introduction of research, (ii) literature review, (iii) methodology, (iv) empirical results and (v) conclusion.

2. Theoretical review

2.1. SMEs: definition and characteristics

Literature concludes inconsistent findings regarding gender bias in credit accessibility; moreover, although many policies favoring female enterprises were issued there is no evaluation regarding the impact of them in practice. As a result, the current study is motivated to do the examination to answer whether gender bias in finance access occurs in Vietnam and if it does exist, whether there are differences among industries and periods.

There is no accurate and broad definition of small and medium enterprises (SMEs) worldwide, it was defined by each nation's approach. Definition of SMEs is often created based on the firm size such as some labors, revenue, profit, and assets. There are two approaches such as economic approach and statistical approach. According to economic approach, SME is firm with small market size, run by individual owner or group of owners without formal structure, be independent solely. According to statistical approach, SME is a firm with regulated small size associated with the contribution to GDP, the number of labors and exporting revenue, comparable firms with other small and medium firms by the time, comparable firms associated with economic contribution among countries (Abor and Quartey, 2010).

Each nation may have its categories to define SMEs in research. European Council (2003) defines SMEs is a firm having fewer than 250 labors or less than 43 million EUR of revenue (Taylor and Adair, 1994). WB, ADB, and UNDP define SMEs according to a number of labors, revenue and assets (Gibson and van der Vaart, 2008). In Vietnam, according to Decree No. 56/2009/ND-CP, an SME is defined as a firm with registered business and there are three categories for SMEs such as micro firm, small, medium-scale which are respective to the capital, number of labors in which the capital criteria is more important.

In this study, the authors apply the definition of SMEs of WB. According to WB, micro firms have up to 10 labors; small enterprises employ up to 50 labors, and medium firms have up to 300 labors and firms having more than 300 labors is classified as large firms. This classification is relatively consistent with the Decree No. 56/2009/ND-CP about "Development Assistance for SMEs."

2.2. Gender differences and finance access

This part will review the theoretical literature and empirical literature about gender bias in financial accessibility. Literature divides two approaches in considering the gender bias

which is supply side and demand side, providing a clear and separate perspective from bankers and borrowers. On the supply side, three key theories emerge as the strong background for the research's motivation. Firstly, women face more financial constraints because the majority of financial providers are men (Aterido, Beck, & Iacovone, 2013). Secondly, Muravyev, Talavera et al. (2009) in (Aristei & Gallo, 2016) examine the tasted-based discrimination and exhibit that bankers have their tastes and perspective regarding borrowers' gender. Finally, women are believed to face more financial constraints than men because they are more vulnerable as they have to pay higher interest rate than men (McKernan, Pitt, & Moskowitz, 2005) or being excluded from financial access (Brana, 2013).

On the demand side, four theoretical ideologies attract the consideration. The first one mentions the risk-averse attitude of women which becomes one of the drawbacks hindering women to apply for credit (Stefani & Vacca, 2015). Another theory related to firm size and owners' age which indicates that women tend to run small sized and young business and these characters decrease their opportunities to financial access (Stefani & Vacca, 2015). Besides, women often have lower education degrees than man which become the barrier to access formal credit (Aterido et al., 2013). The last theory relates to the source of finance, according to Ama and Mangadi et al. (2014), women traders mainly use the profit from their business and personal savings for further developing investment.

However, examination of gender bias should be conducted with care because gender bias does not exist in overall economy but it depends on the sector (Kantor, 2002).

Empirical literature will be reviewed in the context in developed, developing countries and Vietnam. Researchers on gender bias have done studies through United State, France, a group of countries including Germany, France, Italy and Spain. Using data of 4,000 small businesses in United State, Coleman (2000) divides the data into two subsamples for men and women. The author recognizes that women-owned businesses have to pay higher interest rate than men owned business. Also, a higher rate of the women-owned business choose lease contract to meet their capital demand than men owned business (Coleman, 2000).

Brana (2013) does research on the French IMF portfolio of microcredit files including 2,381 men and 1,259 women to examine whether there is gender bias in accessing microcredit. For the whole sample, the author finds that age of the owners, the level of schooling, and

being a man owned business indicate a positive relationship with the amount of microcredit. Similar to Coleman (2000), Brana (2013) separates the sample into male and female to evaluate the gender bias associated with personal characteristics. She finds that while there is no impact of women personal characteristics; age, education and marital status of men do influence on the financial accessibility. Furthermore, low personal assets are one of the reasons hindering women's credit accessibility (Brana, 2013).

Stefani and Vacca (2015) use the European Central Bank survey data for Germany, France, Italy and Spain to measure the gender bias in financial access for small firms. They find that there is no evidence of gender bias because of the different firm characteristics between male and female firms. In particular, as female firms hesitate to apply for credit because of the anticipation on rejections. Moreover, female firms demand less credit than male firms. One significant result of firm age is that young and middle-aged female firms face the higher possibility of denial of applications. Nevertheless, those authors conclude that gender bias does exist but at different levels depending on the country, in which France sees more evidence of gender bias than others.

Researchers focusing on developing countries include Sub-Sahara, Africa Nigeria, and four Caribbean countries. In Sub-Sahara, woman-owned firms are more likely to face financial constraints than man owned firms (Asiedu, Kalonda-Kanyama, Ndikumana, & Nti-Addae, 2013). This gender bias exists only in Sub-Sahara region while there is no evidence of gender bias in Latin America and the Caribbean, East Asia, Pacific, and East and Central Europe. Regarding the firm size, Asiedu, Kalonda-Kanyama et al. (2013) find that financially constraints often occur for small firms rather than large firms.

There is no evidence of gender bias regarding firms and households' characteristics in a study of 37 African countries from 2005 to 2009 (Aterido et al., 2013). These authors claim that smaller firms have less access to external finance.

Although the survey applied to a limited sample of 20 petty traders in Eastern Nigeria, Nkamnebe (2010) discovers the gender bias regarding the ability to access to micro-credit. Several factors which hinder women petty traders include internal, social-cultural and policy (Nkamnebe, 2010).

Presbitero, Rabellotti et al. (2014) conduct the research in four Caribbean countries including Barbados, Jamaica and Trinidad and Tobago in 2012 to examine the gender bias regarding credit access. They claim that women firms with the highest share of management

seem to apply more than other firms, and those enterprises experienced more frequent rejections on application than other companies. Moreover, regarding the distance from enterprises to the bank, the evidence shows that enterprises which locate in rural areas or encounter a great distance from their banks/financial institutions face more difficulties in accessing credit than close distance enterprises (Andrea F. Presbitero et al., 2014).

Limited research about gender bias was conducted in the Vietnamese context. Some papers mention about gender bias, but their approach focuses on cross-section data and small sample. For instance, Ha, Nguyen et al. (2016) use the survey data of CIEM (Central Institute Economic Management) for 2011 only and cover 756 SMEs in Vietnam. They conclude that there is no discrimination between female-owned firms and male-owned firms regarding the financial accessibility. Surprisingly, distance indicates the positive relationship with the likelihood of credit access in their study. They explain that due to informal asymmetry, banks face no difficulties to offer loans for distant clients ((Ha et al., 2016). Another study in the Vietnamese context is Hampel-Milagrosa, et al. (2010). Those authors interviewed 240 businesses covering all region of Vietnam in 2009. They conclude that male firms face more financial constraints than female firms regarding the long-term credit. That surprising conclusion raises the concern about the gender bias which may not exist in Vietnam.

From the above literature review, the current study is motivated because the authors will use panel data covering the long period from 2005 to 2013 for 3,532 SMEs. Especially, the ZINB methodology will be applied for the research regression, which has not been used elsewhere. With ZINB the authors not only modify dichotomous data but also take into account the countable data to provide more detail results and suggestions.

3. Methodology

Based on the literature review, SMEs in the sample could be divided into 2 groups: enterprises applied for a formal loan and enterprises did not apply for a formal loan. Focusing significantly on the first group, this paper attempts to investigate whether female-owned enterprises were denied many times compared to male-owned enterprises when they applied for a formal loan. Regarding the latter group, descriptive statistics is employed to identify the gender differences in the reason why they did not apply for a formal loan. Section 3.1 below describes our strategy to select the most appropriate model for group 1.

3.1. Econometric model selection

According to the above analysis, only the enterprises having applied for a formal loan are employed in this section. Major of empirical studies (Stefani and Vacca, 2015; Ha et al., 2016; Aterido et al, 2013; Asiedu et al., 2013; Presbitero et al., 2014) applied logit or probit model with dependent variable being the possibility of getting a loan (or being denied a loan). However, this strategy could be misleading when it cannot identify the frequency of applying for a loan by an enterprise. For example, the case that a male-owned enterprise can apply and success one time has the same possibility with the case that a female-owned enterprise attempts to apply several times and finally receives the loan. In order to solve this problem, this paper applies the regression model for count variable. Four models including poisson regression, negative binomial regression, zero-inflated poisson (ZIP) and zero-inflated negative binomial regression (ZINB) are considered to apply. We just prefer the ZINB due to 3 main reasons as follows:

> (i) While large proportion of enterprises is denied once, some of them are denied many times: 237 enterprises are denied once, 130 enterprises are denied from twice to 4 times, compared to 28 enterprises applied and were denied 5 times or above (see Figure A1 in Appendix A). In this case, overdispersion may be present and make the result being bias. We also take consideration the test of overdispersion (alpha) to examine this problem. The result of alpha being larger than 0 suggest that overdispersent is present (see Figure A2 in Appendix A). Therefore, negative binomial regression family should be more appropriate than poisson regression family in this case (Long and Freese (2006), p. 243).

(ii) Large proportion of enterprises are accepted for a formal loan (2295/total 2690 – 85.3%), in other word, they are non-denied. In the case of many zero count observations, ZINB should be preferred to standard negative binomial regression in order to control the zero-group. This model helps to separate the whole data into two groups: "zero" group is treated by logit regression, and non-zero count group employs Poisson or negative binomial regression (Long and Freese (2006), p. 250). Vuong test is also an official test to examine the efficiency of ZINB compared to standard negative binomial regression. The significant and positive value of Vuong value suggests that ZINB is more suitable.

(iii) In order to guarantee the most fitted model, we also produce the results of all 4 models and compare the predicted outcomes (see Figure A3 in Appendix A). The result suggests that ZINB is the most suitable model when its predicted outcomes is the most approximate the actual values in term of positive count values.

The idea of this model is that, the observations are divided into 2 groups: always zero group (group A) and not always-zero group (group A~). ZINB model helps to identify the members in group A by logit model, counts for the members in group A~ by negative binomial regression, and finally mixes two effects by conditional possibility.

In term of regression model, ZINB can be computed by STATA from the function:

$$\Pr(\text{count of denied loans}_i = 0 \mid A_i = 1, x_i, z_i) = 1 \text{ by definition of the A Group}$$

$$\Pr(\text{count of denied loans}_i = 0 \mid A_i = 0, x_i, z_i) = \text{outcome of PRM or NBRM.}$$

Where: dependent variable is the number of formal loans being denied

independent variables x_i include: female, education of the owner, enterprise age, employees, dummy for city location and dummy for year control.

3.2. Data

All data sources are available at the surveys of small and medium scale manufacturing enterprises (SMEs) in Vietnam, which include the surveys in 2005, 2007, 2009, 2011 and 2013. The set of surveys are conducted by five organizations as: the Central Institute for Economic Management (CIEM) of the Ministry of Planning and Investment (MPI), the Institute of Labour Science and Social Affairs (ILSSA) of the Ministry of Labour, Invalids and Social Affairs (MOLISA), the Department of Economics (DoE) of the University of Copenhagen, and UNU-WIDER and the Royal Embassy of Denmark in Vietnam. Ten selected provinces/cities, where about 30 percent of total Vietnamese SMEs

located, are Hanoi, HCMC, Ha Tay, Hai Phong, Phu Tho, Khanh Hoa, Nghe An, Lam Dong, Quang Nam, and Long An. As one of few officially large-scaled surveys in Vietnam, SMEs survey has been carried out every two years on the sample of approximate 2,500 enterprises. Of around 2,500 enterprises, 80 percent will be remained in the next survey, while 20 percent are replaced because of some reasons such as industry exiting, not responding or being lost during the sampling. The substitutions are selected to ensure the statistic principles; therefore, the data can be seen as a random sample and be representative for the SMEs population.

This study focuses to research on 7 largest industries which account for 77% of total enterprises in 2013 survey. They include food and beverage (ISIC 10, 11), wearing apparel (ISIC 14), wood processing (ISIC 16), rubber and plastics products (ISIC 22), fabricated metal products (ISIC 25) and electronic products (ISIC 26).

The final unbalanced panel data includes 8,688 observations, representing for 3,532 enterprises.

3.3. Variable measurements

The variables are constructed as following table.

Table 1: Variable measurements

Variables	Meanings	Measurements	Unit
Dependent variable			
Deniedfl	Number of formal loans being denied	Number of formal loans being denied when enterprises apply for.	times
Independent variables			
Female	Dummy for female	Female = 1, male = 0	
Dedu	Dummy for education	College/University/post-graduate = 1 Not entrance College/University=0	
Fage	Firm age	Year of survey minus year of establishment	Years
Logemp	Log of employees	Logarithm value of number of employees	Persons

While female is the most favored variable, other variables are included to control the character of owner (education) or enterprises (age, size in term of employee and accounting book implementation).

4. Empirical results

4.1. General characteristics of the SMEs in surveys

Table 2 below represents general characteristics of enterprises in the sample in terms of industry, size, owner type, age of enterprise and availability of accounting book and business registered certificate.

Table 2: General characteristics of the enterprises in the sample

		Male-owned SMEs (n)	Female-owned SMEs (n)		Total (A+B)	t-test of equality of means (mean A vs mean B)
		(A)	(B)	% female (A)/(A+B)		
Total number of observations		5,492	3,196	37%	8,688	
Industry (International Standard Industrial Classification)	Food & Beverage (10)	1,687	1,550	48%	3,237	
	Apparel (14)	485	377	44%	862	
	Wood (16)	1,394	506	27%	1,900	
	Rubber & Plastics (22)	368	302	45%	670	
	Fabricated metal (25)	872	229	21%	1,101	
	Electronics (26)	687	232	25%	919	
Size (number of workers)	Micro (1-10)	4,089	2,272	36%	6,361	
	Mean (micro)	*4.483*	*4.266*			***
	Small (11-200)	1,361	881	39%	2,242	
	Mean (small)	*37.068*	*39.863*			**
	Medium (201-300)	42	43	51%	85	
	Mean (medium)	*443.238*	*318.000*			*
	Mean(total)	*15.913*	*18.300*			*
Owner type (code)	Household business	4,014	2,151	35%	6,165	
	Sole proprietorship	394	262	40%	656	
	Partnership	20	5	20%	25	
	Collective/Cooporative	175	62	26%	237	
	Limited liability company	764	606	44%	1,370	
	Joint stock company	8	4	33%	12	

	with state capital					
	Joint stock company without state capital	114	101	47%	215	
	State enterprise (local)	1	3	75%	4	
Age (years)	0-5	954	567	37%	1,521	
	6-10	1,444	897	38%	2,341	
	11-15	1,200	701	37%	1,901	
	16-20	814	456	36%	1,270	
	21-25	459	227	33%	686	
	26-30	217	111	34%	328	
	30-	405	237	37%	642	
	Mean	*14.444*	*14.016*			*
Availability of	Accounting book	1,692	1,203	42%	2,895	
	% of total sample	31%	38%		33%	
	Mean	*0.308*	*0.377*			***
	Business Registered Certificate	2,870	1,754	38%	4,624	
	% of total sample	52%	55%		53%	
	Mean	*0.534*	*0.571*			***

*** p<0.01, ** p<0.05, * p<0.1

The sample covered 8,688 observations (equivalent to 3,532 enterprises) from 2005 to 2013. In panel data, observations are preferred to report compared to number of enterprises. The reason is that when we report by enterprise, the change of their characteristic cannot be captured. For example, a firm can change its owner from a man to a woman in different year of survey, which could be reported in term of observation. While male-owned enterprises still accounted for larger proportion throughout this period, the share of female-owned enterprises has increased from 30% in 2005 survey to 40% in 2013 survey.

Regarding industry, this research employs only 7 manufacturing industries which account for 77% of total enterprises in 2013 survey. Among them, food and beverage and wearing apparel have larger share of female workers as well as female owners. Meanwhile, remaining industries including wood processing, rubber and plastics products, fabricated metal products and electronic products appear to be dominated by male workers and male owners. This decomposition made a good suggestion to consider the gender difference in access to finance across the industry groups.

In term of size and owner type, major of SMEs in the sample are in micro size and operate as a household model. This statistic suggests that the character of major of micro enterprises in Vietnam appears to be more similar to a household rather than an enterprise; therefore, the impact of gender on access to finance could be different between group of micro enterprises and group of small and medium enterprises. Another interesting point is that, while male-owned enterprises have larger size in term of employees compared to female-owned enterprises in categories of micro and medium size, the reversed statistic is presented among small-size enterprises. The significant t-test value suggests that the average size of female-owned enterprises is higher than male-owned enterprises when the size ranges from 11 to 200 employees. This figure of Vietnam is surprisingly different compared to other countries in empirical studies (Asiedu et al., 2013; Nguyen, 2014; Stefani and Vacca, 2015; Coleman, 2000; Aterido et al., 2013; Brana, 2013).

Statistic of the age of SMEs represents that major of SMEs are in the range of 0-20 years. Among the categories of 5 year period, the proportions of female-owned enterprises are in the range of 33-38% of total enterprises.

The final figures show the availability of accounting book as well as the registered certificate. The higher mean value of these figures of female-owned enterprises suggests that female-owned enterprises tend to implement the administrative regulations more seriously than male-owned enterprises. These figures also support the argument that female owner is likely to risk-averse than the male owner.

4.2. Results and discussions
4.2.1. SMEs and decision of not applying a formal loan

Table 3 represents the number of SMEs with the decision whether or not applying for a formal loan. The result shows that 2,694 observations of enterprises had applied for a loan. Among them, the figures of 36-37% of SMEs being female-owned in terms of applying for a formal loan as well as being denied are consistent with other statistical figures. Therefore, in term of dichotomous definition (being denied or not), there is no clear evidence of gender difference in access to finance. However, t-test of the equality of means of number of loans being denied between two gender groups represents there could be gender difference when female-owned enterprises were denied many times more than male-owned enterprises. These results suggest that logit/probit model could be not appropriate to identify gender difference in access to finance in the case of Vietnam.

Table 3: SMEs and decision of not applying for a formal loan

		Male-owned SMEs (n)	Female-owned SMEs (n)	Share of female-owned SMEs (%)	Total (n)
		(A)	(B)	(B)/(A+B)	(A+B)
Total number of SMEs		5,493	3,196	37%	8,689
Apply for a formal loan		1,714	980	36%	2,694
% of SMEs applying for a formal loan		31%	31%		31%
	Be denied	248	146	37%	394
	% of SMEs applied for loan	14%	15%		15%
	Mean (t-test value=-1.66) (***)	1.85	2.39		
No apply for a formal loan		3,747	2,192	37%	5,939
	Did not need one	2,089	1,259	38%	3,348
	Do not want to incur debt	592	365	38%	957
	Process too difficult	393	200	34%	593
	Interest rate too high	376	209	36%	585
	Inadequate collateral	185	106	36%	291
	Others	63	28	31%	91
	Already heavily indebted	49	25	34%	74

*** p<0.01, ** p<0.05, * p<0.1

Refer to reasons of not applying for a formal loan, majority of observations represent the reasons that they did not need loans or do not want to incur debt, which are likely subjective decisions. On the other hand, reasons coming from objective decisions such as difficult process, high interest rate are fewer than subjective decisions. The shares of female-owned enterprises are slightly higher in terms of subjective reasons, but it is not a clear-cut evidence. Therefore, next section attempts to process econometric models to identify the gender difference in access to finance of SMEs.

4.2.2. Regression results

To identify the final results, several stages are implemented. Firstly, table of Pearson pair correlations is produced to identify multicollinearity problem (see Table B1 in Appendix B). The highest pair correlation, equal 0.49, between the education and financial statement implies that higher education owner may employ accounting books in order to track the business as well as make report to authorities. However, this relationship appears to be

ambiguous and could be neglect as a serious problem in term of multicollinearity. Secondly, all four models are regressed to test the good of fitness as analysis in Section 3 above. All statistical tests and the distribution of data suggest that ZINB is the most appropriate model in this case. Finally, we propose 7 models which enable us to investigate the impact of gender on access to finance across industries, before and after the policy of extended credit of the State Bank of Vietnam (mid-year of 2008) and firm size. While table of statistical descriptions is presented as Table B2 in Appendix B, the final results are exhibited as Table 4 below.

Table 4: Regression results

	(1) Total	(2) Industry A[1]	(3) Industry B[2]	(4) Before 2008	(5) After 2008	(6) Micro size	(7) Small & medium
			Dependent variable: number of loans being denied				
female	0.293*	-0.00095	0.514**	-0.182	0.539**	0.0954	0.580**
	0.163	0.243	0.219	0.232	0.254	0.219	0.268
dedu	-0.0717	-0.0553	-0.0695	-0.0992	0.000121	-0.269	-0.0122
	0.197	0.318	0.275	0.257	0.321	0.291	0.235
Fage	0.0134	0.0110	0.0146	0.00688	0.0232*	0.0229**	0.0265*
	0.00932	0.0135	0.0115	0.0133	0.0119	0.0102	0.0153
Logemp	0.250***	0.163*	0.359***	0.106	0.322***	-0.135	0.497***
	0.0707	0.097	0.0953	0.0885	0.11	0.187	0.128
Dcity	0.411**	0.455*	0.226	0.523**	0.303	0.751***	0.499**
	0.168	0.255	0.248	0.242	0.255	0.262	0.241
time control	yes	yes	yes	no	no	no	no
Observations	2,686	1,089	1,597	1,202	1,484	1,513	1,173

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(1) Industry A: food and beverage, apparel (larger share of female labors and female leaders);

(2) Industry B: wood, metal product, electronics, rubber and plastics (smaller share of female labors and female leaders)

In general model, coefficient of female is significant and positive, representing that female-owned enterprises may be denied more times than male-owned enterprises. Value of 0.293 means that log count of being denied of female-owned enterprise is 0.293 higher than male-owned enterprise when other things unchanged. In another word, taking exponential of

0.293, we obtain 1.34, which means female-owned enterprise has possibly been denied 34% more than male-owned enterprises. The result can be explained that there should be the gender difference in access to finance. In another approach, female-owned enterprises may apply abundant times than male-owned enterprises; accordingly, they are likely being denied more. The high correlation between the number of application for a formal loan and the owner gender supports latter explanation. However, this result is not in line with report of Hampel-Milagrosa, Pham, Nguyen, and Nguyen (2010), which represented that male-owned enterprises faced more difficulties in access to long-term loan in Vietnam in 2009. The higher number of application for a formal loan of female-owned enterprises in Vietnam also confronts the empirical of (Andrea F Presbitero, Roberta Rabellotti, & Claudia Piras, 2014) applying data sample of Carribean countries.

Coefficients of logemp and dcity being also positive and significant, means that larger enterprises and enterprises located in city appear to be denied many times than others. This could be explained by the availability of formal loans in cities and demand for loans of larger enterprises. It means that larger enterprises or city-located enterprises may applied more than smaller or rural-located enterprises; therefore, they are denied many times. Another explanation may root from the measurement of dummy variable for city. This variable is defined based on the administrative classification of SMEs' report when Ha Noi, Ho Chi Minh City and Hai Phong are defined as city while other provinces are considered as rural area. There could raise problem because some areas in these city are far from the center and could be more significantly "rural" than center area of provinces.

Models (2) and (3) demonstrate that there seems to have no gender discrimination in female-intensive industry such as food and beverage and apparel. Meanwhile, it is obviously evident that female-owned enterprises are denied many times if they are in male-intensive industries such as wood processing, fabricated metal products, electronics and rubber and plastic products. It is justifiable that in the case of male-intensive industries, enterprises are likely to perform better under the management of man; therefore, they are favored to be financed in the lender point of view. To sum up, the difference in gender gap across industries is present in Vietnamese SMEs. This result is supported by the literature of Kantor (2002).

Models (3) and (4) investigate the gender effect on finance access in term of before and after mid-year of 2008. The sample in surveys was carried out from 2005 to 2013 which

cover the status of SMEs over the period of 2004 to 2012. Therefore, we can employ the survey of 2005 and 2007 to construct information of SMEs during the expansionary monetary policy and the remaining surveys to conduct period after the expansionary monetary policy. Figure 2 shows the difference in monetary policy between 2 periods. Before the period of rapid economic growth along with expansionary policy of State Bank of VN, there is no difference in finance access between female-owned and male-owned enterprises. However, since 2009, when Vietnam tried to constraint credit and money supply, female-owned enterprises appear to have difficulty accessing finance.

Figure 1: Monetary policy in Vietnam from 2004 to 2013
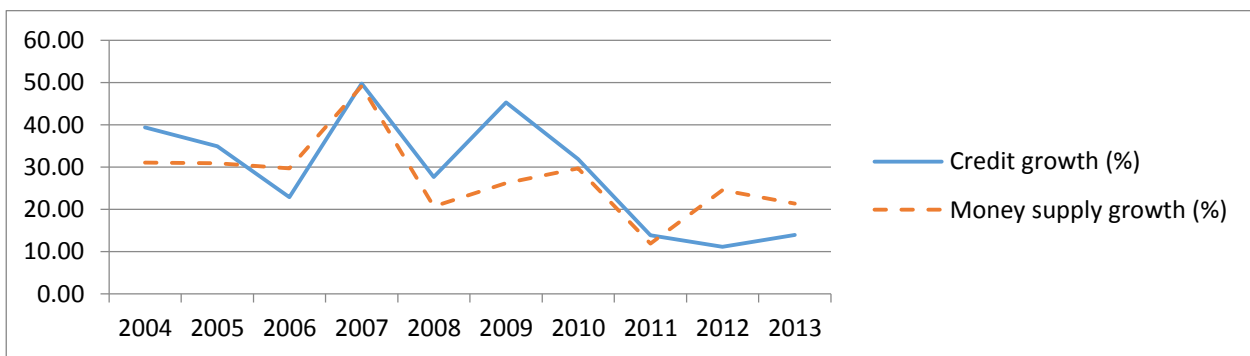
Models (5) and (6) compare the gender effect on access to finance between micro size group and small-and-medium size group. The sample is divided into micro enterprises with less than or equal to 10 employees and small and medium enterprises with more than 10 employees. The results demonstrate that there is no gender difference in term of accessing finance among micro enterprises, which have less than or equal to 10 workers. On the other hand, among small and medium enterprises, there appears to have gender difference when female-owned enterprises are denied many times more than male-owned ones. While the literatures represent the evidence that gender of owner may be correlated with firm size, therefore, affect to possibility of finance access, the results over data of Vietnam are inconsistent. As mentioned before, majority of SMEs, especially micro size enterprises, operated as the household status. This reality may lead to 2 issues, accordingly. First, this type of enterprises have similar characteristic of household rather than typical enterprise. Second, the actual owner may be interchanged between the mature man and woman in the household. These main issues, therefore, may lead to insignificant result in term of micro enterprises.

5. Conclusion

5.1. Conclusion and policy recommendations

The results indicate that there exists gender bias in financial accessibility, in which female firms face higher possibility to be rejected than male firms. Beside from the regression of the whole sample, subsamples are applied to provide more detail explanation. Firstly, the gender bias occurs due to the tight monetary policy to deal with inflation starting in 2008 (in 2009, the explanatory monetary policy was applied to prevent the economic recession as a result of the global financial crisis). Secondly, gender bias does exist in the small and medium enterprises but microenterprises. Another subsample regarding the industry specifics, in which Food & Beverage, Apparel with a higher share of female labors and leaders, there is no evidence of gender bias. Whereas in Wood, Metal Product, Electronics, Rubber, and Plastics (an equivalent number of male and female), female owned enterprises face a higher likelihood of being rejected.

To reach the government's objective regarding gender equality in improving economic and social growth (Hampel-Milagrosa et all, 2010), the Authority should concentrate on improving financial accessibility for female firms and firms with a large share of female labors, especially during the tight monetary policy applied. Some regulations favoring female enterprises were issued, but their practical application does not meet the target

5.2. Future research

This research targets to a small part of a large picture of relationship between gender of owner and finance accessibility. We have discussed on the gender difference in term of application for and being denied a formal loan. The scope of this research, therefore, focuses on only 15% of total enterprises which have applied for a loan. The remaining of 85% of enterprises obtaining loan should be considered in the future research. Additionally, the methodology of this research may be adjusted to include the random/fixed effects of longitudinal data.

Several future extensions could be drawn as following:

(i) Identify whether gender difference may affect the reasons for not applying for a formal loan. Within subjective and objective reasons from the analysis in section 4.2.1, we can construct a multinomial logistic regression to identify the gender difference in decisions for not applying for a formal loan.

(ii) Identify whether there are gender difference in access to formal and informal loan. The total sample of SMEs can be divided into 4 groups: SMEs having both formal and informal loan, SMEs having either formal or informal loan, and SMEs having no loan. Multinomial logistic regression is applied for categorical variable.

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Appendix A: Model selection strategy

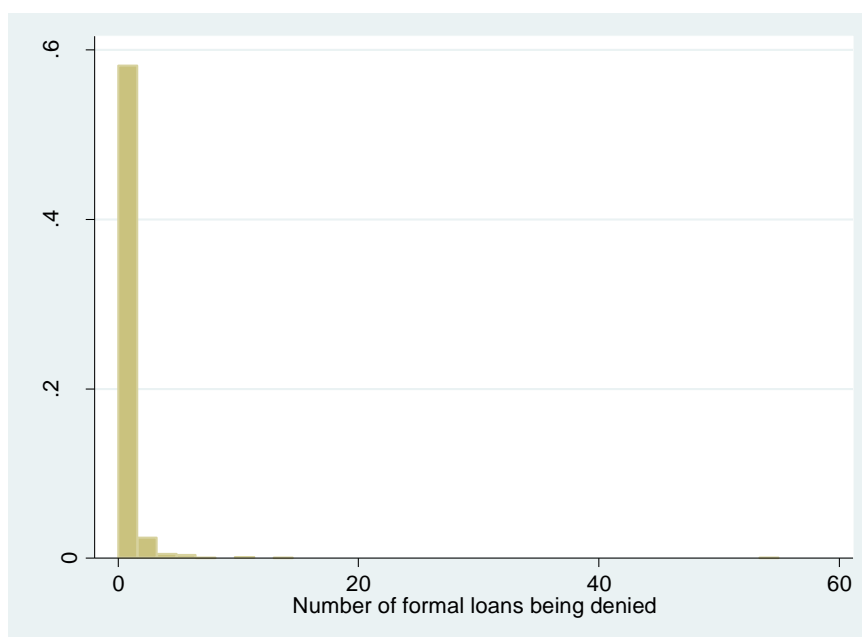Figure A1: Histogram of number of formal loans being denied

Figure A2: Regression results and alpha test

	Dep. Var.: number of formal being denied			
	(1)	(2)	(3)	(4)
	Poisson	nbreg	zip (not-always 0 group)	zinbreg (not-always 0 group)
female	0.202***	0.158	0.377***	0.191**
	0.0722	0.133	0.0915	0.0912
dedu	0.167*	0.136	0.202*	0.108
	0.0872	0.169	0.108	0.113
fage	0.0063	0.00846	0.0120**	0.00783
	0.00399	0.00726	0.00521	0.00512
dsmallsize	-0.225**	-0.223	-0.354***	-0.220*
	0.0968	0.173	0.127	0.12
dfinstm	0.305***	0.333*	0.339**	0.19
	0.101	0.183	0.136	0.127
2007.year	-0.172	-0.248	0.637***	0.333**

	0.113	0.192	0.151	0.139
2009.year	-0.162	-0.214	0.442***	0.227*
	0.111	0.192	0.153	0.135
2011.year	0.382***	0.316	0.900***	0.499***
	0.101	0.193	0.135	0.126
2013.year	-0.0771	-0.109	0.241	0.0994
	0.118	0.213	0.164	0.145
Constant	-1.460***	-1.431***	-0.382**	0.290*
	0.128	0.224	0.179	0.157
Alpha test	*1.939***		*-1.387***	
	0.0835		*0.157*	
Observations	2,685	2,685	2,685	2,685

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure A3: Compare the predicted outcomes produced by 4 models
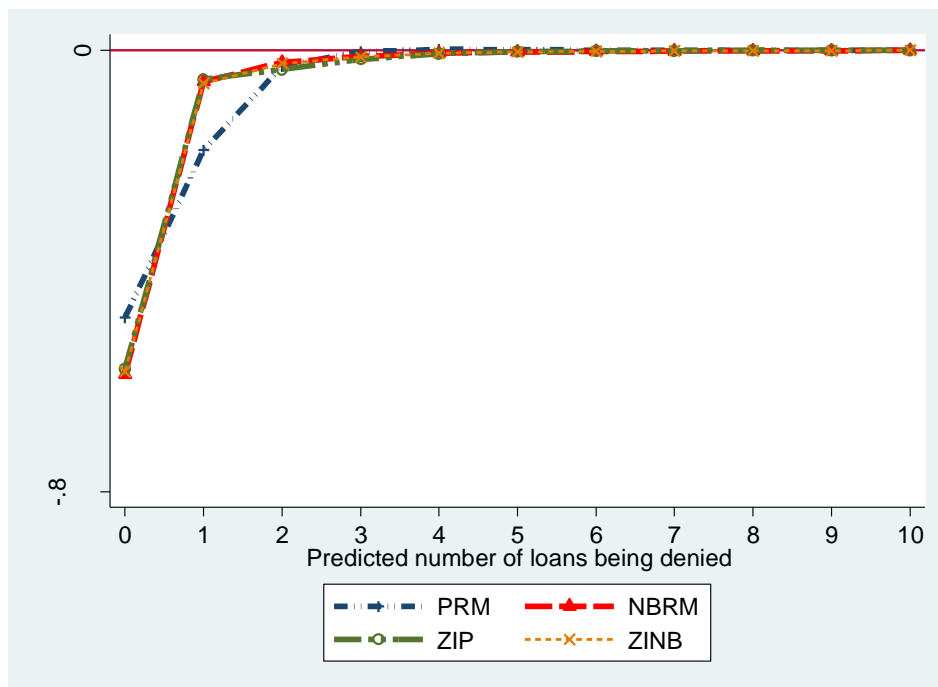
Note: PRM (poisson regression), ZIP (zero-inflated regression, NBRM (negative binomial regression), ZINB (zero-inflated negative binomial)

Appendix B: Regression results

Table B1: Pearson correlation between variables in regression

	deniedfl	female	dedu	fage	logemp
deniedfl	1				
female	0.0305	1			
dedu	0.0478	0.0915	1		
fage	-0.0054	-0.0142	-0.1399	1	
logemp	0.0804	0.0602	0.4989	-0.1743	1

Table B2: Descriptions of data using in regression model

Variable	Obs	Mean	Std. Dev.	Min	Max
deniedfl	2686	0.30	1.41	0	55
female	2694	0.36	0.48	0	1
dedu	2694	0.25	0.43	0	1
fage	2694	12.70	9.37	2	75
logemp	2694	2.40	1.30	0	7.85