# Access to Formal Credit and Firm Performance – the Case of Small and Medium-Sized Enterprises in Vietnam

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**Abstract**

Formal credit has been recognized as an important factor of firms, especially small and medium-sized enterprises (SMEs). SMEs normally have a problem of credit constraints and thereby firms with access to credit may experience quicker development and higher profit than the non-borrowing firms. The main purpose of this study is to examine the role of formal (bank) credit on performance of the SMEs in Vietnam. This study applied propensity score matching (PSM) method to investigate the impact of formal credit on firm performance. The results showed that formal credit improves performance of SMEs in Vietnam via increasing revenue and profit.

**Key words***: credit, firm performance, PSM, SMEs, Vietnam*

## 1. INTRODUCTION

SMEs which constitute of 90 percent of firms play an important role in developing countries. SMEs make contribution to economic development and employment. SMEs are found to make a great contribute to GDP, provide a large labor supply and generate a large number of value added (Atieno, 2009; Punyasavatsut, 2011)

In Vietnam, SMEs are a main business type. As a statistics by the General Statistics Office of Vietnam (GSO) in 2011, SMEs accounted for 97.6 percent of total of firms in Vietnam. The numbers of labors working at SMEs are 5.06 million. The number of SMEs in Vietnam has increased rapidly and makes a great contribution to the national budget.

SMEs normally face with the credit constraints, which hinders their performance, expansion or growth (Wagenvoort, 2003; Beck, Demirgüç–Kunt and Maksimovic, 2005; Khandker, Samad and Ali, 2013). However, SMEs have difficulties in accessing to credit, especially the formal sources. Dalberg (2011) stated that credit has significant positive impact on SMEs performance via facilitating market entry, improving growth, decreasing risks and enhancing innovation. Literature also confirms that SMEs mat benefit more when borrowing form bank rather than informal source (Akoten et al., 2006; Atieno, 2009; Shinozaki, 2012).

For the case of Vietnam, there are few studies about the effect of bank credit on SMEs performance. Shinozaki (2012) concluded that bank credit positively affect SMEs' growth, while Malesky and Taussig (2009) found no relationship between bank credit and firm performance.

Therefore, the main objective of this study is to investigate the role of bank credit in enhancing the performance of SMEs in Vietnam. This study employs PSM to assess this impact. The analysis of this study relies on the data from two surveys on SMEs in Vietnam in the year of 2009 and 2011.

The results from this study may be considered as empirical evidence on the role of bank credit; thenceforth the policy makers and firm managers can have policies and solutions to improve the effectiveness of financial services to support the SMEs.

The structure of research is designed as follows: Section 1 introduces this paper. Section 2 presents literature review on the role of credit. Section 3 present methodology. Section 5 describes data. Section 4 presents results and discussions. Section 5 gives conclusion, policy implications and limitations.

## 2. LITERTURE REVIEW

Literature documents that financial constraints and access to credit have significant impact on firm performance. Credit is considered as one of important production factor. SMEs with access to credits allow are able utilize productive assets to improve (Kira & He, 2012). Dalberg (2011) states that access to finance may facilitate market entry, enhance growth, reduce risks, and boost innovation and entrepreneurial activity. In a research for the case of SMEs in 14 Europe, Wagenvoort (2003) states that financial constraints may inhibit firms' growth. Beck, Demirgüç–Kunt and Maksimovic (2005) conduct a research on firms in 54 countries and also confirmed that growth of firms, especially small firms, may be limited due to financial constraints limit firm growth. Khandker, Samad and Ali (2013) apply fixed-effect model to investigate the impact of access to credit on growth and profitability of microenterprise in Bangladesh. Their findings prove that credit constraint inhibits firms' profit margin. Moreover, firms that borrowed from informal sources such as money lender have lower profit than those borrowing from other sources. Some empirical studies document that firms borrowing from bank grow more rapidly than from informal sources (Ayyagari, Demirgüç-Kunt and Maksimovic; 2010; Akoten et al., 2006; Atieno, 2009; Shinozaki, 2012). However, Allen et al. (2012) contrast that there is no evidence for the difference in firm performance between firms borrowing from bank source and other sources. Informal credit sources is an important alternative financial when formal credit is not available.

Very limited studies have examined the impact of credit accessibility on SMEs' growth and performance in Vietnam. Malesky and Taussig (2009) conclude that there is no evidence for the relationship between bank credit and firm profitability due to some political issues arising in lending procedure. Meanwhile, a research by Shinozaki (2012) finds positive relationship between bank credit and SMEs' growth.

## 3. METHODOLOGY

### *3.1. Impact evaluation using PSM*

PSM has become a widely applied method in impact evaluation of a program, activity or policy. PSM is considered as an effective technique to reduce the selection bias. PSM method was developed by Rosenbaum and Rubin (1983), Sascha and Ichino (2002), and Khandker (2010).

Based on the impact evaluation procedure using PSM by these authors, *first of all*, a probit model of determinants of access to credit is conducted. The equation is written as follows:

$$\Pr(CREDIT_i=1) = \Phi(\beta_0 + \beta_1 Z_i + \varepsilon_i) \qquad (1)$$

Where $CREDIT_i$ represents firm *i*' access to formal credit (1 if firms with access to credit; and 0 otherwise); $Z_i$ denote vectors of variables that affect firm *i*' access to credit. This equation is used to calculate the probability of accessibility to formal credit or be considered as propensity score of each firm. On the basis of terms in impact evaluation, firms with accessibility to credit may be defined as the treatments and the non-borrowing firms as the control.

*In the second step*, the common support region will be determined; that is, some observations may be omitted because their propensity score are much different from the others. Moreover, before matching, the balancing test also needs to be satisfied (Dehejia & Wahba, 2002).

*In the final step,* each treatment will be matched with one or some control units that have similar propensity score. Then, the difference in outcomes between each treatment and control units are calculated. This difference is considered as "individual gain". The matching process may be conducted via using some techquiques of PSM such as Nearest-neighbor, Stratification and

Kernel.Mean of all individual impact will be calculated to achieve overall impact. The estimation is conducted using standard errors Bootstrap to overcome incorrect standard errors (Khandker, 2010).

### *3.2. Selection of variables*

Kung'u (2011) proved that three main factors affecting SMEs' accessibility to credit, including, firm, financial and entrepreneurial characteristics. Nguyen, Gan and Hu (2012) also suggested that such factors as owner characteristics, firm characteristics, and number of doing business may determine SMEs' access to credit. While Monge-Naranjo and Hall (2013) found that firms' accessibility to bank credit may be affected by firm characteristics, including firm's value, the firm's size in terms of number of employees, the firm's age, and whether it keeps formal accounting procedures. Buyinza and Bbaale (2013) proved that the quality of the legal environment have positive impact on firms' access to credit while the weaknesses in tax administration has negative effect. Ha, Nguyen and Nguyen (2014) suggested that owner attributes and firm's assets play an important role in firm' accessibility to credit.

**Table 1 - Definition of the Variables used for Analysis**

| VARIABLE | Description Definition | Description |
|---|---|---|
| ***Treatment variable (from the survey 2011)*** | | |
| CREDIT | Accessibility to formal credit (from bank) | Dummy: 1=Yes; 0=Otherwise |
| ***Explanatory variables (from the survey 2009)*** | | |
| *INNO* | Firms with any innovation activities | Dummy: 1=Yes; 0=Otherwise |
| *BEFORE* | Firms borrowing from this bank before | Dummy: 1=Yes; 0=Otherwise |
| NBANK | Network size: Number of bank officials that firms have relationship with | Continuous |
| RTA | Real Total asset in the survey of 2009 | Continuous (mil dong) |
| RRB | Real Revenue in the survey of 2009 | Continuous (mil dong) |
| *ROAD* | Firms with location on main road | Dummy: 1=Yes; 0=Otherwise |
| *INFM* | Accessibility to any informal credit | Dummy: 1=Yes; 0=Otherwise |
| FAGE | Age of firms | Continuous |
| *MEMBA* | Member of association | Dummy: 1=Yes; 0=Otherwise |
| *RD* | Firms with Research & development activity | Dummy: 1=Yes; 0=Otherwise |
| FSIZE | Number of employees | Continuous |
| *BUSLI* | Firm with business registration license | Dummy: 1=Yes; 0=Otherwise |
| IFCOST | Ratio of informal payment over total revenue | Percentage |
| ***Outcome variables (from the survey 2011)*** | | |
| RR | Real Revenue in the survey of 2011 | Continuous (mil dong) |
| RGP | Real Gross Profit in the survey of 2011 | Continuous (mil dong) |

*Note: Dummy variables are in Italic*

From reviewing the previous empirical studies, the factors in **Table 1** are applied to investigate the determinants on access to formal credit. These variables use the information in the survey of 2009, which indicate the firms' characteristics before access to formal credit. The variable CREDIT employs information in the survey of 2011.

**Table 1** also present the dependent variables used for analysis in this study. These dependent variables apply the information in the survey of 2011. However, when estimating the impact of formal credit, logarithm of these variables is employed.

## 4. DATA DESCRIPTION

### *4.1 Survey area*

This research employs the data is collected in the surveys of SMEs in Vietnam in 2009 and 2011. These surveys were conducted by the Central Institute for Economic Management (CIEM), Institute of Labor Science and Social Affairs (ILSSA), the United Nations University's World Institute for Development Economics Research (UNU-WIDER) Department of Economics (DoE) of Copenhagen University and Embassy of Demark in Vietnam.

These data is a nation-wide survey of SMEs in Vietnam. In particular, approximately 2,500 non-state manufacturing SMEs are interviewed. The firms locate in 10 cities or provinces including Hanoi, Hai Phong, Ho Chi Minh City, Ha Tay, Phu Tho, Nghe An, Quang Nam, Khanh Hoa, Lam Dong and Long An. The survey of SMES is designed to represent the whole SMEs in Vietnam.

### *4.2 Sample selection*

Based on the literature of impact evaluation methods including PSM, all the firms will be categorized into two comparison groups, including treatment group and control. Particularly in this research, these two groups are defined as follows: (1) Treatment group are the firms with access to formal credit within the survey of 2011. (2) Control group are the firms without access to formal credit.

**Table 2 - Descriptive Statistics**

| Variable | Total Sample | | | Borrowing Firms | | | Non-borrowing Firms | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Mean** | **Min** | **Max** | **Mean** | **Min** | **Max** | **Mean** | **Min** | **Max** |
| *CREDIT* | 0.33 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| *INNO* | 0.45 | 0.00 | 1.00 | 0.55 | 0.00 | 1.00 | 0.41 | 0.00 | 1.00 |
| *BEFORE* | 0.44 | 0.00 | 1.00 | 0.64 | 0.00 | 1.00 | 0.34 | 0.00 | 1.00 |
| NBANK | 2.33 | 1.00 | 4.00 | 2.72 | 1.00 | 4.00 | 2.13 | 1.00 | 4.00 |
| RTA | 1191 | 0.33 | 39,148 | 1616 | 4.64 | 23,414 | 981 | 0.33 | 39,148 |
| RRB | 1003 | 4.08 | 19,518 | 1588 | 6.13 | 19,518 | 713 | 4.08 | 15,368 |
| *ROAD* | 0.80 | 0.00 | 1.00 | 0.84 | 0.00 | 1.00 | 0.78 | 0.00 | 1 |
| *INFM* | 0.70 | 0.00 | 1.00 | 0.79 | 0.00 | 1.00 | 0.65 | 0.00 | 1.00 |
| FAGE | 14.25 | 2.00 | 55.00 | 12.7 | 2.00 | 55.00 | 15.0 | 2.00 | 55.0 |
| *MEMBA* | 0.11 | 0.00 | 1.00 | 0.17 | 0.00 | 1.00 | 0.08 | 0.00 | 1.00 |
| *RD* | 0.32 | 0.00 | 1.00 | 0.19 | 0.00 | 1.00 | 0.39 | 0.00 | 1.00 |
| FSIZE | 16.55 | 1.00 | 270.0 | 24.6 | 1.00 | 245.0 | 12.5 | 1.00 | 270.0 |
| *BUSLI* | 0.67 | 0.00 | 1.00 | 0.73 | 0.00 | 1.00 | 0.64 | 0.00 | 1.00 |
| IFCOST | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.04 |
| RR | 992 | 2.07 | 18,529 | 1708 | 2.07 | 18,529 | 637 | 5.56 | 13,666 |
| RGP | 157 | -4.8 | 4447 | 242 | -4.8 | 4447 | 114 | -1.3 | 3517 |
| **Obs** | | 1490 | | | 494 | | | 996 | |

*Note: Dummy variables are in Italic*

On the basis of this criterion and after dropping out the firms with measurement errors, 1490 firms are used for analysis, including 494 borrowing firms and 996 non-borrowing firms.

In order to investigate the probability of access to formal credit, this paper applied the firm attributes before access to formal credit (in the survey of 2011); that is, these characteristics employ information from the SMEs survey in 2009. **Table 2** presents the characteristics of SMEs in this paper.

## 5. RESULTS AND DISCUSSION

**Table 3** shows results of determinants of accessibility to formal credit. From **model 1**, such variables as INNO, BEFORE, NBANK, RRB, IFM, MEMBA and FSIZE are found to have significantly positive effect on accessibility to formal credit while RTA, FAGE and RD have significantly negative impact of firms' access to formal credit. The variables such as ROAD, BUSLI and IFCOST have no effect on accessibility to formal credit.

However, the main objective of this research is not forecasting the determinants of access to credit. Therefore, the balancing of the independent variables are more important that their statistical significance.

As presented in methodology**, Table 3** also indicates some results of the first stage of PSM methods. Based on this estimated model, propensity score will be calculated. The result from balancing test for **Model 1** shows that the variable ***FSIZE*** does not meet the requirement of balancing property, so it is dropped out of the model. Model 2 shows that the balancing test is satisfied. Max VIF equal to 2.17 indicate no multi-colinearity in the model.

**Table 3 – Estimate of Probability of Access to Formal Credit**

| Variable | MODEL 1 | | MODEL 2 | |
|---|---|---|---|---|
| | Coef. | P-value | Coef. | P-value |
| *INNO* | 0.235*** | 0.001 | 0.241*** | 0.001 |
| *BEFORE* | 0.463*** | 0.000 | 0.473*** | 0.000 |
| NBANK | 0.174*** | 0.000 | 0.172*** | 0.000 |
| *RTA* | -3.23e-05* | 0.065 | -2.03e-05 | 0.219 |
| *RRB* | 4.93e-05** | 0.048 | 7.82e-05*** | 0.000 |
| *ROAD* | 0.031 | 0.740 | 0.039 | 0.670 |
| *INFM* | 0.312*** | 0.000 | 0.311*** | 0.000 |
| FAGE | -0.009** | 0.017 | -0.009** | 0.016 |
| *MEMBA* | 0.208* | 0.075 | 0.251** | 0.029 |
| *RD* | -0.249*** | 0.005 | -0.257*** | 0.004 |
| FSIZE | 0.005** | 0.017 | | |
| *BUSLI* | 0.003 | 0.973 | 0.019 | 0.825 |
| IFCOST | 6.079 | 0.633 | 7.444 | 0.558 |
| CONSTANT | -1.370*** | 0.000 | -1.360 | 0.000 |
| **Obs** | 1,490 | | | |
| **Balancing Test** | Not Satisfied | | Satisfied | |
| **Max VIF** | 2.17 | | 2.17 | |
| **Common Support** | [.04501959, .97781027] | | [.04382702, .96031305] | |

*Note: *, ** and *** are significance level at 10%, 5% and 1%, respectively*
*Dummy are in italic*

**Table 4** indicates that there are 6 observations in the control group falling out of the common support, so these observations will not be used for matching. The number of observation using for matching are 1484 firms, in which are 494 borrowers and 990 non-borrowers.

**Table 5** showed that access to formal credit truly leads to a higher increase in firms' real revenue at the significance level of 5 percent. The real revenue of borrowing-firms is higher by 45.1 percent or 45.4 percent or 50.7 percent than that of non-borrowing firms via using Nearest Neighbor, Stratification and Kernel matching respectively.

From **Table 5**, borrowing firms are also found to improve their real gross profit higher by 29.3 percent or 36 percent or 37.8 percent than that of the non-borrowing firms via using Nearest Neighbor, Stratification and Kernel matching respectively. T-stat values indicate that the effect is statistically significant at level of 5 percent.

**Table 4 – Samples before and after Matching**

| Access to bank credit | Before Match | After match | Loss Rate |
|---|---|---|---|
| Without (Control Group) | 996 | 990 | -0.6% |
| With (Treatment Group) | 494 | 494 | 0.0% |
| Total Obs | 1490 | 1,484 | -0.4% |

**Table 5 – Impact of Formal Credit on Real Revenue and Real Gross Profit**

| | No. of Treats | No. of Ctrls | LOG(REVENUE) | | LOG(GROSS PROFIT) | |
|---|---|---|---|---|---|---|
| | | | ATT | t-stat | ATT | t-stat |
| Nearest Neighbor | 494 | 304 | 0.451*** | 3.68 | 0.293** | 2.30 |
| Stratification | 476 | 1008 | 0.454*** | 5.66 | 0.360*** | 4.27 |
| Kernel | 494 | 990 | 0.507*** | 6.77 | 0.378*** | 4.43 |

*Note: *, ** and *** are significance level at 10%, 5% and 1%, respectively*

## 6. CONCLUSION

The findings show that credit has significantly positive impact on firms' performance in terms of real revenue and real gross profit. The level of impact is remarkable; in particular, in comparison to the non-borrowing firms, firms with access to formal credit has higher revenue ranging from around 45.1 percent to 50.7 percent and greater gross profit ranging from 29.5 percent to 37.8 percent. The results indicate that credit plays an important role in improving performance. However, the SMEs in Vietnam still have some difficulties in borrowing from formal institution. Therefore, the Government and the financial institutions should have programs or policy to support the SMEs in accessing to formal credit sources.

This research does not take into account impact of formal credit on firm performance over time. The further study will employ panel data to investigate this effect on the change in firm performance.

## REFERENCE


Akoten, J. E., Sawada, Y. & Otsuka, K. (2006). The determinants of credit access and its impacts on micro and small enterprises: The case of garment producers in Kenya. *Economic development and cultural change*, *54(4)*, 927-944. doi:

Monge-Naranjo, A. &Hall, L. (2013). Access to Credit and the Effect of Credit Constraints on Costa Rican Manufacturing Firms. Inter-American Development Bank Banco Interamericano de Desarrollo Latin American Research Network Red de Centros de Investigación Research Network Working Paper #R-471, 53-54.

Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2010). Formal versus Informal Finance: Evidence from China. *Review of Financial Studies*, *23(8)*, 3048-3097. doi: http://dx.doi.org/10.1093/rfs/hhq030

Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance, 30(11),* 2931-2943.

DALBERG. (2011). Report on Support to SMEs in Developing Countries Through Financial Intermediaries: Dalberg Global Development Advisors.

Dehejia, R. H. & Wahba, S. (2002). Propensity Score Matching Methods for Non-Experimental Causal Studies. *The Review of Economics and Statistics, 84*, 151-161.

Faisal Buyinza and Edward Bbaale (2013). Access to Credit and the Effect of Credit Constraints on the Performance of Manufacturing Firms in the East African Region: Micro Analysis. *International Journal of Economics and Finance, 5 (10).*

GSO (2011). *Small and Medium-Size Enterprises in the period of 2006 – 2011*. https://www.gso.gov.vn/default.aspx?tabid=512&idmid=5&ItemID=13966

Ha Thi Thieu Dao, Nguyen Thi Mai and Nguyen Thien Kim (2014). *Accessibility To Credit Of Small Medium Enterprises In Viet Nam.* Presentation at The Vietnam Economist Annual Meeting (VEAM) 2014.

Kung'u, G. K. (2011). Factors influencing SMEs access to finance: A case study of Westland Division, Kenya. MPRA Paper No. 66633, 22-23.

Khandker, S., Samad, H. A., & Ali, R. (2013). Does access to finance matter in microenterprise growth? evidence from Bangladesh. Evidence from Bangladesh (January 1, 2013). World Bank Policy Research Working Paper(6333).

Khandker, S. R. (2010). Handboook on Impact Evaluation – Quantitative Method and Practice. *The World Bank*, Development Economics.

Kira, A. R., & He, Z. (2012). The Impact of Firm Characteristics in Access of Financing by Small and Medium-sized Enterprises in Tanzania. *International Journal of Business and Management, 7(24)*, p108.

Malesky, E. J., & Taussig, M. (2009). Where Is Credit Due? Legal Institutions, Connections, and the Efficiency of Bank Lending in Vietnam. *Journal of Law, Economics, and Organization, 25(2)*, 535-578.

Nhung Nguyen, Christopher Gan & Baiding Hu, (2012). Credit Accessibility and Small and Medium Sized Enterprises Growth in Vietnam. Lincoln University Digital Thesis. 55-58.

Punyasavatsut, C. (2011). '*SMEs Access to Finance in Thailand'*, in Harvie, C., S. Oum, and D. Narjoko (eds.), Small and Medium Enterprises (SMEs) Access to Finance in Selected East Asian Economies. ERIA Research Project Report 2010-14, Jakarta: ERIA. pp.196-197.

Rosenbaum, P. R., & Rubin, D. B. (1983). The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika, 70*, 41-55.

Sascha O. Becker & Ichino Andrea (2002). Estimation of average treatment effects based on propensity scores. *The Stata Journal*, *4*, 358-377.

Shinozaki, S. (2012). A New Regime of SME Finance in Emerging Asia: Empowering Growth-Oriented SMEs to Build Resilient National Economies: Asian Development Bank.

The Steering Group of Dalberg (2011). *Report on Support to SMEs in Developing Countries Through Financial Intermediaries.*

Wagenvoort, R. (2003). Are finance constraints hindering the growth of SMEs in Europe? *EIB papers*, *8(2)*, 23-50.