

# Does Corruption Hinder or Boost Firm Investment? A Vietnamese Perspective

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**ABSTRACT :** *This study aims to test the contrasting hypotheses that corruption hinders or boosts firm investment using firm-level data of Vietnamese small and medium enterprises. Firm investment dummy is used as the dependent variable while independent variables include the firm corruption dummy and variables of firm characteristics, and owner/manager characteristics. As corruption and investment may be endogenous, leading to biased estimates, we employ both a simple logistic regression model and a bivariate probit model with a corruption instrument to go around the potential issue of endogeneity. We find evidence to support the hypothesis that corruption hinders firm investment and therefore, this may be a mediating channel leading to the negative effect of corruption on firm performance.*

**KEYWORDS** – *Bivariate probit model, Corruption, Firm investment, Vietnam*

## I. INTRODUCTION

Investment plays a key role in firm competitiveness and economic growth. However, in many countries, a firm's investment may face with friction from government officials. Some authors assert that corruption would boost firm investment as bribery "greases" the wheels, so that firms can overcome obstacles from the bureaucracy. On the contrary, the others argue that bribery would deter investment by, for example, increasing costs and promoting rent-seeking behaviors. In the broader picture, there is a strand of the literature supports the hypothesis that corruption greases the wheels of commerce and another strand holds the view that corruption sands the wheels and is detrimental to firm performance. Empirical evidences appear inconclusive and thus further evidence is necessary.

In our previous study [1], we showed that corruption is likely to reduce firm revenue growth and labor productivity growth in Vietnam. Following the study, we conjecture that the effect of corruption on firm performance may go partially through firm investment. That is, corruption may deter investment, leading to the deterioration of firm performance. This study aims to provide additional evidence to shed light on the relationship between corruption and firm investment. To do so, we reuse the micro-data set of Vietnamese small and medium enterprises surveyed in 2015. The dependent variable is a dummy indicating whether a firm has made a new investment in the past two years. An independent corruption dummy is used, which is one if a firm gives bribes to public officials and zero otherwise. As the dependent variable is binary, we first model the relationship by a simple logistic model. There is, however, a potential endogeneity problem as investment may reversely affect corruption behaviors. To go around the problem, we adopt the technique of Fisman and Svesson [2] to use the location-industry average of bribery rate as the instrument for bribery. However, traditional instrumental regression is applicable only if the dependent variable is continuous. We, therefore, follow Woodridge [3] to use the bivariate probit framework. For comparison, we also run the simple logistic regression.

The rest of the study is organized as follows. In section 2, we briefly review the literature on the relationship between corruption and firm performance in general and corruption and firm investment in particular. In section 3, we describe the methodology and dataset used in this study. Section 4 discusses the empirical results and findings. The final section is the conclusion.

## II. LITERATURE REVIEW, METHODOLOGY AND DATA

The relationship between corruption and firm investment is often discussed on the broader topic of corruption and firm performance. In that literature, two contrasting views have emerged. The first line of view, referred to as the "sand the wheels" hypothesis asserts that corruption hampers firm performance as it increases transaction costs and encourages non-productive, rent-seeking behaviors of firms (see, for example, De Rosa et al [4] and Gravia [5]). The other view, on the contrary, demonstrates that corruption helps to enhance firm performance by clearing bureaucratic obstacles and secures firm operations (Mendoza et al [6], Radaev [7]). In this broader literature, some authors argue that corruption raises transaction costs, creates uncertainty, discourages productive activities and thus deters investment (Shleifer and Vishny [8], Wei [9]). Asiedu and Freeman (2009) investigated the relationship between corruption and investment at a firm-level and found that

corruption affected negatively and significantly on firm investment. Other authors show that corruption might create investment opportunities for firms as they may gain contracts or avoid cumbersome regulations (Hellman et al [10]). As the literature remains vague in the effect of corruption on firm investment, especially in countries with a high degree of corruption, it is necessary to look for additional empirical evidences.

In this study, we examine whether corruption deters or boosts firm investment using firm-level data from Vietnamese small and medium enterprise survey in 2015. Corruption is perceived to be relatively widespread in Vietnam, making the country an ideal case study for our research purpose. Specifically, we attempt to identify whether bribing behaviors of firms, along with other factors, influence their decision to invest or not. Since the dependent variable of investment is binary, a simple logistic model is employed to model the relationship. A potential problem may arise that affect the estimation, however. Investment may have a reverse influence on corruption and thus inducing bias in the estimation. To deal with this potential endogeneity, the convention is to find an instrumental variable that is correlated with the corruption variable but uncorrelated with investment. Following Fisman and Svensson [2], a province-sector bribery corruption variable can be used as an instrument. It is, nevertheless, rather complicated that the conventional instrumental regression can be applied only if the dependent variable is continuous. As our dependent variable is binary, using instrumental regression would produce bias as well. To go around this issue, we rely on a bivariate probit framework with a maximum likelihood estimator. Woodridge [3] shows that the bivariate probit model can produce unbiased and efficient estimates of a binary model with endogenous binary regressors. The model is defined as follow:

$$Investment = 1[X\beta + \alpha Corruption + u > 0]$$

$$Corruption = 1[X\delta + z\gamma + v > 0]$$

where Investment and Corruption are binary variables, z is an instrumental variable defined as province-sector average corruption probability, X is a vector of exogenous variables, u and v are normally distributed error terms. These models can be also be used to compute a Hausman-like likelihood ratio endogeneity test (Knapp and Seaks [11]) to examine the existence of endogeneity.

To be on the safe side and for comparison, we estimate both the simple logistic model and the bivariate probit model, using a dataset of 2,637 small and medium firms surveyed in 2015 across nine provinces in Vietnam. The survey was completed using direct interviews of firm owners or managers. The dependent variable is binary which is one if a firm has invested in the past two years and zero otherwise. The independent variables include a corruption dummy variable and variables of firm characteristics. The full list of variables and their definitions is given in Table 1.

### III. RESULTS AND DISCUSSION

Before jumping to the regression results, we first examine some descriptive statistics of the variables in the models. Table 2a reports the results of the proportion test of binary variables between firms that have invested in the past two years and those have not. It shows that investing firms and not-investing firms are significantly different in most binary variables. For example, corruption seems to be higher among investing firms (46.78%) than non-investing firms (39.6%). The proportion of household firms is significantly lower among investing firms. It is interesting to note that investing firms are more likely to be exporters, have more educated owners/managers, and more likely to face increasing competition. Also, investing firms appear more likely to have a single owner.

Table 2b shows t-test statistics of the continuous variables. We can see that the variables appear significantly different between investing and non-investing firms. Investing firms seem to have larger sizes, lower firm age, and lower age of owners/managers.

**Table 1: Dependent and Independent Variables and their definitions**

Variable	Description
<b>Dependent variable</b>	
<b>Investment</b>	Binary variable which is one if a firm has invested in the past two years and zero otherwise
<b>Explanatory variables</b>	
<b>Corruption</b>	Dummy variable which is one if a firm engages in bribing behaviors.
<b>Total assets</b>	Total assets of firm in logarithm which proxies firm size.
<b>Firm age</b>	Logarithms of the number of years since the firm established.
<b>Household firm</b>	Binary variable which is one if the firm is run by a household.
<b>Increasing competition</b>	Dummy variable which is one if the firm faces increasing competition
<b>Single owner</b>	Binary variable which is one if the firm has a single owner.

<b>Age of firm owners/managers</b>	Logarithms of the age of owner or manager in years.
<b>Gender of firm owners/managers</b>	Binary variable which is one for male.
<b>Primary education</b>	Binary variable if firm owner or manager’s general education is primary education or below.
<b>Professional education</b>	Binary variable if firm owner or manager’s professional education is vocational college or above.
<b>Exporter</b>	Binary variable which is one if the firm has export sale.
<b>Managerial experience</b>	Binary variable which is one if firm owner or manager has previous experience in firm products.

**Table 2a: Descriptive statistics of binary variables**

Variable	Proportion (%)	
	Investing firms (N=1,291)	Non - investing firms (N=1,346)
<b>Corruption</b>	46.78***	39.6***
<b>Household firm</b>	54.07***	71.25***
<b>Gender of owner/manager (male =1)</b>	61.04**	57.06**
<b>Single owner</b>	80.79***	91.53***
<b>Primary education</b>	4.57***	8.4***
<b>University education</b>	30.13***	24.00***
<b>Increasing competition</b>	57.71***	49.55***
<b>Exporter</b>	9.60***	4.46***
<b>Owner/manager experience</b>	14.02	13.82

\*\*\*, \*\*: One and five percent statistically significant levels respectively.

**Table 2b: Descriptive statistics of continuous variables**

Variable	Investing firms N=1,291		Non-investing firms N=1,346	
	Mean	Standard Dev	Mean	Standard Dev
<b>Total assets</b>	14.27***	1.79	13.76***	1.74
<b>Firm age</b>	2.49**	0.7	2.56**	0.73
<b>Age of owner or manager</b>	3.76***	0.25	3.81***	0.26

\*\*\*, \*\*, \*: One, five, and ten percent statistically significant levels respectively.

Table 3 reports the estimation results of the simple logistic model and bivariate probit models. We show both the log-odd regression coefficients and marginal effects. At the bottom of the table, we report the Hausman-like endogeneity test statistics. The null hypothesis is that there is no endogeneity between the investment variable and the corruption variable. The p-value of test statistics is zero, indicating that the null hypothesis is rejected. That is, there exists endogeneity in the models. Therefore, the simple logistic model may give biased estimates. However, for comparison, we would still show the results of the model.

The estimation of the simple logistic model and the bivariate probit model show a striking similarity in terms of coefficient sign and level of significance. The two models demonstrate significant effects of firm size, firm type, type of ownership, age, gender, and education of firm owners/managers and exporter status. Specifically, larger firms are more likely to invest than smaller firms. Firms tend to invest more when they face increasing competition. Also, firms tend to invest more if they are exporters, selling their products to international markets. Male owners/ managers have a higher probability to invest than female ones. A similar pattern is found if firms are run by younger owners/managers. On the contrary, firms run by households are less likely to invest. Single-owner firms tend to have a lower probability to invest.

The difference between the models is the effect of corruption on firm investment. The logistic regression reports that the effect is insignificant. The t-test p-value is, however, merely slightly over 10 percent significant level. Meanwhile, the bivariate probit model shows a significant and negative effect of corruption on firm investment. Bribing firms are less likely to invest than non-bribing firms. Since the endogeneity test confirms the existence of endogeneity, the bivariate model provides better estimates than the simple logistic model. This finding gives additional support to the sand-the-wheel hypothesis that corruption deters firm investment.

Table 3: Estimation Results of Simple Probit Model and Bivariate Probit Model

Variable	Simple logistic model		Bivariate probit model	
	Coefficient	Marginal effect	Coefficient	Marginal effect
Corruption	-0.16	-0.04	-1.42***	-0.48***
Total assets	0.07**	0.02**	0.18***	0.06***
Firm age	0.05	0.01	-0.08**	-0.03**
Household firm	-0.57***	-0.13***	-0.53***	-0.18***
Increasing competition	0.24***	0.06***	0.2***	0.07***
Single owner	-0.55***	-0.13***	-0.37***	-0.12***
Age of owner/ manager	-0.54***	-0.13***	-0.29***	-0.1***
Gender of owner/manager	0.29***	0.07***	0.11**	0.04**
Primary education	-0.34**	-0.08**	-0.23**	-0.08**
University education	-0.4***	-0.09***	-0.19**	-0.06***
Exporter	0.37***	0.09**	0.26***	0.09***
Owner/ manager experience	0.11	0.03	-0.04	-0.01
Constant	1.48*		-0.11	
Hausman-like likelihood ratio test of endogeneity	Null hypothesis: no endogeneity (rho=0)		Chi-square statistics: 0.97	Prob: 0

\*\*\*, \*\*, \*: 1% and 10% statistically significant levels, respectively

#### IV. CONCLUSION

This study provides additional evidence to the inconclusive literature on the relationship between corruption and firm investment. Specifically, we test the contrasting hypotheses that corruption hinders or boosts firm investment using a firm-level data of Vietnamese small and medium enterprises. We estimate both a simple logistic regression model and a bivariate probit regression model to deal with the potential issue of endogeneity between corruption and firm investment. We find that corruption tends to significantly hinder firm investment. Variables, such as firm assets, firm age, competition environment, and other firm and firm owner characteristics come into play as well. Our finding supports the hypothesis that corruption is detrimental to firm investment and thus, this may be a channel through which corruption may negatively influence firm performance.

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