

## Abstract

There is a relatively large empirical literature on the effects of corruption on firms. However, while the firm data on corruption suffers from a considerable amount of nonresponse, there has been little attention to this aspect of the data and its consequences. This paper provides first-hand evidence on this issue. The first contribution of this study is to analyze the association between the likelihood of data being missing and observed data in the sample. It is found that nonresponse is strongly correlated with firms' characteristics, which implies that removing missing data from the sample is not justifiable and leads to biased estimates. Then, the paper explores the effect of corruption on firm investment, using multiple imputation approach to account for missing data. The results suggest that there is a striking difference between the estimates of a model with and without missing data. While a naive model finds a statistically significant adverse relation between corruption and firms' investment, the estimates of the multiple imputation approach are both insignificant and smaller in magnitude.

## Data & Methodology

### Data:

- The data used in this paper is from the 2007 World Bank Enterprise Survey (WBES) in Bangladesh.
- The final sample consists of 1443 establishments.
- One advantage of WBES is that it contains quantitative as well as qualitative measures of firms' responses to various factors impeding production process.
- The firms' experience and perception of corruption are one of the topics that the survey covers.
- The measure of corruption is the firms reported bribe payment.

### Methodology:

The regression equation takes the following form:

$$Investment_i = \beta_0 + X_i\delta + \beta_1Bribe_i + u_i$$

Where  $i$  refers to firms,  $X_i$  refers to firms' characteristics, and  $u_i$  denotes error term.

$X_i$  contains the following firm characteristics.

Sales, capital, employment and age, sales growth, debts, taxes  
Whether the firms trade, owned (partially) by foreigners, have access to financial market.  
Dummy variables for industry, region and legal status of the firm.  
Number of permits and licenses the firms have applied for in the previous year.

- It is important to account for the endogeneity of the firm bribe payment. In this study, instrumental variable method is employed to rule out this concern. The instrument for bribe payment is the average region-sector bribe payment.
- The influence of missing data is accounted for by using Multiple imputation (MI) approach. MI creates separate sets of completed data sets by filling in missing observations by values drawn from an imputation model (in this paper, Markov chain Monte Carlo, MCMC, and chained equations methods are used.)
- The underlying instrumental variable model then is implemented on each of the completed data sets.
- The results of multiple imputation method come from combining these estimates using what is known as Rubin's law to account for the added variability of incorporating missing data.

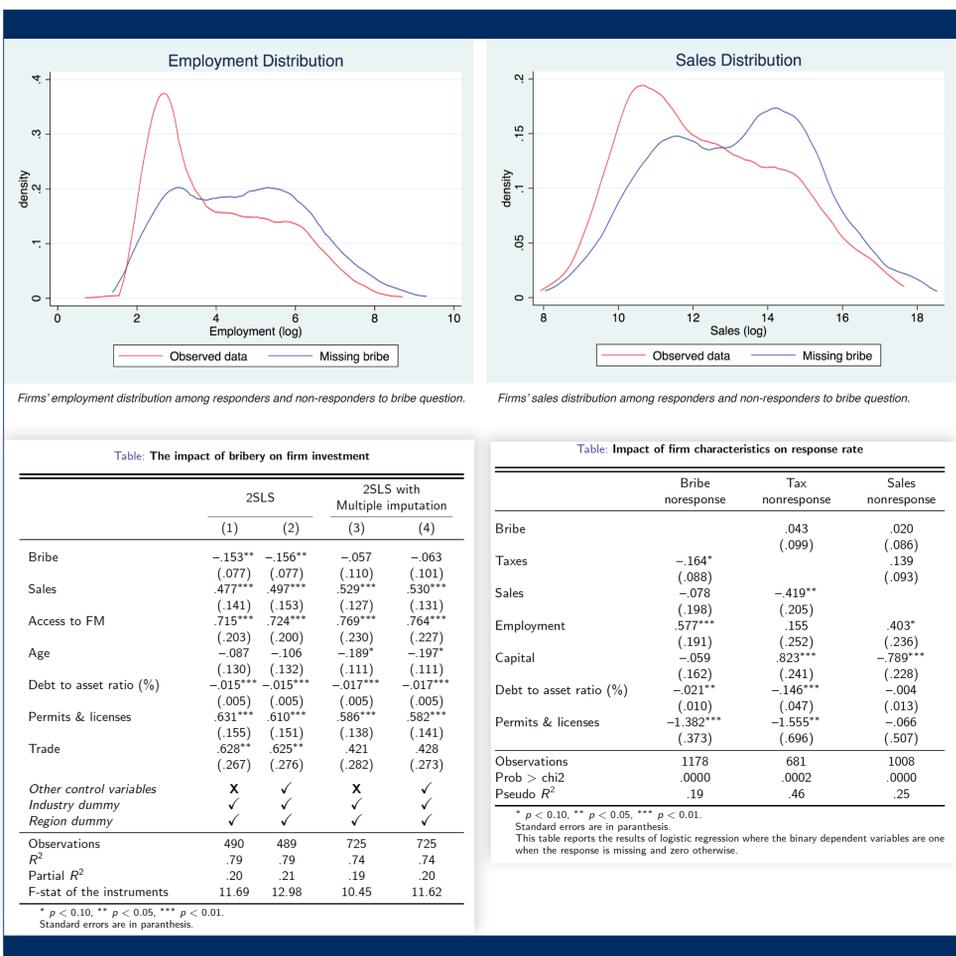
## Results

- The naive regression finds an adverse effect of corruption on firms' investment. A 1 percent increase in bribe payment lowers investment by 0.15 percent, holding other factors constant.
- Controlling for missing observations lowers the magnitude of the bribe coefficient and raises its standard error.
- The result of the specifications based on multiple imputation approach finds insignificant and smaller relationship between corruption and investment.

## Introduction

There is a wide range of empirical studies investigating the effect of corruption on firm performance. The overwhelming consensus is that corruption adversely affects firms' businesses. However, as noted by Jensen et al. (2010), these studies have failed to account for nonresponse in reporting corruption by the firms. They argue that the severity of corruption is likely to be understated since many firms are not reporting their experience or perception of corruption in politically repressed countries. More importantly, not only can nonresponse understate the magnitude of corruption, but it can also potentially lead to biased estimates of its effect on firms. The statistical inference attained by available data is valid if nonresponse is completely at random. That is, if the probability of nonresponse to the corruption question does not depend on any observable or unobservable characteristics of the firm or the business environment. However, as it is shown in the table 1, observable firm characteristics can predict the probability of nonresponse in the three variables with the highest rate of nonresponse which suggests nonresponse is not completely at random.

**Objective:** While the primary goal of this paper is to study the effects of corruption on firm investment, its main contribution is the analysis of missing data in the corruption variable and its implications for earlier and future works in this line of study.



## Conclusion

- This study finds that bribe payment does not have any net effect on investment after controlling for missing data.
- This finding does not mean that corruption and bribery are not harmful to investment. It suggests that taking corruption at the face value and ignoring the fact that firms pay bribes for different reasons and through different channels may conceal and underrepresent its effects.

## Reference

Jensen, N. M., Li, Q., and Rahman, A. (2010). Understanding corruption and firm responses in cross-national firm-level surveys. *Journal of International Business Studies*, 41(9):1481-1504.