Impact of the corrupt behaviour of the government officials on firm growth in the manufacturing industrial sector of Bangladesh

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Abstract

This study examines the impact of the corrupt behaviour of government officials on firm growth in the manufacturing industrial sector of Bangladesh. Two different data sets have been used in this study: the first is collected by the authors and the second is taken from the Bangladesh Enterprise Survey conducted by the World Bank. The investigation has been done in a quantitative analysis using OLS and IV regressions. The main thrust in this study is to investigate if the impact of corruption varies between industries and sectors. Our study shows that the impact of corruption is industry-specific and that the impact of corruption on firm growth in Bangladesh is positive in a sector where bribery is systematic and when the industry enjoys a huge demand from the export market. This impact is seen to be negative if the whole industrial sector is captured in the sample. This study helps us to conclude that it is not appropriate to make a blanket premise that impact of corruption is negative or positive. To have an understanding of the impact of corruption we must have an insight in the industry- especially the system of bribery prevailing in the industry.

Key words

Corruption, growth, bribe, industry, sector

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1. Introduction

The reason why corruption as a topic in Economics and an issue in the development discourse, has been viewed so importantly is the fact that growth, be it micro level or macro level, does not only depend on economic factors like capital stock, investment, quality of human capital, consumption expenditure, age, initial size, efficiency of management, productivity, industry concentration, competition, present firm size, engagement in foreign trade etc. but also on the broader institutional setting and governance factors. Growth depends on institutional and governance factors because economic actors have a lot to do with government offices and public organizations for their activities, which would definitely influence the speed of their activities. Cumbersome and dishonest bureaucracies may create barriers to investment, entrepreneurship and innovation delaying the distribution of public goods thereby slowing down the whole process offsetting the positive effect of technological advances (Mauro, 1995). Corruption thus being an institutional and governance phenomenon has been considered to be one of the determinants of economic growth which, in turn, is the main determinant of development. Institutional and governance issues have been widely examined in the literature while investigating the factors influencing economic growth. In La Porta *et al.* (1999) good economic institutions belonging to public sector have been seen to play vital roles in achieving economic growth. North (1981) and De Long and Shleifer (1993) in their studies have found good governance as a main contributing factor to the economic development of European countries over the

last millennium. Similar studies by Knack and Keefer (1995), and Easterly and Levine (1997) done on a cross section of countries, have found good governance to have a strong positive impact on growth. Acemoglu *et al.* (2005) observe that political institutions such as democracy, give rise to economic institutions. They show that economic institutions such as labour market institutions allowing the formation of workers' union and bargaining power are very conducive to growth because these institutions create scope for bringing terms in favour of the working class. Acemoglu and Verdier (1998) put forward the concept of property rights institutions while examining the determinants of growth. They find property rights institutions to have an impact on long-run economic growth and investment. They use 'settler mortality in countries that were colonized by European nations between 1500 and 1900' and 'initial indigenous population density' as instruments for property rights institutions in their Instrumental Variables approach of regression analysis. Aidt *et al.* (2008) find corruption to have a stronger negative impact on economic growth in countries especially with high quality institutions.

Different types of government spending creates different types of scope or different degrees of possibilities for bureaucrats or politicians to engage in corrupt practices, extract bribe and go without being caught (Rose-Ackerman, 1997; Shleifer and Vishny, 1993; Mauro, 1997; Tanzi, 1998; De La and Delavallade, 2009). Owing to the secrecy and limited competition, military spending is prone to a relatively high level of informal contracts creating scope for rent-seeking activities and other corrupt practices, which crowd out productive investment in the private sector exerting a negative impact on growth (d'Agostino et al., 2012). d'Agostino et al. (2016) investigated how corruption affects the link between government expenditures and growth in Africa. To do that, they used an extended endogenous growth model which allows corruption to affect different types of government spending differently. Their investigation finds corruption to have negative effects on growth and that corruption's negative impact aggravates when there is higher burden of military expenditure. d'Agostino et al. (2016) investigates the effect of corruption using an endogenous growth model which accounts for the effect of

corruption allowing it to capture indirect effect of corruption on military spending and government investment expenditure. This strategy helped to capture the heterogeneous effects on per capita growth rates. Their findings confirm that government investment spending positively impacts economic growth and that large military burden, current government spending and corruption have negative effects. This study also finds that the negative effect of military burden on the growth rate gets stronger in presence of corruption. The extent to which the military expenditure affects the corruption-growth link has been found to be much smaller.

Célimène et al. (2016) in their paper adopt an open economy stochastic growth model and present a standard portfolio argument which says that evasion outcome for the private sector might rather be conducive to economic growth following the development of private investment if the proceeds from tax evasion were invested in the equity market and that the negative externalities of tax evasion on public spending can be diminished if its productivity is high enough. It is noteworthy that, when there is a high incentive for cheating (because the tax collection system is deficient), the negative externalities of tax evasion on public spending can be diminished if its productivity is high enough. This implies that there may be a trade-off between tax governance and policies enhancing the efficiency of public goods and services on the economic growth (Célimène et al., 2016) .

Campos et al. (2010) in their meta-analysis using 41 empirical studies, find evidence that corruption diminishes the positive effect of institutions and trade openness on growth and thus the final effect of corruption on economic growth is seen to be negative after tackling the biases existing in the studies. The meta-analysis done by Ugur (2014) which uses 29 primary studies, confirms corruption's direct negative effect on per-capita GDP growth after controlling for publication selection bias and within-study dependence.

Using bootstrap panel Granger causality approach which addresses both cross-sectional dependence and heterogeneity across countries Huang (2016) conducts investigation on the impact of corruption on economic growth on 13 Asia-

Pacific countries over the period of 1997–2013. The study finds significant results only on South Korea and China. In the former corruption is seen to have a positive effect on economic growth and in the latter the increasing economic growth of the country is seen to give rise to corruption.

Heterogeneity in reported findings on the effects of corruption on growth leads scholars to think that the impact of corruption is inconclusive. Recently many studies including the seminal paper, Mauro (1995), which used econometric analyses to make inferences on a causal relationship between corruption and growth, have been re-investigated and have been seen to be fraught with problems such as reverse causality and omitted variable problems. These studies and many further studies have ended up with inconclusive results (Aidt, 2009; Svensson, 2005), which seems to be predominant in the literature lately. This inconclusiveness has also been supported by Wedeman (2002); (Rock and Bonnett, 2004; Li and Wu, 2007; Vial and Hanoteau, 2010). However, the inconclusiveness might have appeared also due to publication biases. Campos et al. (2010) and Ugur (2014) conducted meta-analyses using 29 and 41 empirical studies respectively and tried to investigate the predominant findings in those studies overcoming the biases and found the negative effect of corruption to be predominant.

Corruption is generally perceived to be an obstacle to economic growth, but findings from empirical studies do not always support this conventional wisdom, rather the effects of corruption on growth are ambiguous. Findings from the research on causal relations between corruption and growth are mixed i.e. some studies e.g. Mauro (1995) have found corruption to negatively impact growth, which is confirmed by Brunetti *et al.* (1998) and (Mo, 2001). Tanzi and Davoodi (2001) from a cross-section analysis of 97 countries provide evidence for a fall in GDP growth due to corruption measured by CPI index. Gyimah-Brempong (2002) who used data from African countries found an adverse effect of corruption on growth. A similar study on sub-Saharan Africa is done by Kumi *et al.* (2015) who examine the effect of corruption on economic growth using the data over 1998-2011 and find corruption harmful to economic growth. Corruption is seen to have this

impact through gross fixed capital formation and labour force. On the other hand, a number of studies such as Leite and Weidmann (1999) and Poirson (1998) report a significant positive impact of corruption on economic growth. Some scholars like Rose-Ackerman (1978) find that corruption might have a positive impact only when the bureaucracy is stuck in too much[2] corruption.

From some studies the impact of corruption on macroeconomic variables appear to be indeterminate. For example, Wedeman (1997) show that the overall level of corruption does not exert any impact on the GDP growth rate of a country. Shaw *et al.* (2011)'s re-examination of Mauro (1995)'s work using a better instrumental variable finds no effect of corruption on economic growth or investment. What all these mean is that the impact of corruption on economic growth or in other words, causal relations between corruption and growth are still ambiguous and needs further empirical investigations on new or different perspectives.

In the literature the impact of corruption on growth has been examined mainly in macro level. In micro level, to the best of our knowledge, only one study has been done by Fisman and Svensson (2007) using World Bank's Ugandan firm level survey data of 1997. Fisman and Svensson (2007) find the negative effect of bribe on firm growth to be 2.5 times larger than that of taxation. Nguyen and Van Dijk (2012) investigate the impact of corruption on firm growth using measures of corruption different from Svensson (2003) or Fisman and Svensson (2007). They find corruption to have a clear negative impact on the growth of private firms but no significant impact on that of state-owned firms. No such work has been done on Bangladesh while Bangladesh is globally perceived to lack institutions and has high level of corruption as measured by Transparency International. More recently

[2] Rose-Ackerman being a proponent of 'negative impact strand' here explains a situation where no files can move from one table to another in government offices without bribe. She argues, in that situation corruption may be found 'functional' or considered 'economically justifiable' and even 'desirable'; but she warns that corruption might be beneficial in certain sectors but if it is allowed to continue to exist, it would not be confined in those sectors- will rather spread all over the economy and finally would be detrimental.

Bangladesh has come to the fore for its co-existence of high growth rates and high corruption levels. Khan (2013) observes Bangladesh to be emerging as a relatively high-growth developing country in recent years and finds Bangladesh, at the same time, to be suffering from apparently dysfunctional governance structure and political system. Similar views/findings have been put forward also by Ahluwalia and Mahmud (2004), (Devarajan, 2005), Mahmud (2008a). Mahmud and Mahajan (2010), Mauro (1995), World Bank (2000b), (Zafarullah and Siddiquee, 2001) and ADB (1998).

Bangladesh is striving to get the status of a middle income country by 2020. To achieve this status, the main driving factor would be industrial growth. Therefore, it is important to find if corruption is one of the determinants of industrial growth. No quantitative analysis has yet been done to measure the impact of the corrupt behaviour of government officials on firm growth in Bangladesh. We attempt to fill the void by investigating the impact of bribe payments on firm growth in the manufacturing industrial sector of Bangladesh. Two different datasets have been used for this empirical investigation. The first study uses primary data collected by the authors and the second uses the Bangladesh Enterprise Survey (BES) data collected by the World Bank. This study Contributes to the existing literature not only by conducting a new firm level analysis of the corruption-growth link on a new country but also by putting some new ideas: a new way of demarcating locations of industrial units (see section- 2.1 for explanations) for capturing the differences in bribe patterns; a new measure of infrastructure (see section- 2.1 for details) on Bangladesh perspectives for using it as an explanatory variable in the regression of growth on corruption; it has been checked if age and size have non-linear effects on growth using squared age and squared size in regressions; interaction terms of bribe & regulation and bribe & competition have been used; location average of bribe, distance and competition have been used as instruments; how firm's sale is affected due to changes in bribe has been examined; the firm level analysis has been on a panel data set where log of sale and log of productivity have been used as a proxy for growth. These are different from what

has been done in Fisman and Svensson (2007), the most cited paper in this area. Another addition to the literature is that the author has elicited a lot of quantitative and qualitative information about bribery prevailing in Bangladesh from firm owners and managers, individuals who have to pay bribe to government offices for public services, experts and retired government officers who took bribe while in office, which provides a deep insight on the corruption scenario of Bangladesh.

The article develops as follows: section 2 discusses the methodology, data and variables, section 3 provides a brief corruption scenario of Bangladesh, section-4 discusses the results and section- 5 concludes.

2. Methodology, data and variables

In order to quantify the impact of the corrupt behaviour of government officials on firm growth, primarily it was intended to carry out the analysis using primary data because we wanted to have a clear understanding of the factors influencing firm growth and the corruption scenario in Bangladesh through not only collecting numerical data but also in-depth interviews of firm owners and managers. However, it was not possible to collect data from a satisfactorily large number of firms due to many constraints. We got a sample of 92 firms. Therefore, we have re-investigated the impact of corruption on firm growth using a larger sample taken from the Bangladesh Enterprise Survey conducted by the World Bank as already mentioned above. For the first piece of work, firm level information has been collected on the estimated bribe payments and other variables from the manufacturing industrial sector through a combination of stratified random sampling and multi-stage cluster sampling methods.

The World Bank's Bangladesh Enterprise Survey Unit collects its data (used in the second piece of work) for the period 2008–2010 by interviewing representative samples of the formal, non-agricultural, non-extractive, private sector with 5 employees or more, with a view to gathering information about what businesses and firms experience. The respondents of the Enterprise Survey are mainly the business owners and top managers and sometimes company

accountants and human resource managers. For a detailed sampling technique visit http://www.enterprisesurveys.org/methodology.

Fisman & Svensson (2007), Reinikka and Svensson (2001), Chen and Reinikka (1999), Svensson (2003) also have used World Bank Enterprise Survey data to examine the impact of corruption on firm growth.

Besides the cross-section data, a panel data set of 2007, 2011 and 2013 from the same source as mentioned above, has been used in order to apply different estimators on panel data model.

One significant difference in demarcating the locations of industrial units between first and second pieces of work is that in the first, we have selected locations in terms of firms' distance from the capital city because in the pilot survey it was found that bribe pattern changes with firms' distances from the capital city. Another location has been selected for the government-controlled specialized zones, namely Export Processing Zone (EPZ) and Bangladesh Small and Cottage Industry Corporation (BSCIC), where bribe pattern is different from other locations regardless of distance. In the World Bank's Enterprise Survey 6 locations are 5 regional towns and another is 'others' outside these 5 regional urban areas.

There are two main concerns in microeconometric analyses on the impact of corruption: (i) measurement errors, and (ii) endogeneity problem. There might be cases where bureaucrats would extract higher bribes from firms having higher demand forecasts for their products and thus higher possibility for profits, and lower bribes from others having lower prospects, which means two firms in the same location pay two different amounts of bribe. Some of these firms with high prospects might decide to increase investment in innovation and production in order to expand alongside paying high bribes. Here bribes would appear to have positive impact on growth but actually the underlying contributing factor is their investment decisions. Another problem in capturing the real effect of bribe might be that some firms might specialize in costly bureaucratic access while others might focus on productivity; both of these two groups of firms would achieve higher growth. In both of these cases a firm's decision is its unobservable factors indicated

by θ_{ij} in the equation below, which would be correlated with both growth and bribe simultaneously giving rise to an endogeneity problem. To overcome these endogeneity problems firm's bribe has been instrumented by the location average of bribes and industry-location average of bribes. It was not possible to use industry-location average of bribe as an instrument in the first one due to data limitations. The argument is that growth may be correlated with bribe payments of individual firms but not with their location averages. In the primary data analysis there are only 5 variations in the instrument as there are 5 locations, obviously, the instrument has turned to be less strong. Howevcer, efforts have been made to tackle the problem of weak instrument because the use of a weak instrument makes the asymptotic theory provide a relatively poor guide to actual finite-sample distribution i.e. results obtained from IV regressions would provide a biased estimator as well as OLS (Davidson and MacKinnon, 2004). In this case of weak instrument a different approach which is to say, an alternative asymptotatic theory is suggested which would provide a more reasonable approximation. One of the several alternative estimators suggested by the literature, which are asymptotically equivelent to 2SLS but may have better finite-sample properties is LIML estimator which is the leading so far. Recently research has revealed that LIML has got some desirable finite-sample properties such as smaller bias than 2SLS or GMM particularly when instrument is weak (Cameron and Trivedi, 2009). Accordingly, in this regression analysis LIML estimator has also been found to tackle weak instrument problem. Instrumention has been done also by two variables: *distance* (distance of the firm from the capital city) and *competitor* (degree of competition in the industry), which are correlated with bribe but not with growth. It has been checked if the effect of age and size on growth is nonlinear. Interaction terms of regulation & bribe and competitor & bribe have been used to examine if regulation (measured by the times spent by the management to deal with regulations as toughness and number of regulation determine bribe level) and competition influence the way how bribe affects growth.

A specification similar to Fisman and Svensson (2007) is considered.

This takes the following form:

$$y_i = \beta_0 + \beta_b b_{ij} + X'_{ij}\delta + \beta_\theta \theta_{ij} + \eta_{ij} \quad (1)$$

Where subscripts, i refers to a firm and j refers to an industry, y_i is firm growth, b_{ij} stands for corruption i.e. bribe, θ_{ij} is a firm-specific unobservable factor that may impact both bribery rates and firm growth. The term $X'_{ij}\delta + \eta_{ij}$ captures the firm's growth potential where X_{ij} is a vector of observable characteristics of firms such as age, size, regulation, competition, involvement in foreign trade, distance of the industrial unit from the capital city etc. b_{ij} consists of two terms: B_j which is location-specific and B_{ij} which is particular to the firm. B_j denotes the (average) amount of bribes common to location *j*, which, in turn, is a function of the underlying characteristics inherent to that particular location, determining to what extent bureaucrats can extract bribes. B_{ij} denotes the idiosyncratic component (Fisman et al, 2007). The sign of b_{ij} in the above equation was expected to be negative as per the hypothesis built.

Variables in the first analysis: *growth* Data on growth have been collected on 3 variables: sales growth, work force growth and output growth. It was expected that managers would be better able to provide information on the number of workers employed but it was found that some firms experienced sales growth but number of workers remained the same in the same period. Investigations revealed that those firms had an excess work force, therefore, with increasing demand for their products they didn't need to employ extra workers in the following year or so, which shows no work force growth but in reality the firm achieved growth. It happened in Bangladesh in 80's and 90's when it experienced a huge demand for their RMG (Ready-made Garments) products in the world market. Following this, many entrepreneurs set up industrial units and employed excess workers with a possibility of getting increasingly new orders from foreign importers. Moreover, workers' productivity increased in the years following the starting year since workers in Bangladesh are usually not given formal training; they actually gain

their efficiency through work. It was not possible to measure output growth because most firms produce more than one item and different items are measured in different units and therefore, a consolidated output can't be determined. Sales growth has been measured from 2008 to 2010 longer than just one year from 2009 to 2010 to have a clearer picture about growth. It has also enabled us to look into the most recent scenario in the industrial sector of Bangladesh. The following formula was used to measure growth:

growth = [log (Sale in 2010 - log (Sale in 2008)]/2

Finding bribe as a fraction of profit would be the best in this regard but firms in Bangladesh do not maintain a uniform standard in keeping accounts. Managers/owners also might not have revealed information about profit in the fear of being reported since tax evasion in Bangladesh is very common. Moreover, profit for some firms might be negative. Therefore bribe has been calculated by dividing the amount of bribe paid by firm's sale to capture the impact of bribe on growth irrespective of firm size. Before taking bribe as a fraction of sale both the values were converted into US dollar. In the regression log of bribe i.e. *log bribe* has been used. Likewise, some other variables have been used in their natural log forms. Arguments for using logs are the facts that logged transformations of the values yield a distribution that is closer to normal and that when data are very right-skewed, a linear model in levels fails to provide exact predictions because it restricts the effects of regressors to be additive. In the survey data unovserved heterogeniety is very much likely to exist and logs of the values reduce this heterogeniety to a good extent. *log age* Many firm-level studies have found age of a firm to be correlated with growth since older firms are likely to have better access to finance and are able to develop relations with bureaucrats; therefore, *log age*, the log of age of firms has been used as a control here. The size might affect future growth of the firm. Bribe payments might also be correlated with the size of firms i.e. larger firms might have to pay more bribes because they are more visible to bureaucrats and thus can't avoid paying bribes. *size* measured by the log of the resale value of the capital stock in 2009 has been used as a control for that. Resale value of the capital

stock has been considered a good measure of firm size. *Foreign trade* Firms engaged in direct imports or exports have to go through tougher regulations, especially in customs and banking, which creates more scope for bureaucrats to extract rents from these firms as against local firms. Therefore, correlations between the involvements of foreign trade and bribe payments need to be controlled. For this purpose *foreign trade* has been used as a dummy which is 1 if the firm directly imports, exports or both, otherwise 0. *regulation* Firms which have to deal more with regulations and thus need to go to government offices to get things done are definitely potentially subject to more bribe payments. To control for this regulation i.e. log of the senior management's time spent for settling issues with regulations and government offices. To separate the effect of competition in the industry the variable, *competitor* has been used, which is the number of competitors in the industry because degree of competition in different industries are different giving rise to different growth trajectories. Distance of the location of the industrial unit from the capital city matters both growth and bribe payments; therefore, *distance* has been included as an explanatory variable in the regression. *average_bribe1* used as the instrumental variable (IV) is the Location averages of bribe in 5 locations described above.

Variables in the second analysis: Some change has been made in the use of variables in the second piece of work. In the previous work age turned out to be fully insignificant, which is why it has been dropped here. For some variables new measures have been used. Formerly, to control for the size of the firm resale of the capital stock was used while for this, average sale has been used. Resale value of the capital stock was considered more authentic and a better control for size but in the Bangladesh Enterprise Survey this variable is not available. *size* measured by firm's sale measured as [(Log of Sale2008 in $ + Log of Sale2010 in $)/2] is used as a control for the effects of firm size while Fisman & Svensson (2007) used sale in 2008 for the same. Average sale has been considered more appropriate than sale in 2008 as a control for size because sale in 2008 might have influenced firm's growth as it itself has been used in calculating growth. It was realized that infrastructure should have

substantial influence on firm growth; therefore, the extra money spent on power supply with the variable name of *infrastructure*, has been used as a control, which is different from Fisman and Svensson (2007). In Bangladesh a substantial amount of extra money has to be spent for power supply- especially electricity, which is, therefore, considered to be a good measure of the infrastructure quality experienced by firms. Along with payment of bribe, no-payment of bribe (*bribedum0*) should also influence the growth of firms and the idea of using this variable has been helpful. It has been seen to play a significant role in the regression. It was not, however, worth using it in a small sample like one using primary data because there are too few firms saying not to have paid bribe. *education*, measured by average years of education, of production workers has been used, which, as suggested by theories, directly increases the productivity of the firm. Innovation is thought to be important in determining firm growth. To have a ceteris paribus impact of bribe on growth this influential factor needed to be controlled because there are huge differences in education levels between firms. Two measures of innovation: *inovation1* and *inovation2* have been used. *inovation1* is the investment in IT and IT-related equipment. Investments in it for increasing productivity are widely different among firms, therefore, needed to be controlled. Control for innovation has been tried with another similar variable, *inovation2* which is investment in non-IT equipment made in order to increase the productivity of the firm. Number of competitors and distance of the industrial unit from the capital city are found significant in none of these two analyses. They are, therefore, dropped.

The measure of location average of bribe *average_bribe1* has been different as locations in the primary survey was determined in a different way. Here *average_bribe1* is the Location averages of bribe in 6 locations in Bangladesh. In the sample made by WB's Bangladesh Enterprise Survey the locations are Dhaka (capital city), Chittagong (divisional city), Khulna (divisional city), Rajshahi (divisional city), Sylhet (divisional city). There has been made another category of location named 'others' outside these 5 locations.

As mentioned earlier, a new instrument called industry-location average of bribe (average_bribe2) has been tried and has been found appropriate. There are 6 locations and 25 industries/sectors giving rise to (6x25=) 150 industry-locations. Average of bribe payments paid in each industry-location has been taken and used as an instrument for bribe paid by an individual firm, which, like *average_bribe1*, is not correlated with a firm's unobservable characteristics.

3.0 Corruption scenario in Bangladesh

It is useful to have information besides the data used in the quantitative analysis to be able to explain the results and grasp the corruption-growth link. With this end, the following information was collected through in-depth interviews with firm managers and owners, and experts. In what follows some data have also been provided about the types of responses of respondents especially on questions regarding bribe, which reveals people's notion about bribery and corruption.

3.1 Corruption in the industrial sector: An overview (on the basis of the survey conducted by the authors)

14% of the 92 firms which finally attended the questionnaire refused to answer the direct question about bribe payments before starting the business (for having licenses, permission, registration etc.). In answer to the question if the firm has had to pay bribe to carry out business, 67% answered positively and 28.3% refused to answer this question. The rate of refusal to answer to the question if it paid bribe during operation is 12.8% and that in answering the question about extra payment for getting things done with government offices is 21.9% i.e. 21.9% refused to answer if they have had to make extra payments while dealing with government offices. However, it was possible to elicit the amount of money that has to be paid informally or beyond the official fees in a year from 91 firms by dint of the indirect question "Many business people have told us that firms are often required to make informal payments to public officials to deal with customs, taxes, licenses, regulations, services, etc. Can you estimate what a firm in your line of business and of similar size and characteristics typically pays each year?" 22.8% of the

respondents held bribe as no. 1 barrier, 22.8% as no. 2 barrier; 3.3% held extortion as no. 1 barrier and 27% as no. 2 barrier; 49% named either bribe or extortion as a retarding factor, and percentage of respondents which considers bribe as a retarding factor for firm growth is 49% as well.

Table- 3.1: Response to questionnaire / questions

Response to questionnaire / questions				How respondents rank obstacles	
Refusal to attend questionnaire	40.65%			Bribe as no.1 obstacle	22.8 %
Refusal to answer 'bribe' question	14%			Bribe as no.2 obstacle	22.8 %
	negative	positive	Refused	Extortion as no.1 obstacle	3.3%
If paid bribe to carry out business	0%	67%	28.3%	Extortion as no.2 obstacle	27%
If paid bribe during operation	0%	87.5%	12.8%	Bribe as a retarding factor	49%
If paid extra to get things done in gov. offices e.g. renew license	0%	78.1%	21.9%	Either bribe or extortion as a retarding factor	49%

Source: Author's survey

3.2 Some anecdotal accounts of bribery collected through in-depth interviews

A good amount of quantitative data about bribery has been elicited besides qualitative information through the in-depth interviews with firm owners and managers. Some experts and individuals who were somehow related or worked with the industrial sector of Bangladesh also shared some information alongside their opinions. This information has helped me to develop an insight on the nature and degree of corruption prevailing in Bangladesh.

It is not always appropriate to conclude that corruption ensues only because government officials create obstacles to activities for businessmen. Wide range in-depth interviews with business people and experts reveal that it is the businessmen who offer bribe from their own to benefit from not paying tax or duty on most occasions. One typical example would explain how it happens. Turn-over of a pharmaceutical company situated close to a regional town, as the owner confidentially reports, is TK. 42, 00,00, 000.00 out of which taxable (i.e. on which VAT is imposable) turn-over is TK. 10, 00, 00, 000.00. For this amount VAT payable is TK. 1, 50, 00, 000.00. Here the firm owner comes to a negotiation with the VAT collector and offers him TK. 10, 00, 000.00, and pays TK. 50, 00, 000.00 to the state as VAT and saves TK. 90, 00, 000.00 for himself. The sum of money taken away by the businessman and the VAT collector is TK. 1, 00, 00, 000.00 which is actually the public money as it is payable to the state in the form of VAT; therefore, this money should be said to be misappropriated by these two persons through a collusion between them. While importing goods importers try to benefit from not paying the payable duty on the category and amount of goods imported according to customs rule. In the in-depth interviews with businessmen, customs officials and the employees of importing firms and clearing forwarding agents unambiguously what has been revealed is that most of the importers try to avoid paying appropriate amounts of duty. They usually adopt two ways: firstly, by under-invoicing and secondly, by miscoding. In both the ways they can release goods by paying less than what they owe because the amount of duty payable depends on the value of the goods and the category of the item. The customs officer easily finds the discrepancies and thus blocks the good as he should. Then the importer comes with his offer of bribe and through negotiations fixes it. Depending on the gravity of the matter i.e. the amount of under-invoicing and the category of the imported item the amount of bribe is determined. For example, if the item is a seriously banned item because it is illegal and dangerous for the state security or something extremely against the interest of the nation, then bribe would be very high and the money misappropriated is equally shared between the government official and the businessman. A similar

account is provided by Cerqueti and Coppier (2011, p. 498): 'if evasion is detected by a corrupt inspector, the entrepreneur must give half of the evaded taxes to the inspector (bribe)'. Cerqueti and Coppier (2011) finds this practice reducing the resources devoted to the capital accumulation and therefore to the growth.

Another scope for the businessmen to misappropriate money by promoting corruption is under-reading the meters showing bills for public utilities like gas, water and electricity. Extremely poor public utility services- especially frequent power failure have been considered the biggest obstacle to firm growth in Bangladesh by most firm owners and managers. The way how corruption comes in centring this power failure and how the money misappropriated is shared between bribe payee and bribe payer are as follows: For a medium garments unit exporting 100% of its output requires electricity of TK. 600, 000.00 for a month i.e. the monthly electricity bill for this industrial unit amounts to TK. 600, 000.00. For a whole year it amounts to TK. 7, 200, 000.00. The owner negotiates with the meter reader on cutting the bill and reaches an understanding. The owner agrees to pay TK. 4, 000, 000.00 worth of a bill and from remaining amount (TK. 3, 200, 000.00) of the actual bill the meter reader is paid TK. 1, 500, 000.00 and the owner saves TK. 1, 700, 000.00 for himself. Monthly gas bill for the unit is TK. 250, 000.00; therefore, the yearly bill amounts to TK. 3, 000, 000.00. Here the distribution is like bill paid is 1, 500, 000.00; bribe is TK. 750, 000.00 and misappropriation by the owner is TK. 750, 000.00. What turns out from this account is that half or a little more than half of the real bill is paid to the government and from the rest the owner saves half or a little more than half and the government official receives half or a little less than half as bribe.

A picture of bribery involved in importing and exporting is like this: a medium size firm of garment industry, while exporting, has to pay TK. 400.00 per invoice to the concerned customs office as bribe otherwise the file will not move, and on average there are 150 invoices in a year; therefore, it has to pay TK. 600, 000.00 for customs clearance a year for its export. For imports it pays TK. 10, 000.00 per consignment. On average there are 40 consignments for which it pays TK. 400, 000.00 a year to the concerned customs office as bribe for customs clearance. These

bribes paid while exporting and importing have been fixed by the customs officials over years, payment of which is a must no matter whether the trader has done anything wrong by miscoding the item or under-invoicing the imported item as mentioned above.

Foreign companies are not exceptions in bribing government officials to get contracts or licenses. To get a contract from the Bangladesh government to supply some machinery a foreign company has to pay 2.8 million US dollars to each of the five concerned ministries. Therefore, in total a company has to pay 14 million US dollars to get hold of such a contract from the Bangladesh government. What this anecdote tells is foreign companies as well as local ones have accepted this 'custom' of bribe payment, got engaged in bribery and learned the technique of offering a bribe. It has also been learned that even foreign firms do not hesitate to offer a bribe directly to a minister.

3.3 Some quantitative accounts of bribery collected through author's survey

To form a joint stock company aiming to import and export government fees charged range from TK. 60,000.00 to TK. 100, 000.00 depending on from how many departments registration/permission/license is needed according to the type of activities but my survey reveal that before starting the business one has to spend TK. 2403241.56 on average, which is one of the highest in the world. Number of days taken by government offices for the following are: for trade license 26 days, for company registration 95 days, board of investment registration 83 days, export import license 51 days, utilization permission 65 days, gas connection 161 days, electric connection 97 days, water line 36 days, telephone line 35 days, permission from the environment department 79 days, fire license 27 days, bond license 53 days. In respond to the indirect question about bribe payment 'Many businessmen have informed us that they had to spend money outside that needed in formal procedures. How much do you think one belonging to your industry/sector and of the similar size as yours has to spend in this way in a year?' on average the respondents estimate the amount to be TK. 2633141.00. In 2009-10

the amount of informal payment for the regular operation of the firms is TK. 1036577.00.

During the operation i.e. after the firm has started production, in 2009-10 the number of days taken to get things done with some government departments is as follows: to clear goods through customs 20 days, to get clear payments from the AG office 9 days, to get a tax certificate 17 days, to get a VAT certificate 11 days and to renew the fire license 13 days. 92.39% of the firms expressed their dissatisfaction with the quality of four essential public services which are gas supply, electricity supply, water supply and telephone.

Corruption or the scope for taking a bribe by the government officials depends on the cumbersomeness of the bureaucracy and strictness of the regulation. To understand the degree of trouble that government departments may create one question in the survey questionnaire is how much time the management has to spend to deal with regulations. It has been found that on average 15.54% of the total time is spent in this purpose showing that regulation regarding the formation and operation of businesses is extremely tight in the sense that, in the Bangladesh perspective, one has to take permission/registration/license from too many offices. Firms engaged in foreign trade (export and/or import) has to employ a Clearing & Forwarding (CnF) Agent to clear goods while exporting or importing, getting papers (permission) from different offices under the customs, for which they have to pay the agent. In Bangladesh an importer has to collect clearance papers from 39 desks. It clearly informs us of the complexity of the process in Bangladesh. How much is paid to a Clearing & Forwarding Agent might be an indicator of the degree of obstruction created by customs offices and the amount of bribe to be paid.

Bribe has been fairly systematic in exporting industries like garments. In both in-depth interviews and from the survey interviews the following information has been collected. Bribery in this sector is said to be systematic because on certain questions like the following all interviewees provided the same figure. For exports a firm has pay spend 0.75% of its turn-over and for imports 0.40% of its turn-over on the services from a CnF agent. A firm exporting and/or importing goods has to

pay TK. 1,569,540.00 a year. One interesting example of the aspect of how inherent has been the desire in Bangladeshi people's mind set to make some extra money out of the assigned duty holding a post dealing with the members of the public bribe. One of the papers that is required to complete the garments export procedure is utilization permission. Initially this permission used to be given by the customs authority, but because of the deliberate delay made by the customs authority on the demand of Bangladesh Garments Manufacturers and Exporters Association (BGMEA), the government has allowed a forum of the garments manufacturers and exporters to issue this paper and accordingly, BGMEA has opened a desk in their office building to deliver the service. Customs official used to be paid a bribe from TK. 3000.00 to TK. 4000.00 for this paper and now, not surprisingly, the BGMEA official has to be paid too; but the amount has come down to the range between TK. 200.00 and TK. 300.00. Firms, with a view to evading taxes, often adjust their accounts. For this they have to employ accounting firms or solicitor's firm. They do the same also because of the complications of the procedures through which firms have to carry out their activities. No matter what the purpose is firms have to spend on employing accounting firms or solicitor's firm, which might be an indicator of the tax evasion by the firms and/or the complications of procedures. On average a firm spends TK. 1,292,531.00 a year in this purpose.

Table- 3.2: Amounts of bribe paid

	Official fees(BDT)	paid	has to pay
Formation of a company	60,000.00 to 100, 000.00	2403241.56	
Total informal pay		2633141.00	
During operation		1036577.00	
For export, per invoice			400.00
For import, per consignment			10, 000.00
For CA/law firm			1,292,531.00

For Clearing and Forwarding Agent (CnF)			1,569,540.00

Source: Author's survey. *Note*: The period when these amounts are referring to is from 2008 to 2011. The sample has been explained in section- 2.

Table- 3.3: Number of days taken by government offices to offer services

Services	No. of days taken	Services	No. of days taken	Services	No. of days taken
Trade license	26	Gas connection	161	Fire license	27
Company registration	95	Electricity connection	97	Fire license renew	13
Registration with Board of Investment	83	Water line	36	Bond license	53
Import-Import license	51	Telephone line	35	Customs clearance	20
Utilization permission	65	Environment department	79	Clearance from AG office	9
Tax certificate	17	VAT certificate	11	Time spent to deal with regulations	15.54%

Source: Author's survey. *Note*: These data were collected by myself and period when these amounts referring to is from 2008 to 2011. The sample has been explained in section- 2.

Descriptive statistics and correlation matrices are provided in the appendix. Location averages of bribe payments in both primary data and WB data significantly differ from each other supporting the finding from the pilot survey that bribe patters vary substantially from location to location while locations determined

by distances from the capital and by the government monitoring or not-monitoring of the industrial area.

4.0 Results

Results are discussed in two separate section: in the first section (4.1) we discuss the results obtained from the primary data and in the second section (4.2) those from the WB data, and then we present a comparative discussion and explanation of the results.

4.1 Regression output from the primary data

In the three standard OLS regressions (see model 1-3 in Table- 4.1.1) the coefficient of Log of bribe is significant at 1% level. The coefficient of 'log bribe' is around 0.085 indicating a positive impact of bribery on firm growth. Bribe is in logged form and growth is in level. Therefore, one percent increase in bribe payment increases growth rate by 0.085. The significance level of the bribe coefficient in the models of OLS with VCE option and cluster option, which tackle problems of unobserved heterogeneity and clustering in bribe, falls from 1% to 10%. This significance level in the model of OLS with strata option applied after declaring the data as survey data, which addresses the problem of stratification in bribe is slightly higher but still lower than standard OLS done in model 1- 3 and still remains in 10% level. Four regressions are run in IV estimation techniques where location average of bribe has been used as an instrument for individual bribe payments (arguments for this have been explained in section- 2). Among these, the last model is run with LIML option with IV technique which is considered to be more efficient in case of weak instrument. As before, none of the control variables are significant in IV models (model 10-13 in table- 4.1.3). The variable of interest i.e. log of bribe also has come up with insignificant coefficients in IV technique. The highest amongst them is model-10 with t-value of 1.34. The reason for this insignificance may be the fact that the IV used here is not strong enough (the weakness of the instrument has been discussed later in this section). For the IV (location average i.e. *average_bribe1*) there are only 5 locations (clusters) in the sample giving only 5 variations in the data. It thus serves a weak instrument.

In the second stage it was intended to check if the age and size had non-linear effect on growth or sale as they increase. With this end, squared terms of these variables are used in some specifications. They do not appear to be significant. The reason for using interaction terms, *bribe*regulation* and *bribe*competitor* has been explained above. *bribe*regulation* has been significant at 1% level (see model 15 in table- 4.1.4) and bribe*competitor has been significant in 10% level (see model 16 in table- 4.1.4). Both of these interaction terms are affecting growth positively. However, in model 15 the coefficient of the variable of interest i.e. bribe has been insignificant. According to model 16, competition is increasing the impact of bribe on growth. Growth rate is seen to increase at a greater rate when bribe is interacted with *competitor*. Model 17 in table- 4.1.4 shows the output from the IV method where instruments used are *distance* and *competitor*. Here the coefficient of bribe has been significant at 10% level with a t-statistic of 2.079 and accordingly, one percent increase in bribe increases the rate of growth by 0.158.

Although our main interest is to look into the impact of bribery on firm growth, it has also been examined how bribery affects firms' sale. In all three specifications i.e. model 18, 19, 20 in table- 4.1.5 *bribe* has appeared to be significant. Bribe is seen to have negative and small impact on firm growth- one percent increase in bribe decreases sales by 0.490%, 0.572% and 0.486% according to model 18, 19 and 20 respectively.

Table- 4.1.1: results from OLS and OLS (VCE)

Dependent Variable:	Model 1	Model 2	Model 3	Model 4	Model 5
growth	OLS	OLS	OLS	OLS	OLS
log bribe	0.085***	0.086***	0.086***	0.085*	0.086*
	(3.503)	(3.694)	(3.763)	(1.641)	(1.722)
size	0.025	0.025	0.025	0.025	0.025
	(1.388)	(1.461)	(1.485)	(1.169)	(1.250)
log age	-0.058	-0.056	-0.056	-0.057	-0.056
	(-1.431)	(-1.427)	(-1.449)	(-1.079)	(-1.100)
foreign trade	0.079	0.075		0.079	

	(0.652)	(0.632)		(0.983)	
regulation	0.0001			0.0001	
	(0.003)			(0.004)	
competitor	0			0	
	(-0.289)			(-0.268)	
distance	0.0001			0.0001	
	(0.133)			(0.188)	
r2	0.178	0.177	0.173	0.178	0.173
r2_a	0.108	0.138	0.145	0.108	0.145
F	2.56	4.61	6.13	0.55	1.04
Prob > F	0.019	0.002	0.0008	0.792	0.379
N	91	91	92	91	92

Note: values in parentheses are t-statistics; ***= significance at 1% level, **= significance at 5% level, *=significance at 10% level

Table- 4.1.2: results from OLS and OLS (VCE)

Dependent Variable: growth	model6 VCE(cluster)	model7 VCE(cluster)	model8 svy(strata)	model9 svy(strata)
log bribe	0.086*	0.086*	0.085*	0.090*
	(1.698)	(1.722)	(1.762)	(1.736)
size	0.0257	0.0252	0.0251	0.0287
	(1.243)	(1.229)	(1.220)	(1.326)
log age	-0.056	-0.056	-0.058	

	(-1.030)	(-1.038)	(-1.138)	
foreign trade	0.075		0.079	0.076
	(0.955)		(1.025)	(0.980)
log regulation			0.0001	
			(0.004)	
competitor			0	
			(0.277)	
distance			0.0001	
			(0.189)	
r2	0.177	0.173	0.178	0.157
r2_a	0.138	0.145		
F	0.88	1.03	0.59	1.14
Prob > F	0.482	0.381	0.759	0.337
N	91	92	91	91

Note: values in parentheses are t-statistics; ***= significance at 1% level, **= significance at 5% level, *= significance at 10% level

Table- 4.1.3: Results from IV regressions

Dependent Variable: growth	Model10 (IV avb1)	Model11 (IV avb1)	Model12 (IV avb1)	Model 13 (IV avb1) LIML
log bribe	0.172	0.171	0.151	0.171
	(1.336)	(1.217)	(1.276)	(1.33)
size	0.046	0.043	0.042	0.046
	(1.407)	(1.377)	(1.363)	(1.37)

log regulation	-0.012			-0.013
	(-0.25)			(-0.24)
competitor	0.000			0.000
	(-0.000)			(0.46)
distance	(0.000)			0.000
	0.4792			(0.59)
foreign trade		0.063		
		(0.487)		
Centred R2	0.0375	0.038	0.0834	0.037
Uncentred R2	0.1286	0.1273	0.1702	-0.018
F	(5,86)=052	(3,87)=0.77	(2, 89)=0.96	(5, 86)=0.48
Prob > F	0.7619	0.5111	0.3865	0.790
N	92	91	92	91

Note: values in parentheses are t-statistics; ***= significance at 1% level, **= significance at 5% level, *= significance at 10% level. avb1 is average_bribe1 (location average of bribe).

Table- 4.1.4: Regression results OLS and IV

Dependent variable: growth	Model 14 OLS	Model 15 OLS	Model 16 OLS	Model 17 IV
log bribe	0.087***	0.02	0.066*	0.158*
	3.534	0.851	2.517	2.254

age	-0.023	-0.011	-0.024	-0.018
	(-1.738)	(-1.043)	(-1.911)	(-1.320)
age-squared	0.001	0	0.001	0.001
	1.550	0.993	1.717	1.263
size	0.115	0.021	0.087	0.218
	0.589	0.126	0.455	0.992
size-squared	-0.003	-0.001	-0.002	-0.007
	(-0.481)	(-0.104)	(-0.351)	(-0.843)
foreign trade	0.087	0.062	0.077	0.068
	0.714	0.605	0.645	-0.535
log regulation	0.004	0.004	0.004	-0.01
	0.100	0.120	0.090	(-0.223)
competitor	0.000	0.000	0.000	
	(-0.224)	(-0.201)	(-1.380)	
distance	0.000	0.000	0.000	
	0.153	0.261	0.123	
bribe*regulation		4.058***		
		6.055		
bribe*competitor			2.008*	0.567
			2.047	-0.573
R-squared	2.118	6.412	2.401	1.92
r2	0.191	0.445	0.231	0.109
r2_a	0.101	0.376	0.135	0.022
N	91	91	91	91

Note: Figure in parentheses are t-statistics. * p<0.05, ** p<0.01, *** p<0.001

Table- 4.1.5: Regression results OLS

Dependent variable: log sale	Model 18 OLS	Model 19 OLS	Model 20 OLS
log bribe	-0.490***	-0.572***	-0.486***
	(-4.986)	(-4.106)	(-4.633)
age	0.018	0.013	0.019
	-0.375	-0.26	-0.381
age-squared	0	0	0
	0.202	0.285	0.190
size-squared	1.179	1.155	1.186
	1.581	1.546	1.575
size-squared	-0.031	-0.03	-0.031
	(-1.101)	(-1.079)	(-1.099)
foreign trade	-0.326	-0.28	-0.323
	(-0.720)	(-0.612)	(-0.709)
log regulation	0.367*	0.331*	0.367*
	2.412	2.090	2.397
competitor	0	0	0
	1.038	1.021	0.903
distance	0.002	0.002	0.002
	1.114	0.937	1.110
bribe*regulation		39.55	
		0.832	
bribe*competitor			-0.407
			(-0.114)
R-squared	10.421	9.409	9.255
r2	0.559	0.563	0.559

r2_a	0.505	0.503	0.499
N	84	84	84

Note: Figure in parentheses are t-statistics. * p<0.05, ** p<0.01, *** p<0.001

4.2 Regression output from the World Bank data

The bribe variable, *log bribe*, the main variable of interest in this study is seen to impact firm growth negatively and this negative impact is highly significant (at 1% level) in all the OLS regression equations (from model 1 to model 12 in table-4.2.1, 4.2.2, 4.2.3). In model 13 (table-6.6) in which regression is done in IV method with the instrument of location average (average_bribe1) the coefficient of *log bribe* has been significant in 10% level. However, the sign remains the same. In the IV regression of model 14 where industry-location average (average_bribe2) instead of location average of bribe has been used, bribe coefficient becomes significant at 1% level. The standard OLS regression estimates that one percent increase in bribe payment reduces growth rate by 0.016 or 0.017 which are almost the same also in the estimates done by regressions which are robust to unobserved heterogeneity, clustering and stratification in the bribe payments. The techniques used in the regressions with vce, cluster and strata options have tackled the problem of heterogeneity (model 4 to 12). The IV regression in which individual bribe payment is instrumented by their location averages, shows a fall of 0.07 in growth rate due to a one percent rise in bribe, which is significant at 10% level (see model 13 in table-4.2.3). The IV regression in model 14 which uses industry-location average of bribe as instrument, shows a fall of 0.155 in growth rate due to a one percent rise in bribe (see table- 4.2.3), which is significant at 1% level.

Table- 4.2.1: Regression output OLS, OLS (vce)

Dependent Variable: growth	Model 1 OLS	Model 2 OLS	Model 3 OLS	Model 4 OLS (vce)	Model 5 OLS(vce)	Model 6 OLS(vce)
log bribe	-0.017**	-0.017**	-0.016**	-0.017***	-0.017***	-0.016***
	(-2.066)	(-2.168)	(-1.992)	(-2.529)	(-2.74)	(-2.619)
sale	0.0121	0.0114	0.012	0.0121	0.0114	0.012
	(1.406)	(1.307)	(1.395)	(0.939)	(0.881)	(0.944)
infrastructure	0.141***	0.138***	0.138***	0.141***	0.138***	0.138***
	(15.755)	(15.386)	(15.429)	(2.865)	(2.767)	(2.768)
bribedum0	0.114**	0.124**	0.111*	0.114	0.124	0.111
	(1.977)	(2.144)	(1.913)	(1.488)	(1.586)	(1.439)
foreign	0.0362	0.0398	0.0389	0.0362	0.0398	0.0389
	(0.982)	(1.076)	(1.058)	(0.812)	(0.908)	(0.897)
regulation	0.0188	0.0197	0.0179	0.0188	0.0197	0.0179
	(1.134)	(1.190)	(1.083)	(1.085)	(1.154)	(1.072)
onnovation1			0			0
			(-1.950)			(-1.920)
education		0.048**	0.059***		0.048	0.059
		(-2.141)	(-2.543)		(-0.991)	(-1.172)
innovation2		0			0	
		(-0.360)			(-0.665)	
F	44.618	34.202	34.878	2.754	2.616	2.588
Prob>F	0.000	0.000	0.000	0.012	0.008	0.008

r2	0.316	0.321	0.326	0.316	0.321	0.326
r2_a	0.309	0.312	0.316	0.309	0.312	0.316
N	587	587	587	587	587	587

Note: value in parentheses are t-statistic. *** indicates 1% significance level, ** indicates 5% significance level and * indicates 10% significance level. *infrastructure* is measured by monetary loss due to power outage; *foreign* is foreign trade; *bribedum0* is dummy variable which = 1 if the firm has not paid bribe otherwise 0.

Table- 4.2.2: Regression output OLS (cluster)

Dependent Variable: growth	Model 7 (OLS, cluster)	Model 8 (OLS, cluster)	Model 9 (OLS, cluster)
log bribe	-0.017***	-0.017***	-0.016***
	(-2.194)	(-2.428)	(-2.332)
sale	0.012	0.011	0.012
	(1.164)	(1.027)	(1.113)
infrastructure	0.141***	0.138**	0.138**
	(2.031)	(1.946)	(1.950)
bribedum0	0.114***	0.124***	0.111***
	(2.880)	(3.283)	(3.104)
foreign	0.036	0.040	0.039
	(0.968)	(1.046)	(1.051)
regulation	0.019*	0.020**	0.018*
	(1.900)	(1.988)	(1.793)
innovation1			0.000***
			(-2.940)

education		0.048	0.059
		(1.170)	(1.341)
innovation2		0.000	
		(-1.291)	
F	.	.	.
Prob>F	.	.	.
r2	0.316	0.321	0.326
r2_a			
N	587	587	587

Note: value in parentheses is t-statistic. *** indicates 1% significance level, ** indicates 5% significance level and * indicates 10% significance level. *infrastructure* is a variable for infrastructure measured by monetary loss due to power outage.; foreign is foreign trade; *bribedum0* is dummy variable which = 1 if the firm has not paid bribe otherwise 0.

size i.e. firm's sale measured as [(Log of Sale2008 in $ + Log of Sale2010 in $)/2] which is used as a control for the effects of firm size has appeared with insignificant coefficients in all the regressions meaning that size does not really impact growth. Unlike Fisman & Svensson (2007) this study has used a quantitative measure of infrastructure condition as a control variable. The fact that industrial units in Bangladesh have been facing a severe problem of power outage for which they have to spend substantial amounts of money on the purchase of generators and fuel motivated me to use the monetary loss due to power outage as a control variable indicating the status of the infrastructure. Intuitively this variable was expected to come up with a negative coefficient in the regression but its impact has appeared to be positive with high significance level. Probable reason for this might be that the amounts thus spent have correlations with firm's sale prospects and ability to spend on power supply in order to meet orders promptly, which, therefore, positively impacts growth.

The dummy, *bribedum0* i.e. a dummy of no bribe is significantly positive in sign, which is in line with the negative effect of bribe on growth. *education* i.e.

average years of education of production workers has significantly positive impact on growth because it directly increases the productivity of the firm.

innovation1 i.e. investment in IT and IT-related equipment for increasing productivity is counter-intuitively seen to negatively impact growth. From the survey conducted by myself for the 1st empirical chapter it has been discovered that it was not a culture in Bangladesh to invest in increasing the productivity. Most firms responded negatively in answer to the question if they invested for this purpose. Only a few firms mentioned 5% of their turn-over for investment in the increasing of productivity. According to the BES survey, the firms which have invested for increasing productivity must have done so recently i.e. immediately prior to the period of this survey; as result the firm did not begin to enjoy the return from it. Therefore, the return that would accrue from this money if invested in increasing current sale has been lost.

Table- 4.2.3: Regression output OLS (strata), IV

Dependent Variable: growth	Moodel 10 OLS(STRATA)	Moodel 11 OLS(STRATA)	Moodel 12 OLS(STRATA)	Model 13 IV (*avb1*)	Model 14 IV (*avb2*)
log bribe	-0.017***	-0.017***	-0.016***	-0.073*	-0.155***
	(-2.538)	(-2.755)	(-2.633)	(-1.767)	(-2.560)
size	0.012	0.011	0.012	0.004	-0.007
	(0.945)	(0.889)	(0.952)	(0.395)	(-0.520)
infrastructure	0.141***	0.138***	0.138***	0.143***	0.148***
	(2.885)	(2.790)	(2.792)	(-14.531)	(12.510)
bribedum0	0.114	0.124	0.111	0.429*	0.879***
	(1.494)	(1.596)	(1.447)	(1.837)	(2.600)
foreign	0.036	0.040	0.039	0.035	0.029
	(0.815)	(0.914)	(0.903)	(0.905)	(0.640)
regulation	0.019	0.020	0.018	0.053*	0.103***
	(1.093)	(1.165)	(1.082)	(1.751)	(2.460)
innovation1			0.000**	0.000	0.000

			(-1.93)	(-1.11)	(-0.230)
education		0.048	0.059	0.064***	0.070***
		(0.998)	(1.180)	(2.603)	(2.420)
innovation2		0.000			
		(0.670)			
F	2.770	2.630	2.600	31.960	23.460
Prob>F	0.011	0.008	0.008	0.000	0.000
r2	0.316	0.321	0.326	0.266	-0.023
r2_a					-0.038
N	587	587	587	587	587

Note: value in parentheses is t-statistic. *** indicates 1% significance level, ** indicates 5% significance level and * indicates 10% significance level. *infrastructure* is measured by monetary loss due to power outage; *foreign* is foreign trade; *bribedum0* is dummy variable which = 1 if the firm has not paid bribe otherwise 0. *avb1* is average_bribe1 (location average of bribe) *avb2* is average_bribe2 (industry-location average of bribe).

Table- 6.7: Test of weakness of the instruments (reading the correlation)

	growth	log bribe	*avb1*	*avb2*
growth	1			
log bribe	0.1019*	1		
avb1	0.0449	0.3378*	1	
avb2	-0.1585*	-0.2146*	0.0940*	1

Note: *avb1* is average_bribe1 (location average of bribe) *avb2* is average_bribe2 (industry-location average of bribe). * = significant at 5% level

Table- 6.8: Test of weakness/identification of the 1st instrument (First-stage regression)

Test of weakness of the instrument (First-stage regression from IV)					
F test of excluded instruments:					
	F(	1,	578)	=	24.4
	Prob	>	F	=	0.000
Angrist-Pischke multivariate F test of excluded instruments:					
	F(	1,	578)	=	24.4
	Prob	>	F	=	0.000
Variable	F(1, 578)	P-val	AP Chi-	P-val	AP F(1, 578)
log bribe	24.4	0.000	24.78	0.000	24.4
Stock-Yogo weak ID test critical values for single endogenous regressor:					
	10%	maximal	IV	size	16.38
	15%	maximal	IV	size	8.96
Underidentification					
Ho: matrix of	reduced	form	coefficien	has	(underidentifie
Ha: matrix	has	rank=K1	(identifie		
Anderson canon	corr.	LM	statistic	Chi-	P-val=0.0000
Weak	identificati	test			
Ho:	equation	is	weakly	identified	
Cragg-Donald	Wald	F	statistic		24.4
Stock-Yogo weak	ID test	values	for K1=1	and L1=1:	
	critical				
	10%	maximal	IV	size	16.38
	15%	maximal	IV	size	8.96
	inference				
Tests of joint significance of endogenous regressors B1 in main equation					
Ho: B1=0 and orthogonality conditions are valid					
Anderson-Rubin	Wald test	F(1,578)	3.4	Pval=0.06	
Anderson-Rubin	Wald test	Chi-	3.45	Pval=0.06	
Stock-Wright	LM S	Chi-	3.43	Pval=0.06	
	Statistic	sq(1)=		4	

Table- 6.9: Test of weakness/identification of the 2nd instrument (First-stage regression)

Underidentification tests:

		Chi-sq(1)	P-value
Anderson canon. corr.	Likelihood ratio stat.	15.86	0.0001
Cragg-Donald N*minEval stat.		16.08	0.0001

Ho: matrix of reduced form coefficients has rank=K-1 (underidentified)

Ha: matrix has rank>=K (identified)

Weak identification statistics:

Cragg-Donald (N-L)*minEval/L2 F-stat 15.83

Anderson-Rubin test of joint significance of endogenous regressors B1 in main equation, Ho:B1=0

F(1,578)= 10.03 P-val=0.0016

Chi-sq(1)= 10.19 P-val=0.0014

Anderson canon. corr. LR statistic (identification/IV relevance test): 15.863

Chi-sq(1) P-val = 0.0001

Sargan statistic (Overidentification test of all instruments): 0

(equation exactly identified)

Instrumented: log bribe

Included instruments: size infrastructure *bribedum0* foreign regulation innovation1 education

Excluded instruments: avb2

Table- 6.10: Test of endogeneity (hausman) for the 1st instrument

. hausman m3 m13
b = consistent under Ho and Ha: obtained from regress
B = inconsistent under Ha, efficient under Ho; obtained condivreg
Test: Ho: difference in coefficients not systematic
chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= -5.35 chi2<0==> model fitted on these data fails to meet the asymptotic assumptions of the Hausman test; see suest for a generalized test

Table- 6.11: Test of endogeneity (Durbin Wu-hausman) for the 1st instrument

. estat endogenous					
Tests of endogeneity					
Ho: variables are	exogenous				
Durbin	(score)	chi2(1) =	2.20273	(p =	0.1378)
Wu-Hausman	F(1,577)	=	2.17336	(p =	0.1410)

Table - 6.12: Test of endogeneity (hausman) for the 2nd instrument

. hausman m3 m14
b = consistent under Ho and Ha: obtained from regress
B = inconsistent under Ha, efficient under Ho; obtained condivreg
Test: Ho: difference in coefficients not systematic
chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= -5.35 chi2<0==> model fitted on these data fails to meet the asymptotic assumptions of the Hausman test; see suest for a generalized test

Table- 6.13: Test of endogeneity (Durbin Wu-hausman) for the 2nd instrument

. estat endogenous					
Tests of endogeneity					
Ho: variables are	exogenous				
Durbin	(score)	chi2(1) =	8.33303	(p =	0.0039)
Wu-Hausman	F(1,577) =		8.30903	(p =	0.0041)

Table- 4.2.4: Regression output from panel data using OLS, Random Effect

	Model 15 OLS on panel data Dependent variable: log productivity	Model 16 OLS on panel data Dependent variable: log sale	Model 17 Random Effect Dependent variable: log productivity
log bribe	-0.006***	-0.006***	-0.006***
	(-9.218)	(-7.360)	(-189.686)
age	0.011	0.026**	0.011*
	(1.472)	(2.610)	(2.120)
age-squared	0	0	0.000
	(-0.489)	(-1.044)	(-0.547)
size	0.025***	0.050***	0.025***
	(5.473)	(7.432)	(6.266)
size-squared	-0.000***	-0.000***	-0.000***
	(-4.761)	(-6.875)	(-7.322)
regulation	0.013	0.048***	0.013***

	(1.410)	(3.972)	(3.291)
foreign	0.766***	3.017***	0.766**
	(7.024)	(20.888)	(3.223)
R-squared			
r2			
r2_a			
N	858	858	858

Note: Values in parentheses are t-statistics. * p<0.05, ** p<0.01, *** p<0.001

The other variables that do not show any significant impact on growth are *foreign trade*, *innovation2* (investment in non-IT equipment). *regulation* i.e. log of time i.e. Senior management's time spent in dealing with regulations) has significant coefficients in the models addressing the problem of clustering in bribe (model 7, 8, 9 in table- 4.2.2) and in the model 13 and 14 which run IV regression. In model 14 it is highly significant. The positive impact of regulation which has positive correlations of 0.2 with log bribe and 0.3 with average_bribe1 (location averages of bribe) on firm growth is puzzling but the possible reason might be this slight multicollinearity plus the fact that the firms engaged in exports and imports have to deal with regulations to a greater extent but at the same time enjoy the prospects of higher sales than local firms which have less to do with regulations.

The results obtained from panel data may be taken as a robustness check. As has been discussed above that panel data set has got severe data limitations. Log productivity and log sale- these two dependent variables became significant in OLS. Sales growth as a measure of growth used as a dependent variable in growth equations with all explanatory variables did not turn out to be significant in any of the regressions (not reported). Log productivity as an alternative to growth is seen to be negatively affected by bribe (model 15 in table- 4.2.4). The negative effect of bribe is shown also in Random Effects estimator (model 17 in table- 4.2.4). Model 16 in the same table shows a negative effect of bribe on log of sale.

4.3 Robustness of the results

Results found from the investigation on the impact of bribery on firm growth are not robust across the two pieces of work. They are robust within.

In the primary data analysis the main variable of interest, bribe has come up with positive coefficient in all the regression equations including the IV. Coefficient of *bribe* has remained significant in all OLS techniques mentioned earlier (see model-1 to 9 in table-4.1.1 and 4.2.2). In the second stage when regressions have been run using two squared-terms and two interaction terms, bribe coefficient possesses the same sign and magnitude remains also very similar. Then in the IV regression which uses distance and competitor as instruments the bribe coefficient becomes more significant with a t-statistic of 2.079 with the same sign and its magnitude is very similar to the one obtained from the IV regression which used location average of bribe as an instrument in the first stage.

In the World Bank data the main variable of interest, bribe has come up with negative coefficient in all the regression equations including the IV regression. The significance level of the estimator has remained highly significant in all OLS techniques mentioned earlier (see model- 1 to 12 in table-4.2.1, 4.2.2, 4.2.3). In the IV regression the coefficient is significant at 10% level and 1% level in model 13 and 14 respectively. It may, therefore, be inferred that the negative impact of bribe on firm growth is robust.

The results obtained from the estimates of panel data provide further robustness to the negative effect of bribe on firm growth found in the cross-section analysis in this chapter because log of productivity, as an alternative measure of growth, is seen to be negatively affected by bribe in OLS and Random Effects estimators applied on panel data.

5 Concluding remarks

The hypothesis made in the first study was a negative effect of bribery on firm growth. The hypothesis was influenced by the general wisdom, the expression of firm owners' and managers' dissatisfaction about the corruption of the government officials. Regression results, to the contrary, reveal a positive effect.

The fact is, firms have to pay bribe to get around the obstacles created by bureaucrats even if they are connected to the ruling party, which means nobody can get things done without bribe because even a low ranking officer or clerk can find ways of showing excuses of not being able to move the file. Threatening from politicians or politically connected people does not work here while it is not easy to get a government official sacked. Moreover, this low ranking officer is connected to high-ups who receive a portion of the bribe and he or she cannot be sacked without the recommendation of the officers above him or her of the department. In this situation they prefer to pay bribe and get things done quickly. There are other reasons for firms to decide to pay bribe instead of waiting for getting things done without bribe: during operation, capital is already brought in the business, therefore, if the business activities get stuck at any point, then that capital becomes idle in a sense, which would definitely make the firm incur loss. For example, when goods are stuck in port, a firm has to pay high amounts of money for the rent of containers and space; when electricity office produces an abnormal bill and cuts the line, the later it is to clear bills, the longer the machinery would remain unused incurring loss. There would be other dimensions of loss such as: owing to the delay caused in the ways mentioned above would result in the cancellation of the order from the buyers and huge amount of money already invested in the production would be lost. In such cases the firms with huge capital can meet the demands for bribe and avoid losses and achieve faster growth. In this situation the faster one can pay bribe, the quicker he or she can get things done and thus expedite the economic activities. The firms owned by individuals connected to the ruling party or those of greater ability to bribe, have the advantage of getting the right and quick connection to the bribe takers. These features and mechanism just mentioned are prevalent in the garments industry of Bangladesh, which dominates the small sample used in it. The finding reveals this growth-enhancing effect of bribe paid in quicker ways and larger quantities. Garments sector is the largest exporting sector in Bangladesh, where investors are of greater financial ability and are pressurized by the necessity of meeting foreign buyers' demand to pay any amounts as bribe. Another important

feature of Bangladesh garments industry is that bribery here is systematic. The entrepreneurs in this sector unitedly, through successful negotiations with government officials, have made some systems of bribe payment by which firms don't need to waste time in searching the right person to bribe, don't need to spend time on bargaining and in many cases just one office or officer offers a number of documents/papers/permissions. Government officers also cooperate with each other to make the bargain a success and distribute the bribe among themselves. Thus, firms belonging to garments industry by dint of bribe payments experience higher growth compared with the firms belonging to other sectors.

In the second study this impact is found to be negative. In this empirical study the finding goes in line with the hypothesis i.e. the more one has to spend informally, the lower the growth it experiences. It implies that bribe payments do not necessarily expedite the delivery of public services. With an effort to seek more rents the government officials might rather delay the process. This view is predominant in the literature discussed above. In Bangladesh perspectives the impact of the corruption of bureaucrats on firm growth is negative and small. This empirical exercise using secondary data started with a sample of only medium size firms and the bribe coefficient still remained positive. After enlarging the sample by including all the firms of the industrial sector of Bangladesh from small to large the regression output shows a negative effect of bribery on firm growth. This change in the direction is understandably has occurred due to the overcoming of the sample bias. It is, therefore, more appropriate to make inferences on the basis of results obtained from the second analysis. Accordingly, a 1% increase in bribe decreases growth rate by about 0.016. It means that impact of bribe payments on firm growth is negative but small.

There is always a concern about the measurement of variables on sensitive issues like corruption as explained earlier. Despite the efficient survey instrument suspicion still remains about the authenticity of information collected on bribe. Besides the unwillingness of the owner/manager to reveal information, there are problems like the lack of records of data and the fact that data on different variables

are with different officials, therefore, when one person provides information about everything, misinformation is likely to occur.

The sample size of 92 observations is small which might cause a small sample bias. Therefore, increasing the number of observations would definitely help to overcome this bias and make more appropriate inferences. Substantial increases in the sample size would make regressor(s) endogenous and in that case it would need to use an IV for which whole population area of firms need to be divided into a pretty large number of clusters and strata enabling us to have a better instrument (location average or industry-location average of bribe).

To overcome the endogeneity problem as explained earlier, initially location averages have been used as an instrument which is theoretically valid but very weak. Main reason of this weakness is that there are only 5 locations (in the first analysis) or 6 locations (in the second locations) in the sample giving rise to only 5/6 strata meaning that there are only 5/6 variations in the variable of interest. The number of locations may be increased by demarcating total population area according the distances from the capital city and from regional towns like remote towns, outskirts, villages, specialized areas like Export Processing zones etc. (as is done in the survey conducted by ourselves). However, the second instrument which is the industry-location average of bribe has been a strong one with a lot of variations in it. It has served very satisfactorily and removed any possibility of endogeneity in the regressions. Therefore, the results found from the IV regressions are reliable and inferences made on these results may be considered appropriate.

Appendices

Table- A4.1.1: Summary statistics from the primary survey

Variable	Obs	Mean	Std. Dev.	Min	Max
growth	91	0.095323	0.285544	-1.17932	0.949226
bribe	91	254631	1776398	0	14300000
size	91	5332781	12600000	3142.857	85700000
age	91	12.15385	8.773601	0	40
foreign trade	90	0.888889	0.31603	0	1
regulation	91	16.79121	13.1728	1	66
competitor	91	404.6939	592.9196	5	2000
distance	91	47.6044	81.72568	0	360

Note: The variables *bribe* and *size* are respectively bribe paid in the base year (2008) in dollar and resale value of capital machinery of the firm in dollar used as a control for the size of firms. These values in the summary statistics table are different from the variables used in the regressions in that in the regressions bribe and resale value of capital machinery were taken as fractions of sale. To have a clear idea in the summary statistics absolute values are shown.

Table- A4.1.2: correlation matrix

	growth	log bribe	BRIBEav	LindlocB	size	log reg	competitor	distance
growth	1							
log bribe	0.355*	1						

avb1	0.134	0.167	1					
avb2	0.106	0.501*	0.592*	1				
size	0.055	-0.287	0.081	-0.166	1			
regulation	0.047	0.131	-0.043	0.071	-0.071	1		
competitor	-0.054	-0.115	0.124	0.055	-0.065	0.025	1	
distance	-0.024	-0.116	-0.433*	-0.275	0.037	-0.092	-0.127	1

Note1: *=significant at 5% level

Note2: avb1 is the location average of bribe; avb2 is industry-location average of bribe; *log reg* is log of regulation (i.e. amount of time spent by the management for settling issues with government offices; *competitor* is the number of competitors in the industry the firm belongs to; *distance* is the distance of the firm from the capital city.

Table- A4.2.1a: Correlation matrix from the Bangladesh Enterprise Survey, World Bank

	growth	log bribe	LBRIBEav	Lindlo~a	size	infrastructure	BRIBEd~0	foreign	regulation	inov1	edu
growth	1										
Log bribe	0.1019*	1									
avb1	0.0449	0.3378*	1								
avb2	-0.1585*	-0.2146*	0.0940*	1							
size	0.1415*	-0.0113	0.1867*	-0.2181*	1						
infrastructure	0.5251*	0.1422*	0.1998*	-0.0534	0.1205*	1					
bribedum0	0.1112*	0.8309*	0.1812*	-0.2490*	0.0402	0.1240*	1				
foreign	0.1259*	-0.011	0.1725*	-0.1035*	0.7230*	0.0368	-0.011	1			
regulation	0.0813	0.1485*	0.2347*	-0.0794	0.2851*	0.0987	0.0369	0.2193*	1		
innovation1	-0.0223	-0.0587	-0.0373	0.0466	0.0328	0.0186	-0.0965*	-0.0034	0.0141	1	
education	0.0134	0.0152	-0.0388	-0.0958*	-0.0524	0.054	-0.0011	-0.082	-0.054	-0.036	1

Note: * = significant at 5% level

avb1 is location average of bribe; avb2 is industry-location average of bribe; foreign is foreign trade; bribedum0 is dummy variable which = 1 if the firm has not paid bribe otherwise 0.

Table- A4.2.2: Comparison between the location averages of bribe in 2008

Cluster	Average bribe in US dollar
cluster1	1057952.00
cluster2	9047.62
cluster3	5387.14
cluster4	9088.67
cluster5	62000.00

Table- A4.2.3: Comparison between location averages of bribe

Variable	Obs	Mean	Std. Dev.	Min	Max
DhakaAV	555	17860.33	92356.74	0	1714286
ChittagongAV	208	15052.71	47121.68	0	308571.4
KhulnaAV	102	4826.992	22507.61	0	214285.7
RajshahiAV	95	14237.2	73434.93	0	623942.9
SylhetAV	105	342.6348	1353.837	0	13035.71
OthersAV	71	23326.67	108748.3	0	817714.3

Source: Bangladesh Enterprise Survey, World Bank

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