MONASH University
Business and Economics

Department of Economics
Issn 1441-5429
Discussion paper 38/10

Non-collusive Corruption: Theory and Evidence from Education Sector in Bangladesh

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Abstract

We study non-collusive corruption in the education sector. For this purpose, we construct a simple theoretical model that captures non-collusive corruption between service providers (teachers) and service demanders (students). The model shows that the bribe paid by the service demander increases with the level of red tape and her income level, but it decrease with the improvement of the individual's social status. We also establish that with the increase in the income and the social status of the private agent (networks), the probability of paying bribes and the severity of red tape declines. Then we use a survey data set collected in 2007 by Transparency International Bangladesh, to test the predictions of the model. The estimations confirm that both the probability of being subjected to non-collusive corruption and the cost of corruption is related to the individual characteristics of the bribe payer. Moreover, network connections are an important factor that helps to ease the burden of corruption on private agents, which is also likely ensuring the persistence of this type of corruption.

JEL Codes: K4, O1
Key words: Education, non-collusive corruption, bribery, Bangladesh

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We thank Russell Smyth for helpful comments, and the Transparency International Bangladesh for providing the data used in this paper.

1. Introduction

We study causes and possible consequences of non-collusive corruption in the education sector. The main focus of our paper is i) to ascertain if informal networks play a part in persistence of non-collusive corruption, ii) and if non-collusive corruption in education contributes to inequality. We start our analysis by building a simple theoretical model to obtain insights on how non-collusive corruption affects provision of public services to households. Then using survey data from Transparency International Bangladesh for 2007, we test hypotheses based on the predictions of the theoretical model.

The first contribution of this paper is that it shows that a membership in informal networks can benefit the private agent by allowing getting favorable corrupt deals. The existence of such private gains from membership of informal networks creates a self-reinforcing structure that supports the persistence of such non-collusive corruption. For example, it is known that collusive corruption creates gains for private agents, and hence incentives not to report corrupt bureaucrats is given as one of main reasons why corruption exhibits persistence (see e.g. Bardhan, 1997). However, this reasoning cannot explain the persistence of non-collusive corruption, where private agents seemingly do not have any gains. In a theoretical paper, Foellmi and Oechslin (2007) argue that non-collusive corruption not only redistributes income from non-officials towards officials but also within the group of potential entrepreneurs by limiting market entry. This creates an incentive for such corruption practice to persist. However, we cannot use this rationale to explain persistency of non-collusive corruption in provision of education or health care services. The reason is that in this case, exclusion of some individuals from these services will not create rents to those who are receiving the services, unlike to the case with firms.

To address this issue, in our model we use the intuition based on the following papers. Kingston (2007, 2008) theoretically shows that if a government official and a member of the public share informal social or economic ties, this may enable them to enforce bribe transactions. This situation can lead to the development of a "culture" of corruption that can subsequently prove hard to dislodge. A similar conclusion is made by Çulea and Fulton (2009) about re-enforcing nature of externalities created by such a "culture"; more cheating by firms is good for bribe-taking inspectors and more bribe-taking inspectors are good for cheating firms. Véron *et. al.* (2006) find that when the vertical accountabilities are weak, horizontal accountability structures between local civil society and officials can mutate into networks of corruption in which ''community'' actors become accomplices or primary agents. Along these lines, we study whether those who use private networks to avoid excessive red tape pay less in

bribes.[2] Our empirical results corroborate the findings we obtain from the theoretical model. The results show that the social status of the students (or their parents) is a significant factor in reducing the burden of non-collusive corruption. Hence, this outcome works in support of perpetuating non-collusive corruption as predicted by Kingston (2007, 2008), Çulea and Fulton (2009) and Véron et. al. (2006). Moreover, our results corroborate Hunt (2004) who finds that networks facilitate the replacement of a bribe with an implicit quid pro quo, and that older people and residents of small town who are more likely to establish networks bribe less. Since the poor often have lower social status and hence lack influential network connections, thus this finding also explains why corruption can reduce equity.

Another issue we analyzed in this paper is how non-collusive corruption in education affects inequality. In this regard, the relevant literature indicates that corruption affects income inequality and poverty through reduction of economic growth, an increase in the progressivity of taxes, unequal access to services such as education and healthcare, and by creating an unequal distribution of wealth. For example, Gupta et al. (2002), Li et al. (2000), and Gyimah-Brempong (2002) found a significant effect of corruption on inequality using cross-country and panel data analyses, while Begović (2007) obtains a similar result based on a theoretical model. Moreover, the relationship between corruption and inequality is likely to flow in both directions. In this regard, You and Khagram (2005) argue that income inequality increases the level of corruption through material and normative mechanisms. All the above-mentioned studies relate corruption measures to aggregate inequality measures (such as the Gini coefficient).[3] However, there is also some microeconomic evidence that sheds light on the mechanisms linking corruption and inequality.[4] Inequality is promoted by corruption as public agents can treat public service demanders unequally, in the first place. For example, Olken and Barron (2009) find the existence of price discrimination on the basis of observable characteristics, which is evidence of complex pricing mechanism by corrupt officials. Hunt (2007a) who shows that victims of misfortune are more likely than non-victims to bribe public officials. Hunt (2007b) studies public health care in Peru and Uganda and finds that rich patients are more likely to bribe. Hunt (2004) examines the bribes using data from 34 countries,

[2] We use the term bribe when a household pays some amount for getting an educational service, which they are entitled to get free of charge. Similarly, we use the term extortion when the service provider compels households to pay something in exchange for nothing. The distinction between bribery and extortion, albeit in a different context, is provided in Khalil et al. (2010).

[3] The bulk of the existing empirical work on corruption mostly based on the macro level perception based corruption measures. This type measure might be prone to shortcomings, which are discussed in e.g. Galtung (2006) and Sik(2002), Fisman and Gatti (2002), Mauro (1995), Treisman (2000), Olson et al. (2000).

[4] Svensson (2003), Kaufmann and Wei (1999), analyze the corrupt interactions between firms and public officials, and Hunt (2007a) , Hunt (2007b), Hunt (2004), Deininger and Mpuga (2004), Mocan (2004), Di Tella and Schargrodsky (2003), Swamy et al. (2001) study individual bribery. See Banerjee and Pande 2009 for a review.

and finds that rich people pay the most bribes while poor the least. However, she also finds that the factor such as city size, age, sex, and ownership of a car all have a larger effect on bribery than income. Svensson (2003) finds that more profitable firms pay larger bribes. Mocan (2004) also finds that individuals with higher income and education levels are more likely to be asked for bribes.

Notably, there is not much research is done on corruption in the education sector, in general, how this type of corruption is related to inequality, in particular. Although, Biswal (1999) theoretically analyzed corruption in education sector, the results have not been substantiated empirically. The empirical work on this issue is also scanty. For example, Cockcroft et al. (2002) indicate that the poor have less access to health services and are less likely to enroll their children in school. The World Bank's Voices of the Poor survey (1999) reports that poor people suffer from corruption in obtaining health care, getting education for their children, claiming social assistance, and in accessing the justice system or receiving police protection. This paper contributes in this respect by offering some new evidence on what factors determine corruption in the education sector. We identify the characteristics of households who are more likely to pay bribes to get educational services from their immediate providers. These characteristics include education, wealth, and the age of the parents, as well as the strength of their network connections. Unlike firm level corruption data where business is reluctant to reveal the actual bribe payment because of its sensitivity; our data do not suffer from such bias. Specifically, our results show that non-collusive corruption in education increases inequality by disadvantaging the poor. The results also indicate the poor, less educated and lower social status people are subjected to higher red tape and they effectively pay higher bribes or are more likely to make so called “voluntary” contributions to schools. Therefore, the results of the empirical investigation are supportive of the hypothesis: namely, non-collusive corruption creates an unequal burden amongst the private agents and favors the rich and well connected over the poor and socially isolated.

Most importantly, our results on the relationship between corruption and inequality differ from what is found by Hunt (2007b, 2004), Mocan (2004) and Svensson (2003). We find, on the contrary to them, the poor pay more bribes than the rich. This difference might be stemming from the fact that overall higher income people are more active and hence, have higher demand for public services, and thus, pay more bribes overall. In addition, the gains from informal networks that what decreases the burden on non-collusive corruption on the rich, while the poor lacking access to such networks have to shoulder the brunt of corruption. In other words, in terms of an individual transaction, the burden of bribes still can be lower, for wealthier people than for the poorer people. The results could also depend on the nature of the service. Unlike healthcare, where people can choose doctors and hospitals, the education provider is a

monopoly, especially in rural areas, because parents (practically) do not have choice to alternative schools. In this aspect, our findings support Hunt (2007a), who demonstrates that the need for public services drives the bribery not the income level per se. Based on our results we also conclude that corrupt public agents in the education sector can discriminate private agents based on their individual characteristics. Hence, our results complement the findings on the price discrimination of truck drivers by Olken and Barron (2009).

The rest of the paper is structured as follows: in Section 2 we present the theoretical model and draw empirical implications. In Section 3, the data used is described, which is followed by explanation of the empirical strategy, in Section 4. In Section 5, we present the estimation results and Section 6 concludes our paper.

2. The Model

In this section we present the theoretical basis of our empirical analysis. A somewhat similar model of corruption in education is considered in Biswal (1999). However, corruption in that model is cast as a sale of club goods, while in our model we consider it as an independent interaction between a teacher and a student (or a parent).

In the model, there are two types of agents that interact directly: the service suppliers (S) and service demanders (D). The supplier is supposed to provide an amount of services, q, at per unit social cost, C, given exogenously. The per unit private value of the service is $\theta > C$. The value attached to the service depends on the quality of the services, and may vary in the range of $[\underline{\theta}, \overline{\theta}] > C$. Thus, these services generate positive social welfare. By design, the suppliers are supposed to provide services that are valued as $V = \overline{\theta}\overline{q}$, where $\overline{q}$ is the maximum amount to be received by the demander. We assume that the cost is covered by government, and hence, the services are provided free of charge.

So according to this model, by increasing red tape the supplier effectively creates rents and captures them. In our context this means that the public supplier of the service creates red tape to force the demander either to pay bribes or to buy the service at a private outlet operated by the same supplier. It is expected that higher red tape should be related to the higher demand for the services (or effective supply to the originally public domain demanders) from private outlets. [5]

[5] The supplier uses his position and the imperfect monitoring to create rents for himself. The mechanism used for rent creation is red tape. In our context, red tape is pure non-pecuniary cost (as in Banerjee , 1997). This cost can be either a time cost or a physiological cost caused by harassment exerted by the supplier of the service. As Shleifer and Vishny (1993) demonstrate, red tape results in shortage of the services being provided, and those who can accept the higher prices buy it with a mark-up to the statutory price. The mark-up is either an amount of bribe or in some cases is just obtaining the service (education or healthcare) at higher private prices.

Formally, the outcome for the demander in the presence of red tape is stated as $V = \theta q - b(q - \underline{q})$ if the service demander pays bribes, and $V = \underline{\theta}\underline{q}$ if she does not pay bribes, where b is a bribe paid or a markup paid if the demander is forced to obtain the service from a private outlet. It is also possible that instead of the bribe the agent may use her influential connections, which is assumed also incurs some costs to her. In this environment, both the quality and quantity of the service being provided deteriorates due to red tape, i.e. $\underline{\theta} \le \theta \le \overline{\theta}$ and $\underline{q} \le q \le \overline{q}$. Those who are willing to pay bribes or other forms of side-payments get a higher, both in quality and quantity, amount of services.

The suppliers maximize their objective function by choosing the level of red tape, taking into account both the participation constraint of the service demanders and the penalty constraint for being corrupt. The red tape may not be homogenously applied to all demanders. It is possible that the social status of the demander may also affect the level of red tape to which she is subjected. In this context, a somewhat related issue is to ascertain if those who use their connections to avoid red tape pay less in bribes or other illicit payments.

Note that the rent captured by the teachers can be expressed by bribes, illegal payments to the school or the teacher, or private tutorials. Use of networks or referrals from influential people can be costly for the student, but may not bring any rents to the teacher directly. However, usually in societies with strong informal networks, favors must be returned, so the teacher may get some favors from the influential person at some point in the future.

Given the discussion about the environment in general, now, we proceed to the formal analysis of the optimization problems of both the service demander and supplier.

3.2 Service demander's problem

We assume that the service demander has the following utility function:

$$u(c, s) = c^{\alpha} s^{1-\alpha}, \tag{1}$$

where c is the amount of consumption of goods and s is the value of the services demanded. The service demander is endowed with income y, which is used to purchase consumption good and pay bribes in the process of obtaining services. Then her consumption of goods and services are given as follows:

$$c = y - \delta b(q - \underline{q}) \tag{2}$$

$$s = \theta \underline{q} + \delta\beta(q - \underline{q}) - (1 - \delta)(\theta - h\underline{q})\underline{q} \tag{3}$$

where δ is the Dirac measure,

$$\delta = \begin{cases} 1 \text{ if bribe is paid;} \\ 0 \text{ otherwise;} \end{cases}$$

b is the bribe rate, β is the parameter of benefit from paying bribes, $\underline{q}$ is the red tape parameter as the public agent exerts pressure on the private service demander by limiting the amount of services available[6], h is a set of individual characteristics.

Then the agent's problem is expressed as the following:

$$\max_{q} \; u(c,s), \tag{4}$$

subject to (2) and (3).

From the FOC, we can establish that the agent pays bribes and demands higher quality and quantity of services only if the following condition holds:

$$u[y-b(q-\underline{q}),\theta\underline{q}+\beta(q-\underline{q})] \geq u[y,(\theta-h\underline{q})\underline{q}]. \tag{5}$$

By inserting (2) and (3) into (1), the problem given by (4) is transformed into unconstraint one, a solution of which entails the following equilibrium amount of services demanded:

$$q^{*} = \frac{(1-\alpha)(y+b\underline{q})+\alpha b\beta(\theta-\beta)\underline{q}}{\alpha b\beta+(1-\alpha)b}. \tag{6}$$

3.2 Service supplier's problem

Since we are interested in the relationship between the service supplier and demander, we abstract here from the problem that arises in considering the relationship between the service supplier and the government. For that purpose we assume that the monitoring and penalty system allows for the service supplier to be corrupt and seek personal gain by abusing his position. We assume that the service provider supplies the lowest possible quantity of services, $\underline{q}$, for the given level of penalty and monitoring effort by the government, that allows him to avoid losing his position. It is also assumed that there N agents in the service providers jurisdiction; n out of them end up paying bribes to the service provider. Then the service supplier's problem is given by:

$$\max_{b} \; v[w+nb(q-\underline{q})], \tag{7}$$

subject to

$$u[y-b(q-\underline{q}),\theta\underline{q}+\beta(q-\underline{q})] \geq u[y,(\theta-h\underline{q})\underline{q}], \tag{8}$$

$$N-n \geq 0. \tag{9}$$

For the sake of tractability we assume that the service provider's utility function is given by:

$$v \equiv w+b(q-\underline{q}).$$

Constraint (9) holds with equality assuming homogenous agents. However, if the service demanders are heterogeneous then only a fraction of the agents, that satisfy constraint(8), will be included. That is $N > n$. Since, income and other individual characteristics are exogenously

[6] As it is shown in Shleifer and Vishny (1993)

given, we can assume that only an exogenously given fraction, $\varphi < 1$, satisfies constraint (8), hence we can write $n = \varphi N$.

By incorporating the last discussion and the specific form of the service demander's utility function, we re-state the service provider's problem as maximization of the corresponding Lagrangian:

$$\begin{aligned} &\max_b \; L = w + \varphi N b(q - \underline{q}) + \\ &+\lambda\left[\left(y - b(q-\underline{q})\right)^{\alpha}\left(\theta\underline{q} + \beta(q-\underline{q})\right)^{1-\alpha} - y^{\alpha}\left((\theta - h\underline{q})\underline{q}\right)^{1-\alpha}\right]. \end{aligned} \tag{10}$$

Hence, the optimality conditions are given as follows:

$$\frac{\partial L}{\partial b} = \varphi N(q-\underline{q}) - \lambda(q-\underline{q})\alpha\left(\frac{\theta\underline{q} + \beta(q-\underline{q})}{y - b(q-\underline{q})}\right)^{1-\alpha} = 0 \tag{11}$$

$$\lambda \geq 0, \qquad \lambda\left[\left(y - b(q-\underline{q})\right)^{\alpha}\left(\theta\underline{q} + \beta(q-\underline{q})\right)^{1-\alpha} - y^{\alpha}\left((\theta - h\underline{q})\underline{q}\right)^{1-\alpha}\right] = 0 \tag{12}$$

By solving (11) we arrive at the equilibrium expression for the bribe rate:

$$b = \frac{1}{q-\underline{q}}\left[y - [\theta\underline{q} + \beta(q-\underline{q})]\left(\frac{\lambda\alpha}{\varphi N}\right)^{\frac{1}{1-\alpha}}\right]. \tag{13}$$

Here we follow the conditions specified by the Kuhn-Tucker theorem. Hence, if we assume $\lambda = 0$, then this means the service provider does not have to take into account the participation constraint imposed on the service demander. This is obviously not an optimal solution, as the demander may demand zero services if the price is prohibitive.

Thus, we assume $\lambda > 0$ and $\left(y - b(q-\underline{q})\right)^{\alpha}\left(\theta\underline{q} + \beta(q-\underline{q})\right)^{1-\alpha} - y^{\alpha}\left((\theta - h\underline{q})\underline{q}\right)^{1-\alpha} = 0$. The last condition renders

$$b = \frac{y(1-\Gamma)}{q-\underline{q}}, \tag{14}$$

where $\Gamma = \left(\frac{(\theta - h\underline{q})\underline{q}}{\theta\underline{q} + \beta(q-\underline{q})}\right)^{1-\alpha} < 1.$ Therefore, $b^* > 0$, hence, this assumption satisfies the participation constraints of both types of agents. By inserting (14) into (13) we can solve for λ, and arrive at:

$$\lambda = \frac{\varphi N}{\alpha}\left(\frac{y\Gamma}{\theta\underline{q} + \beta(q-\underline{q})}\right)^{1-\alpha} > 0, \tag{15}$$

as required by the optimality condition. This confirms that results given by (13) and (14) are optimal.

The discussion above provides us with testable hypotheses, which are stated as the following proposition.

Proposition: *The bribe paid by the service demander increase with the level of red tape and her income level, y, but it decrease with the improvement of the individual's social status, h (i.e. $\frac{\partial b}{\partial \underline{q}} > 0$, $\frac{\partial b}{\partial y} > 0$, $\frac{\partial b}{\partial h} < 0$). With the increase in income and the social status of the private agent, the probability of paying bribes and the severity of red tape declines (e.g. $\frac{\partial \varphi}{\partial y} < 0$, $\frac{\partial \varphi}{\partial b} > 0$, $\frac{\partial \varphi}{\partial h} < 0$).*

Proof: *See Appendix A.1*

Having stated the refutable hypotheses, stemming from our analytical model, we now turn to the presentation of our empirical strategy and the description of the data.

3. The Environment of the Study, the Survey Data and Descriptive Statistics

3.1 Education and Corruption in Bangladesh

Studying corruption in the context of Bangladesh is important and interesting for various reasons. The country was ranked lowest in the global ranking of Corruption Perception Index (CPI) developed by Transparency International (TI), consecutively for five years from 2001 to 2005. In the following two years (2006 to 2007), its position marginally improved (6th and 7th, respectively). Perception based governance indicators prepared by the World Bank (2007) reveal low ratings for Bangladesh on six key indicators, with a particularly poor rating on control of corruption, regulatory quality and rule of law. In addition, an investment climate survey by World Bank (2003) from 1001 manufacturing firms operating in Bangladesh showed that nearly 60 per cent of these firms stated corruption was the most serious constraint, followed by poor infrastructure.

In terms of schooling, Bangladesh has achieved good progress in gender parity in schooling outcomes. This has been made possible due to the government's various stipend programs for children in primary and secondary schools. The government has adopted a universal primary education system which is free for all children. Incentives to attend primary school have been introduced with the distribution of free textbooks and provision of "food for education"—the latter was converted to a cash stipend in 2002.[7] The government also provides scholarship (*Upabritti*) and financial assistance for female secondary school students to increase school

[7] The government provides a poor student a stipend of Tk. 100 (US$1.5) (for one student) and Tk. 125 (US$1.9) for two or more students from the same family.

enrolment and reduce drop-out rates especially for girls.[8] A large section of the country's national budget is set aside to help put these programs into action and to promote education and make it more accessible.

Despite government efforts to increase enrolment there has been some setbacks in recent years. The total primary school enrolment fell from 94 percent for boys and 91 percent for girls in 2003 to 79 percent and 81 percent in 2008, respectively.[9] According to a report by Bangladesh bureau of educational information and statistics (BANBES) in 2008 nearly 50 percent of primary school students drop out before they complete grade five, and that the grade-10 completion rate is than 20 percent. According to TIB's Corruption Database Report 2005 (TIB 2006), the education sector was ranked the most corrupt sector.

Anecdotal evidence shows that corruption in education sector in Bangladesh occurs in a number of ways. It is often the case that final exam or entrance exam papers are sold in advance to high-paying candidates or to favour particular students. It is also common to manipulate oral or practical examinations results which even more open to corruption as evaluations are subjective and difficult to monitor. Although primary education is free for all, it becomes prohibitively expensive for poor families as the reality requires paying for private tutors in order to pass. This private tutoring is likely to exacerbate inequalities, as teachers provide paid supplementary tutoring after school hours. These teachers usually teach only parts of the curriculum during school hours, and thus force students to pay for the rest during private lessons. Teacher beating students or misbehaving with them or fixing of final results are also very common problems.

Motivated and efficient teachers are crucial for quality in teaching. However, absent or abusive teachers often demands for illegal fees. The proceeds from such fees, as well as other favours received as payment, are frequently for the private gain of educators. It is not uncommon to find pupils exploited as unpaid labour, physical abuse, or simply classes where no teaching is conducted at all. Nearly half of the rural poor students get stipends from government but many of them are deprived of getting the right amount or facing frequent problem not getting the stipend in due time. According to TIB (2006), 40% of households reported having paid 'donations' or bribes for enrolling their children in primary schools. The harassment comes in different forms by collecting unauthorized payments from students for various services such as fees for admission into school, charging money for textbooks which are free of costs,

[8] Under the girls' stipend program, all girls in rural areas who enter secondary school are eligible for a monthly sum ranging from Taka 25 in Class 6 to Taka 60 in Class 10 (between US$0.37– $0.88 in July 2006). They also receive additional payments for new books. The conditions to get stipend are (1) a minimum of 75% attendance rate; (2) at least a 45% score in annual school exams, and (3) staying unmarried until sitting for the Secondary School Certificate (SSC) or turning 18.

[9] Bangladesh Economic Review, 2010

collecting fee for sports and recreation purposes, subscription for religious activities, fees for examination.

The high drop-out rate and sluggishness in the improvement of school enrolment rates in recent years suggest that merely providing cash incentives may not improve the schooling outcome of children. One potential reason for high drop-out rates is negligence of teachers in performing their duty.[10] Though there are officials at the *thana* (sub-district) level who monitor the activities of teachers in schools, they seldom visiting schools. Anecdotal evidence and newspaper reports is that there are a number of irregularities involved in getting the stipend which includes persuasion through influential persons, personal request to the head/class teacher or payment of bribe/commission for entitlement.

3.2 The Data and the Summary Statistics

The survey was conducted by TIB in 2007 with a view to (1) to identify the sectors or services where households experience corruption (2) to assess the nature and extent of corruption and harassment in selected institutions/services in public and private sectors. TIB usually does year round scanning of newspapers to identify some sectors that were found to be very corrupt, and the corruption perception index (CPI) is based on those newspaper reports. As newspaper reports are subject to bias, in view of the criticisms from government and other agencies TIB conducted this household survey to get a more objective assessment about corruption. The survey covered households' experience with mostly petty corruption from July 2006 to June 2007. In the survey, corruption is defined as more than bribery. It is defined as abuse of entrusted power for personal gain manifest in six common forms –bribery, negligence of duties, nepotism, embezzlement, deception and extortion. The educational institutions we are dealing with are either government or semi-government schools[11]and, it is expected that teachers would provide the same services to everybody in the absence of red tape or harassment.

For selecting households for the survey, a three stage stratified cluster sampling method was followed. The Integrated Multipurpose Sampling (IMPS) Frame developed by the Bangladesh Bureau of Statistics (BBS) was used as the sampling frame.[12] A total of 5,000

[10]Teacher absence in school is one of the most serious problems in Bangladesh and in many other developing countries, and it has been documented in various studies (Chaudhury et al., 2006; Kremer et al., 2005). Chaudhury et al. (2006) find 15.5% primary school teacher absence rate in Bangladesh. Sometimes teachers do not go to classroom to teach even if they are present in school. Glewwe et al. (2000) find that despite presence of teachers in school there are 12 percent of the teachers being absent in the classroom during class hour in Kenya.

[11] Almost all primary level (grades 1-5) schools are government-managed. Secondary schools (grades 6-10) are mostly semi-government, often government-subsidized and community-managed but run according to government rules and regulation.

[12] The IMPS design consists of 1,000 *Mauzas* distributed in 16 strata according to rural, municipality and SMA (Statistical Metropolitan Area) throughout the country. There were 6 rural, 6 urban and 4 SMA strata. These *Mauzas* constitute the PSUs in this sampling frame.

households were interviewed from 87 sub-district (*thana*),[13] 3,000 (60%) from rural areas and 2,000 (40%) from urban areas. There were 250 Primary Sampling Units (PSU). Among them 150 were for rural areas and 100 were for urban areas. Then 250 PSUs were distributed in 16 strata according to the national population weights of those strata. At the first stage, PSUs or *Mauzas* were selected randomly from each of 16 strata. Then a block of 200 households was constructed randomly from each PSU. As there are some PSUs in the IMPS that have less than 200 households, households from adjacent *Mauzas* were added to those PSUs. The PSUs covered 62 out of 64 districts in Bangladesh with divisional and rural–urban population representations. In this paper, we consider households reporting interaction with schools for their children's education. They constitute about 72.2% or 3636 households, out of which about 60% are from rural areas.

The basic socio-economic and outcome variables at the household level are reported in Table 1. Below we discuss some statistics from the survey (most of which are not reported in Table 1) to understand the nature and extent of corruption in primary and secondary schools. The descriptive statistics indicate that more than 50% of household heads attained primary education or more, while 34% household heads were illiterate. The proportions of population belonging to the Muslim and Hindu community were 89.7% and 9.2% respectively. 9% of surveyed households did not own any land, while a further 56% were functionally landless (owning less than 0.5 acre of holding). Average monthly income of a household is about Tk. 10,000. Rural household per-capita income (Tk. 7,489) is almost half that of urban households (Tk. 13,285).[14] Average monthly expenditure of a household is Tk. 7,345 with corresponding figures for rural and urban areas being Tk. 5,643 and Tk. 9,875 respectively. The average household size in the survey is 5.5.

About 11.6% students of surveyed households encountered irregularities in getting admission to educational institutions in the year prior to the survey. This number is quite high considering the fact that not all of them need to get admission to a new school in a given year. Such irregularities were found to be higher in rural areas (13%) than in urban areas (9%) though there is much less competition for admitting into school in rural areas. Of those who experienced irregularities, 64.4% had to pay donation or unauthorized payments for admission. Taking assistance from influential people or using networks was the next dominant irregularity (33.4%). On average, parents who paid bribes had to pay Tk. 574 to get admission. The students in urban areas paid bribes equal to three times that of rural areas.

[13] Thana is the local administrative unit where police, judiciary and the educational administration (officers who monitor the quality of education) are located.
[14] In 2007, 1US$=68Taka (approx).

About 87% students reported that their educational institutions had provided regular classes; 21.5% reported engaging class teachers as private tutors because they did not receive adequate attention in the classroom. The extent of having private tutors is pervasive among high school level students. As high as 31.4% of high school students reported having private tutors; 38.7 % of students in households who reported having tutors, admitted to having benefited from private tutors and, about 50% received tips for exam questions or got exaggerated marks in the exam. Students who did not have any private tutor reported instances of misbehavior by teachers for not engaging them as private tutors (60%). Besides, misbehavior (e.g., rebuking unnecessarily, not providing feedbacks in classroom) in the classroom and non-cooperation by the concerned teachers were reported by 19% and 34.5% students respectively.

Overall, 25.1% students of households reported receiving a stipend (upabritti). Among those students who got *upabritti*, 22.0% experienced harassment for receiving this. Of those students who faced harassment, 74.6% of them paid bribe for the enlistment, and paid Tk. 90.72 as bribe. The major beneficiaries are headmasters (44.7%) and class teachers (42.4%). Among other beneficiaries are Union *Parishad* Chairman and Members, Thana project officer and bank officials. The households reported several reasons for not being enlisted for a scholarship. About 31.6% reported that school authorities failed to enlist their eligible students. The parents also had to pay additional money to school on different occasion. As many as 18 % parents paid money without any receipt by school authorities with such incidence is the highest (around 26.2%) in primary schools in rural areas.

4. Empirical Strategy

The theoretical model indicates that the red tape suffered, and bribes paid, by the private agents are explained by individual characteristics (such as gender, minority status, income or social status). We first examine the factors that determine the probability of being subjected to red tape using a probit model with the following specification:

$$prob(redtape_{ij}) = \alpha_j + X_{ij}\beta + \mu_{ij}\,, \tag{16}$$

where $redtape_{ij} = 1$ if a household i in area j is subject to harassment or paid a bribe. X includes vector of demographic and socio-economic characteristics of the household, α_j is the fixed effects specified at the police station or *thana* level.[15] We include a number of variables in X such as age, sex, education and religion of household head, sex of the respondent, number of

[15] Probit estimates with fixed effects give rise to inconsistent coefficients of the fixed effects. However, when the number of observations per fixed effect is at least 8, we can consistently estimate the fixed effects (Heckman 1981). We have 50 observations per *thana* and so the model is consistently estimated. We do not estimate school fixed effects as we are interested also to see the effects of school level characteristics. The formal institutional mechanisms are the same within the *thana,* as thana is the administrative unit.

male and female adults in the households, land area and the total monthly expenditure of the household. We use expenditure rather than income despite the availability of both as the former is a better proxy for permanent income, and household socio-economic status. The use of both land and household expenditure would allow us to examine whether poor households receive less service than rich households. We also control separately for number gender of children studying to examine the differential effects on harassment/bribe of sending a son as opposed to a daughter to school. To examine the local school and teacher level characteristics, we control for whether the school teacher comes to class regularly, encourage students to come to their house for private tuition, and whether they influence the exam results (such as by changing marks or giving exam tips). We cluster standard errors at the *thana* level.[16]

In specification (16) we follow Svensson (2003) and assume that both the incidence of corruption and the level of bribes paid are determined by the same set of individual characteristics of the private service demander. In our case, the intuition for this assumption is even simpler than in Svensson (2003), who studied why firms pay bribes. The firms in his study had heterogeneous dealings with the bureaucrats; hence, the incidence of corruption differed depending on the nature of the interactions between firms and bureaucrats. In the current environment, the interaction between the service supplier and demander is homogenous across the agents, as they deal with only one type of service. However, public agents may create red tape to get rents. Private agents might use connections to avoid red tape and pay less in bribes. To ascertain this, we examine if the informal networks create real rents for the members. The empirical model to test the hypothesis about the incidence of bribery or harassment is formulated as follows:

$$prob(redtape_{ij}) = \alpha_j + X_{ij}\beta + network \times \gamma + \mu_{ij} \qquad (17)$$

where the term "*network*" dummy is introduced to examine whether the informal networks help overcome red tape or the incidence of bribery. If we find a negative and significant coefficient of γ, then it gives us another explanation for the persistence of corruption. That is to say that corruption is more of a network problem or a problem of interest groups, than rent seeking of individual position holders. As soon as a membership in the informal network creates rents, agents will be engaged in corrupt deals to reap those rents. Therefore, penalties designed against individuals for being corrupt may not reduce corruption as it leaves the informal network intact.

However, the network variable might be endogenous- people with better informal network are likely to be different than those who do not have any, or only have weak, networks. Therefore, unobservables that affect the network could also affect the red tape variable. In order

[16] We also clustered standard error at the students' school level and results are unchanged.

to solve the endogeneity problem, we need to find an instrumental variable which is correlated with *network* but not with *redtape*. It should also satisfy the exclusion restriction, i.e., the instrument affects *redtape* only through *network*. In the absence of a suitable instrument, we report results using simple probit estimates. Our goal here is not to estimate the causal effect of *network* on *redtape*. We are rather interested to show how people with networks can cause corruption to persist. Thus, endogeneity is not a major concern in this case. In robustness check of our results, we address this concern using IV estimates.[17]

According to the analytical model, the level of red tape is positively related to the amount of bribe paid. Red tape in our case is expressed by harassment or other irregularities. Next we consider the level of bribes paid and the factors that affect it. Since there are households who also did not pay bribes we run the following regression and estimate using a Tobit model.

$$bribe_{ij} = \alpha_j + X_{ij}\beta + network \times \delta + \mu_{ij} \qquad (18)$$

where $bribe_{ij}$ is the amount of bribe or donation paid by agent *i* in sub-district *j* for a given service. It includes the total amount of money spent to get services including money paid to others who might have helped to get the service. All other variables are as explained above. We define *network* variable equal to one if a household reports using relatives, friends, or influential people (e.g., local elected representative) to assist, or exert influence, when they faced with difficulties everyday life (not just for their child education but for any matters that could arise in daily life), and zero otherwise.

5. Estimation Results

We estimate a number of equations in our regression**.** We use probit model for a binary outcome and OLS or Tobit for continuous or censored outcome measures. Our variables of interests are the following:

1. whether respondent is seeking child's admission to school (binary variable),
2. whether respondent paid any bribe for admission into school (binary variable), ,
3. the amount of bribe paid to get admission into school (censored variable),
4. whether respondent is receiving a stipend (binary variable),,
5. the amount of bribe paid to get stipend (censored variable),
6. whether the respondent paid a donation without receipt for child's study in school (binary variable),,

[17] We also estimate a Heckman-type selection model when the dependent variable is the amount of bribe. In that case, we run a probit model to estimate the probability of bribing and then use the resulting residual (Mills-ratio) to estimate the bribe equation using OLS. The results do not differ with those reported below using simple probit/Tobit.

7. any extra fee (informal payments) paid to school for different reasons (censored variable),
8. total bribe paid for admission and extra fees to school for different purposes (continuous/censored);

The estimated results are discussed in light of our theoretical model: first we discuss if our findings support the hypothesis about networks creating gains for its members, then we discuss if corruption in education contributes to inequality by discriminating the poor.

5.1. Networks

First we consider if having informal network connections decrease the probability of being harassed in seeking child admission to school. The results reported in Table 2 imply that people having a network find it easier to have their child admitted into school. However, the variable is statistically insignificant. We also estimate the probability of whether a household paying bribes to get admission depends on network connections. The point estimates indicate that having network matters—people using connections are less likely to pay a bribe to get admission. The estimates in column 4 of Table 3 indicate that people who have informal network connections are 15 percentage points less likely to pay a bribe.[18] The results from tobit regression reported in Table 4 indicate that people with a network pay nearly Tk. 700 less conditional on their income, assets and other socioeconomic characteristics.

When we consider the distribution of stipends disbursed to students from the school, the network variable is not statistically significant (see Table 5). The coefficient estimate indicates that network does not significantly reduce the probability of being sufferer in getting stipend money. However, having network connections reduces the amount to be paid to school teachers. This is indicated by the coefficient estimates of a Tobit model for the amount of bribe paid on network and other covariates as reported in Table 6. We consider separately if forced donations made by the parents depend on network connections. In this case, the network variable is also significant and negative indicating that people use network connections to avoid paying or at least people with better informal connection are less likely (18 percentage points) to pay such donations (see Table 7).

Next, we estimate a Tobit regression where the dependent variable is informal payments made to school for different reasons (e.g., in the name of some extracurricular activity, classroom renovation, etc.). We find that people with network connections pay significantly less than those did not have networks. On average they pay 60-75 taka less (see Table 8). The results are similar when we add all types of bribes and donations (see Table 9). Estimates from

[18] We do not model the bribe conditional on being a victim since those who are not victim do not pay any bribe, and hence probit estimate would only consider those victimized.

the Tobit model indicate that, conditional on a children being admitted to a new school in that year, parents having network connections are paying less, by about 475-600 taka depending on the specification of the regression. As an additional evidence of gains from networks we also find in all the specification used, that older households pay smaller amounts in bribes and other illicit payments.

Our results confirm the theoretical conjecture of our own model about importance of informal networks in non-collusive corruption. The results also substantiate the theoretical findings of Kingston (2007, 2008) ,Véron et. al. (2006) and Çulea and Fulton (2009) about informal social or economic ties creating a "culture" of corruption that can subsequently prove hard to dislodge. These results also corroborate Hunt (2004) who finds that networks facilitate the replacement of a bribe with an implicit quid pro quo, and that older people and residents of small town who are more likely to establish networks bribe less.

5.2. Inequality

To relate the burden of corruption to the income level and social status, we examine the determinants of probability of being a victim of corruption in seeking child admission to school and whether a household paid bribes to get admission. Our focus is on if wealth or social status plays some part in this process (see Table 2 and Table 3). The results show that educated people are less likely to be a victim. The coefficient of age of household head is negative and education is positive, implying that older and better educated households are less likely to pay bribes. Wealthy people are likely to suffer less harassment in seeking admission of their children as shown in the corresponding estimates of the coefficient of land which is negative and statistically significant. Since land is a continuous variable, the marginal effects reported in Table 2 indicate that a person owning maximum land (100 acres) in the sample is likely to suffer 82 percent less than person do not own any land. Parents of girls are likely to be harassed, while being a parent of a boy has no effect on the probability of being harassed when seeking admission into school. The probability of being a victim and paying bribes is increased in schools with households reporting that teachers influence the exam results. The marginal effects reported in column 4 of Table 2 indicate that parents are likely to report 11.7 percentage points more harassment for their children's admission in those schools with teachers influencing the exam results.

Next we estimate a Tobit model for the amount of bribe paid by parents to get child's admission into school. The result is also consistent with that of the probit model; educated, older people and richer households pay less as indicated by the statistically significant negative coefficient on the log of the expenditure variable. Therefore, combining probit estimates from above, we see that poor people are subject to bribe more frequently and pay a higher

proportion of their income as bribes. The results also show that parents need to pay higher bribes to get their children admitted into schools where classes are held irregularly and teachers influence the exam results. It is likely that the later variables are highly correlated with the outcome variable, and hence the coefficient estimates might not represent the causal effect. The coefficient estimates of other variables remain intact with or without these school-level characteristics (regular class, private tuition, and exam influence).

We also analyze the probability of obtaining a stipend based on a probit model (see Table 5), and the amount of bribe paid to secure the award based on a Tobit model (see Table 6). We use as a dependent variable the answers to the survey question asking households of eligible children about difficulty in getting stipend money from the school authority. It is assumed that the dependent variable is equal to 1 if a household reports that it faced a problem in getting stipend money, and zero otherwise. The point estimates indicate that households with higher permanent income, as measured by log of total expenditure, are likely to face fewer problems. Thus children of poor people are more likely to be the victim of not getting the stipend or have problems getting the stipend money. The results also suggest that rich parents pay smaller amounts in bribes. Both parents of boys and girls have reported increased probability of not getting the stipend, but the probability is higher in the case of girls. And moreover, girls' parents are paying bribes significantly more than boys'. This is likely because most of the stipends are targeted towards girls, and thus they engage with teachers more often than boys. Interestingly, parents who report their children are privately taught by their school teachers outside school hours also report higher probability of difficulty in getting the stipend. On average the difficulty of getting stipend money is 17-19 percentage points higher in schools with teachers forcing children to obtain private tuition under their tutelage. This indicates that school teachers generate multiple layers of red tape for the children and their parents, and merely satisfying teachers by sending children to them for private tuition might not be enough to counter other problems students face in schools.

The survey asked households about any payments they made to the school authority (e.g., school teachers, school management committee) without receipt which they term as illegal. If these payments are done for improving school infrastructure or for a general purpose we would expect richer households are expected to pay more. However, we find the opposite—poorer households are more likely to pay donations as reflected by the negative coefficients of land and household permanent income (Table 7). We also estimate a Tobit regression where the dependent variable is informal payments made to school for different reasons (e.g., in the name of some extracurricular activity, classroom renovation, etc.). These fees can be considered as a form of extortion by teachers from students. The results indicate that better educated, higher income households do pay less (Table 8). In other words, poor people are subject to more

extortion. The results are similar when we add all types of bribes and donations (Table 9). The coefficient corresponding to the permanent income variable is negative and the estimated value is tk. 300-450. Since the dependent variable is not in logarithmic form, we need to divide the coefficient by the value of the dependent variable to calculate the income elasticity. The resulting elasticities are always greater than one in absolute values. This means that richer households not only pay less in bribes, but the amount of bribe which is paid is reduced more than proportionately with the increase in income.

With respect to other factors that affect corruption in education sector we find the following. The above-mentioned "voluntary" donations and extortion are higher in schools where parents report irregularity in holding classes or forcing children to go to private tuition and where teachers influence exam results. This indicates the rent captured by teachers from various sources. The point estimates do not differ much with or without *thana* fixed effects. If the results were due to specific area which are either very corrupt or fair then the fixed effects would take those into account. Overall the point estimates are generally slightly lower with fixed effects but the sign remains the same. These results imply that such corruption is more of a general phenomenon in Bangladesh rather than a local one. In all specifications, we also find that the religious status of households plays no role in paying bribes or making other illicit payments. In this aspect our results differ from Dincer (2008) who finds a positive and linear relationship between ethnic/religious polarization and corruption and an inverse-U-shaped relationship between ethnic/religious fractionalization and corruption.

Most importantly, our results are opposite to what is reported by Hunt (2004, 2007b), Svensson (2003), and Mocan (2004). These authors reported that the burden of non-collusive corruption rises with the income of the private agent dealing with the bureaucrat. For example, both Hunt (2004) and Mocan(2004) examine the bribes using data cross- country data, and find that individuals with higher income are more likely to be asked for bribes, and rich people pay the most bribes while poor the least. However, Hunt (2004) also finds that the factor such as city size, age, sex, and ownership of a car all have a larger effect on bribery than income. Similar results are obtained by Hunt (2007b) in a study of the public health care in Peru and Uganda, and Svensson (2003) in a study of firms paying bribes. We believe that this difference can be explained by the idea that overall higher income people are more active and hence, have higher demand for public services, and thus, pay more bribes overall. In other words, in terms of an individual transaction, the burden of bribes still can be lower, for wealthier people than for the poorer people. The results could also depend on the nature of the service. Unlike healthcare, where people can choose doctors and hospitals, the education provider is a monopoly, especially in rural areas, because parents (practically) do not have choice to alternative schools. In this aspect, our findings support Hunt (2007a), who demonstrates that the need for public

services drives the bribery not the income level per se. In addition, the gains from informal networks decreases the burden on non-collusive corruption on the rich, while the poor lacking access to such networks have to shoulder the brunt of corruption. In other words, in terms of an individual transaction, the burden of bribes still can be lower, for wealthier people than for the poorer people. The results could also depend on the nature of the service. Unlike healthcare, where people can choose doctors and hospitals, the education provider is a monopoly, especially in rural areas, because parents (practically) do not have choice to alternative schools. Based on our results we also conclude that corrupt public agents in the education sector can discriminate private agents based on their individual characteristics. Hence, our results complement the findings on the price discrimination of truck drivers by Olken and Barron (2009).

6.1 Robustness Check

A major concern regarding the network variable is that it is potentially endogenous. Thus, we consider using an instrumental variable (IV) to address endogeneity. We use education of the household head to instrument for *network* . The first stage results, reported in Table 10, show that the instrument is highly correlated with the network variable. Thus, our instrument satisfies the first requirement- correlation. However, satisfying the exclusion restriction is a concern. That is, the education level of the household head has no direct influence on the household experiencing corruption at school level other than through its effect on network. We include most variables that can influence corruption (such as income, assets which are also good proxy for education) as independent controls in the econometric model. If the exclusion restriction is not satisfied then the bias associated with the IV estimate is larger than our previous estimates (using OLS/Tobit). Therefore, such bias is likely to make the resulting point estimates not useful for policy analysis. Nevertheless we can still potentially use the point estimates to address our question. We also note that our main concern is not to estimate the causal impact of the network although causality is of special interest to policy makers. In the absence of any causal interpretation, our results would still be meaningful to identify an important source of petty corruption. Since we are not talking about aggregate corruption or political corruption, education is likely to serve better instrument than otherwise.

The IV regression results using full set of controls for different corruption-related binary and amount of bribe variables are reported in Tables 11. In all binary cases, the coefficient estimates corresponding to the network variable are consistent with our previous estimates. The point estimates are negative and statistically significant (except one) which again indicates that people with network connections are less likely to bribe or face less difficulty in school in educating their children. When we report the results using the amount of bribes paid as the

outcome variable, we also find negative and significant coefficient estimates for the network variable (Table 12). The point estimates here are larger than the OLS estimates, suggesting that there could be reporting bias or measurement error in the *network* variable that might cause the OLS estimate towards zero. Our results are show that the network variable is an important factor which reduces the reporting of corruption and extent of bribery. Without taking into account of such 'silent corruption' caused by network, the corruption statistics would be downward bias.

The estimated coefficients of other variables are similar to that of previous estimates. Number of girls studying continues to be a factor of bribing more than the number of boys. Because girls are getting stipends more than boys, the results are more likely an indicative of corruption rather than indicating it as gender bias. Similarly, we find the older people are less likely to bribe and pay less amount of bribe. These people are more likely to have established networks than younger people, and hence, they need to face less harassment and pay fewer bribes. The minority status as reflected by the variable 'religion' has no effect on either the probability or the amount of bribe.

We also change the network variable to check the robustness of our results. In the survey, households were asked to report problems they faced related to various sectors such as land, electricity, police and judiciary, local government, NGO, etc. The survey asked households whether they actually received any big personal help from friends, relatives, neighbors, or local elected representative, leader of the political party, etc in last one year. We use this information to construct a new network variable and redo our estimations with the previous specification. We report the results of the new network variable in Table 13 where the upper panel reports the results using binary dependent variable, and lower panel reports results using Tobit regression. The results are similar, but the point estimates are smaller. However, many of these people did not face any problem in education related services from schools because they do not have any child in school. So, these results are based on different sample size, but they also show that network connections matter.

6. Conclusion

We study non-collusive corruption in the education sector. We construct a simple theoretical model that captures the non-collusive corruption between service providers (teachers) and service demanders (students). The model allows to show that the bribe paid by the service demander increase with the level of red tape, and decrease with the improvement of the individual's social status. We also establish that with the increase in the income and the social status of the private agent (networks), the probability of paying bribes and the severity of red tape declines.

We focus on the education sector which is the largest or second largest budget item in most countries, and opportunities for corrupt practices are numerous. We are interested in petty corruption in this sector which affects the daily life of poor people in developing countries. The empirical estimates, based on the survey data set collected in Bangladesh for 2007, confirm that both the probability of being subjected to non-collusive corruption and the cost of corruption is related to the individual characteristics of the bribe payer. Moreover, network connections are important factor that helps ease the burden of corruption on the private agents, which is also likely enforcing the persistent of this type of corruption. Specifically, the results indicate that better educated, higher income households are less subject to harassment and they pay less bribe or additional fees both in seeking admission of the children into school or in obtaining stipend money. This means that corruption at the school level would create unequal access to education, resulting more drop-outs from economically backward groups. The results show that informal network matters—people with network are less likely to pay bribe and do pay significantly less. We also find that older, richer households pay less. Overall, our results indicate that the burden of corruption is disproportionately borne to the poor as they are more likely to pay, and pay more amounts. Such corruption is like to exacerbate inequality and create long-term poverty, and hampers growth (see, for example, Murio 1995). Our results are not directly comparable with studies that find rich people bribe more frequently and pay more as unlike other studies (1) we are dealing with a almost homogenous service provider (2) police or mainstream public administration do not play any direct role in such corruption or extortion. Overall, our findings indicate that there is a lot of 'hidden' corruption which are mostly unreported and unrecognized, and they need to be considered in formulating any antic-corruption policy. This type of corruption increases inequality and marginalized some groups in the society, and is likely the important bottleneck for formation of human capital.

Appendix A.1 Proof of the Proposition.

Based on (14) we can verify that an increase in red tape will lead to an increase in the bribe rate; that is $\frac{\partial b}{\partial \underline{q}} > 0$. Analogously, we establish a positive link between the bribes paid and the income level of the service demander, as $\frac{\partial b}{\partial y} > 0$. This result indicates that with income the amount of bribe payments increases. Another interesting comparative static result is $\frac{\partial b}{\partial h} < 0$, which means that with a higher social status or stronger network connections the bribe paid declines.

In our model, the probability of paying bribes is captured as the value of the fraction of population paid bribes, φ. We can state the equilibrium value of φ by reformulating (13) as:

$$\varphi = \left(\frac{\lambda\alpha}{N}\right)\left[\frac{\theta\underline{q} + \beta(q - \underline{q})}{y - b(q - \underline{q})}\right]^{1-\alpha}. \tag{18}$$

Based on (18) we can establish the direction of the change in the occurrence of non-collusive corruption following the changes in the variables or parameters of the model. It can be verified that with the increase in the income level the probability of bribe-paying declines, as $\frac{\partial \varphi}{\partial y} < 0$. This implies that, if the public servants become more extortive, then the probability of bribe-paying increases. In other words, $\frac{\partial \varphi}{\partial b} > 0$. Since we know that $\frac{\partial b}{\partial h} < 0$, indirectly, it implies that $\frac{\partial \varphi}{\partial h} < 0$. Thus, with a stronger social standing, the probability of paying taxes falls.

In a similar fashion, (18) can be used to solve for $\underline{q}$:

$$\underline{q} = \frac{y - \beta q\zeta}{(\theta - \beta)\zeta - b}, \tag{19}$$

where $\zeta = \left(\frac{\lambda\alpha}{\varphi N}\right)^{\frac{1}{1-\alpha}}$. Now, we are able to deduce that $\frac{\partial \underline{q}}{\partial y} > 0$, which means that red tape lowers with the level of income of the service demander. Recalling that $\frac{\partial b}{\partial \underline{q}} > 0$ and $\frac{\partial b}{\partial h} < 0$, we also can infer that $\frac{\partial \underline{q}}{\partial h} > 0$. Thus we conclude that with the improvement of the social status or network standing the level of red tape decreases. This outcome seems quite intuitive.

Appendix A.2 Tables

Table 1: Basic Descriptive Statistics

	Rural		Urban	
Exogenous variables	Mean	S.D	Mean	S.D
Age (years)	47.39	14.39	46.5	13.48
Sex (Male=1)	0.94	0.24	0.91	0.29
Education (years)	4.73	3.99	7.63	4.91
Religion (Muslim=1)	0.9	0.3	0.9	0.3
Sex of the Respondent	0.87	0.34	0.73	0.45
Number of female adults	2.67	1.43	2.65	1.45
Number of male adults	3.03	1.6	2.92	1.58
Total land owned (decimal)	154.73	309.13	114.46	354.57
Log of expenditure (taka)	8.48	0.56	8.96	0.66
Number of girls studying	0.92	0.82	0.94	0.85
Number of boys studying	0.98	0.86	1	0.85
regular class (yes/no)	0.14	0.35	0.12	0.32
private tuition (yes/no)	0.32	0.47	0.31	0.46
Exam influence (yes/no)	0.07	0.26	0.11	0.31
Outcome variables				
Victim of admission (yes/no)	0.13	0.34	0.09	0.29
Bribe for admission (yes/no)	0.11	0.31	0.05	0.23
Bribe for admission (amount in tk.)*	211.44	1616.90	1039.81	4189.50
Harassed to get stipend (yes/no)	0.45	0.5	0.24	0.43
Bribe for stipend (amount in tk.)*	85.80	120.32	115.38	174.40
Extra fee (amount in tk.)*	67.13	149.39	84.09	165.08
Donation without receipt (yes/no)	0.22	0.42	0.13	0.33
Faced any irregularity in school (yes/no)	0.43	0.49	0.36	0.48
Total bribe (amount in tk.)*	155.87	1185.93	496.24	2766.82
Number of Observations	2154		1482	

Notes: Number of observations varies depending on the outcome variables.
*average amount for only those who paid

Table 2: victim in seeking child admission to school (dependent variable =1, 0)

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-0.038004		-0.011088
		(0.023495)		(0.033868)
Age	-0.000370	-0.000724	-0.000362	-0.000289
	(0.000644)	(0.001159)	(0.000734)	(0.001380)
sex	0.013146	0.008364	0.008653	-0.027048
	(0.032845)	(0.063359)	(0.040902)	(0.088186)
education	-0.004672*	-0.006837+	-0.004630*	-0.006189
	(0.002000)	(0.003699)	(0.002312)	(0.004630)
religion	0.038513+	0.072099+	0.031643	0.033183
	(0.022639)	(0.037862)	(0.028150)	(0.053556)
land	-0.000066+	-0.000081	-0.000081+	-0.000090
	(0.000040)	(0.000062)	(0.000045)	(0.000072)
expenditure	-0.004750	-0.009570	-0.004428	-0.036568
	(0.019769)	(0.034324)	(0.022852)	(0.045841)
girl	0.010493	0.011042	0.021684+	0.036024
	(0.010606)	(0.019883)	(0.013043)	(0.026153)
boy	0.009541	-0.000099	0.015096	0.001898
	(0.010479)	(0.018686)	(0.010587)	(0.019775)
Regular class	0.032956	-0.019875	0.029800	-0.028301
	(0.022549)	(0.027544)	(0.026022)	(0.035349)
Private tuition	0.015869	-0.005249	0.011876	0.000800
	(0.013890)	(0.025797)	(0.018277)	(0.033889)
Exam influence	0.146227**	0.099674*	0.165043**	0.117828*
	(0.034233)	(0.039210)	(0.043233)	(0.050796)
Observations	1968	1043	1684	897

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. Standard errors are reported in parenthesis and they are clustered at the police station level, **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 3: whether paid any bribe for admission into school

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-0.129723**		-0.152042**
		(0.023625)		(0.030161)
Age	-0.000962+	-0.001826*	-0.000926	-0.001526
	(0.000523)	(0.000924)	(0.000653)	(0.001127)
sex	0.023981	0.036531	0.021610	0.010232
	(0.020745)	(0.037148)	(0.030238)	(0.065453)
education	-0.004912**	-0.007062*	-0.005349**	-0.007730+
	(0.001637)	(0.003315)	(0.002033)	(0.004648)
religion	0.016776	0.031514	0.005415	-0.046224
	(0.021128)	(0.034596)	(0.029768)	(0.062986)
land	-0.000043	-0.000063	-0.000058+	-0.000070
	(0.000030)	(0.000042)	(0.000033)	(0.000052)
expenditure	-0.019879	-0.011018	-0.026465	-0.038338
	(0.015706)	(0.027263)	(0.021276)	(0.041614)
girl	-0.003495	-0.017852	0.001381	-0.002303
	(0.007765)	(0.014218)	(0.009597)	(0.019668)
boy	0.002742	-0.009463	0.006572	-0.011179
	(0.007689)	(0.013309)	(0.008770)	(0.015034)
Regular class	0.041991*	0.000563	0.048127+	0.008006
	(0.020087)	(0.023418)	(0.026797)	(0.035873)
Private tuition	0.011176	-0.002297	0.013370	0.007087
	(0.012037)	(0.021486)	(0.017320)	(0.029217)
Exam influence	0.080821**	0.036236	0.112638**	0.069504
	(0.027412)	(0.032780)	(0.036632)	(0.043478)
Observations	2004	1058	1511	809

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are probit marginal effect where the binary dependent variable is whether a household paid any bribe for child's admission to school or not. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 4: amount of donation/bribe to get admission

	(1)	(3)	(5)	(7)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-699.07**		-528.71*
		(245.07)		(241.65)
Age	-20.40+	-23.51+	-21.14+	-21.13
	(11.81)	(13.83)	(12.01)	(13.43)
sex	-167.18	-411.64	-151.34	-296.21
	(457.93)	(601.22)	(480.81)	(545.87)
education	-24.88	-17.29	-15.02	-4.860
	(30.36)	(27.75)	(26.10)	(24.50)
religion	488.20	564.48	556.80	496.82
	(416.13)	(445.95)	(447.67)	(447.26)
land	-0.08	0.004	-0.276	-0.097
	(0.25)	(0.190)	(0.338)	(0.213)
expenditure	-640.87*	-617.87+	-454.39	-525.97
	(299.79)	(324.88)	(308.72)	(356.88)
girl	481.35**	498.53**	586.39**	612.95**
	(158.60)	(167.23)	(175.33)	(193.98)
boy	163.55	80.70	235.62	103.28
	(137.77)	(140.36)	(150.73)	(127.60)
Regular class	742.37*	119.46	591.917+	90.01
	(354.60)	(241.26)	(339.54)	(262.09)
Private tuition	411.98+	246.46	342.45	211.31
	(240.44)	(218.42)	(232.44)	(213.33)
Exam influence	1,129.52*	495.59	1,171.35*	603.02
	(494.91)	(355.54)	(521.63)	(377.55)
Observations	3452	1751	3448	1748

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are reported using Tobit regression where the dependent variable is amount of illegal payments made to admit child to a school. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 5: whether victim in getting stipend money

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		0.020763		0.021918
		(0.031780)		(0.030022)
Age	0.001106	0.001880	0.001472	0.002955+
	(0.000921)	(0.001448)	(0.000970)	(0.001594)
sex	0.015656	0.004944	0.013745	0.029966
	(0.049726)	(0.071950)	(0.053956)	(0.079895)
education	0.001906	0.002099	0.003473	0.004425
	(0.002252)	(0.003743)	(0.002328)	(0.004242)
religion	-0.006990	0.002150	0.009770	0.031311
	(0.045093)	(0.061697)	(0.049313)	(0.073852)
land	0.000050	0.000049	-0.000001	-0.000024
	(0.000048)	(0.000068)	(0.000054)	(0.000086)
expenditure	-0.150363**	-0.199169**	-0.117712**	-0.150686**
	(0.027513)	(0.040514)	(0.029978)	(0.050418)
Girl	0.109241**	0.110072**	0.131430**	0.140485**
	(0.021097)	(0.031920)	(0.022787)	(0.036397)
Boy	0.043272**	0.053119**	0.049475**	0.060240**
	(0.015077)	(0.018486)	(0.016331)	(0.022243)
Regular class	-0.016160	-0.058179	-0.025689	-0.063417
	(0.030671)	(0.037078)	(0.033806)	(0.044582)
Private tuition	0.183467**	0.175709**	0.190675**	0.191505**
	(0.027043)	(0.038902)	(0.028179)	(0.044253)
Exam influence	-0.007185	-0.028746	0.022544	0.011728
	(0.039052)	(0.041744)	(0.040335)	(0.045755)
Observations	2075	1091	2038	1049

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are probit marginal effect where the binary dependent variable is whether a household faced any harassment in getting child's stipend money. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 6: amount of donation/bribe to get stipend

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-51.838*		-21.34
		(20.149)		(19.56)
Age	-1.61*	-1.74**	-1.70**	-1.74**
	(0.63)	(0.61)	(0.62)	(0.59)
sex	52.88	33.94	62.514+	43.15
	(36.17)	(33.45)	(35.44)	(34.91)
education	-1.01	-0.698	-0.255	0.411
	(2.12)	(1.76)	(1.90)	(2.23)
religion	67.93	62.07	91.04+	91.42*
	(49.58)	(43.02)	(47.88)	(43.79)
land	-0.019	-0.014	-0.045	-0.040
	(0.029)	(0.024)	(0.038)	(0.042)
expenditure	-65.14**	-49.21*	-49.36*	-43.28
	(20.06)	(21.16)	(20.81)	(26.89)
girl	105.82**	99.19**	113.72**	104.26**
	(16.64)	(16.87)	(18.83)	(20.63)
boy	-6.645	-8.30	2.622	-2.38
	(14.17)	(14.05)	(15.07)	(15.93)
Regular class	46.14+	-2.62	21.95	-19.60
	(26.87)	(25.16)	(26.61)	(25.86)
Private tuition	28.42	4.66	22.25	2.863
	(18.41)	(18.61)	(18.91)	(19.19)
Exam influence	83.10**	26.32	102.57**	61.97+
	(29.92)	(27.33)	(35.27)	(31.81)
Observations	1973	1009	1971	1008

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are reported using Tobit regression where the dependent variable is amount of illegal payments made to get stipend money from school. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 7: did you pay any donation without receipt at which your child is studying

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-0.185704**		-0.176996**
		(0.033594)		(0.039523)
Age	-0.000193	-0.000611	-0.000111	-0.000357
	(0.000507)	(0.001120)	(0.000548)	(0.001335)
sex	0.023576	0.047840	0.030838	0.082589+
	(0.030031)	(0.047499)	(0.027744)	(0.046294)
education	-0.007359**	-0.010633**	-0.007867**	-0.011190**
	(0.002359)	(0.004086)	(0.002161)	(0.003725)
religion	-0.013027	-0.013911	-0.001176	-0.000030
	(0.034247)	(0.058310)	(0.036341)	(0.067544)
land	-0.000038	-0.000066	-0.000066+	-0.000103+
	(0.000028)	(0.000041)	(0.000035)	(0.000062)
expenditure	-0.079004**	-0.097210**	-0.074691**	-0.101298**
	(0.019882)	(0.035136)	(0.019393)	(0.036668)
Girl	0.007965	-0.006241	0.018255	0.004621
	(0.010620)	(0.019286)	(0.011237)	(0.021917)
Boy	0.016176	0.005852	0.021643+	0.007890
	(0.011466)	(0.019665)	(0.011430)	(0.020874)
Regular class	0.146879**	0.041330	0.104772**	0.006286
	(0.025330)	(0.036159)	(0.024688)	(0.036444)
Private tuition	0.027352	-0.040212	0.036478+	-0.005591
	(0.016704)	(0.029303)	(0.018763)	(0.037191)
Exam influence	0.104800**	-0.023162	0.126021**	0.020789
	(0.033641)	(0.036550)	(0.036914)	(0.045004)
Observations	3025	1505	2885	1459

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are probit marginal effect where the binary dependent variable is whether a household paid any illegal payments to school authority. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 8: Extra fee paid to school for different reasons

	(1)	(3)	(5)	(7)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
network		-74.59**		-63.10**
		(19.32)		(22.02)
Age	-0.078	-0.148	0.019	0.055
	(0.486)	(0.594)	(0.513)	(0.64)
sex	21.86	23.72	25.13	27.64
	(30.87)	(31.36)	(30.23)	(31.36)
education	-4.09*	-3.18+	-3.832*	-2.60+
	(2.01)	(1.86)	(1.62)	(1.34)
religion	-15.30	-10.25	-11.86	-14.72
	(26.71)	(29.82)	(29.29)	(32.55)
land	-0.041	-0.048	-0.061+	-0.065+
	(0.027)	(0.031)	(0.033)	(0.037)
expenditure	-46.82**	-31.84*	-46.33**	-28.84+
	(13.62)	(14.43)	(15.54)	(16.15)
girl	13.28	7.67	21.36+	14.11
	(10.40)	(12.06)	(12.19)	(13.80)
boy	23.53*	18.87	24.75*	17.35
	(11.55)	(12.42)	(10.48)	(11.57)
Regular class	102.92**	38.42*	73.46**	18.97
	(22.07)	(17.35)	(19.22)	(17.11)
Private tuition	32.19*	14.29	35.53*	24.10
	(15.79)	(17.39)	(16.44)	(19.73)
Exam influence	82.86**	18.53	88.37**	31.96
	(24.25)	(20.99)	(25.40)	(21.70)
Observations	3085	1531	3081	1528

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. The coefficient estimates are reported using Tobit regression where the dependent variable is total amount of different fees paid to school. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 9: total bribe paid for admission, PLUS extra fee to school for different purposes

	(1)	(2)	(3)	(4)
Police Station Fixed effects	**No**	**No**	**Yes**	**Yes**
Network		-608.99**		-474.20**
		(173.99)		(151.13)
Age	-9.25	-11.70+	-9.27	-10.18
	(5.75)	(7.04)	(5.71)	(6.64)
sex	-153.94	-296.16	-143.78	-184.68
	(307.58)	(412.58)	(320.98)	(369.22)
education	-26.18	-21.47	-25.66	-18.22
	(22.85)	(21.25)	(18.26)	(15.46)
religion	44.49	98.34	63.56	56.52
	(191.11)	(211.22)	(216.16)	(226.26)
land	-0.11	-0.066	-0.221	-0.102
	(0.14)	(0.124)	(0.185)	(0.129)
expenditure	-448.81*	-404.29+	-319.75	-299.77
	(205.47)	(227.88)	(197.91)	(220.93)
Girl	194.66**	173.04*	240.47**	220.01**
	(69.36)	(74.13)	(75.18)	(80.64)
Boy	129.70	78.56	164.62+	82.45
	(92.65)	(93.76)	(97.82)	(82.25)
Regular class	706.51**	195.74	559.58*	146.48
	(270.58)	(159.57)	(239.88)	(159.48)
Private tuition	263.61+	111.87	220.49	80.92
	(150.54)	(125.79)	(136.30)	(114.87)
Exam influence	708.45*	189.55	730.89*	260.96
	(299.96)	(187.79)	(318.37)	(211.54)
Observations	3453	1752	3449	1749

The coefficient estimates are reported using Tobit regression where the dependent variable is total amount bribes or illegal money paid to school. Each regression also includes household size (number of male members and number of female members) and sex of the respondent. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 10: First-Stage Results (dependent variable is binary Network variable)

	(1)	(2)	(3)
Variables	No Control/ Fixed Effects	No Thana Fixed Effects	Including Thana Fixed Effects
education	0.04519**	0.03830**	0.03797**
	(0.00847)	(0.01142)	(0.01088)
Age		-0.00133	-0.00176
		(0.00254)	(0.00295)
sex		-0.04592	0.00419
		(0.13801)	(0.15602)
religion		-0.04633	-0.15923
		(0.14709)	(0.16813)
land		-0.00013	-0.00010
		(0.00012)	(0.00010)
expenditure		0.39932**	0.41687**
		(0.09179)	(0.09836)
girl		-0.02655	0.00820
		(0.04406)	(0.04920)
boy		-0.00824	0.03656
		(0.04671)	(0.05383)
Regular class		-0.41029**	-0.39398**
		(0.08763)	(0.09921)
Private tuition		-0.24200**	-0.27422**
		(0.07696)	(0.08392)
Exam influence		-0.26879**	-0.23019**
		(0.08045)	(0.08912)
Observations	2083	1749	1660

Each regression also includes household size (number of male members and number of female members) and sex of the respondent. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 11: IV estimates (Binary outcome)

Variables	(1) Any irregularity in school	(2) Victim of admission	(3) Did you Bribe for admission	(4) Harassed to get stipend	(5) Donation without receipt
Network	-0.951140**	-0.529392+	-0.614481*	-0.019936	-1.102652**
	(0.182527)	(0.319621)	(0.297842)	(0.298251)	(0.423111)
Age	-0.000381	-0.001004	-0.002018+	0.001673	-0.001442
	(0.000681)	(0.001243)	(0.001074)	(0.001339)	(0.001521)
Sex	-0.002156	-0.006760	0.030209	0.010466	0.005431
	(0.042977)	(0.075378)	(0.054790)	(0.065975)	(0.070934)
education	-0.008746	0.074497	0.039112	0.000834	-0.024180
	(0.033670)	(0.048255)	(0.050043)	(0.058106)	(0.081144)
Religion	-0.000033+	-0.000055*	-0.000046**	0.000048	-0.000068*
	(0.000018)	(0.000022)	(0.000018)	(0.000060)	(0.000032)
Land	0.044244	0.078310	0.076727	-0.167504**	0.030589
	(0.040876)	(0.083930)	(0.074424)	(0.063404)	(0.078456)
expenditure	0.057039**	0.009667	-0.024165	0.106039**	0.001632
	(0.014157)	(0.022147)	(0.017771)	(0.028727)	(0.023229)
Girl	0.012543	-0.000831	-0.009521	0.047662**	-0.003370
	(0.012320)	(0.022107)	(0.018193)	(0.017550)	(0.024054)
Boy	0.057103+	-0.081601+	-0.062167	-0.059198	-0.075260
	(0.031408)	(0.047463)	(0.043634)	(0.053206)	(0.072010)
Regular class	0.023013	-0.065033	-0.068168	0.164575**	-0.109436*
	(0.026709)	(0.046385)	(0.041819)	(0.040598)	(0.053509)
Private tuition	0.086885**	0.028790	-0.026386	-0.028420	-0.093950+
	(0.030064)	(0.059013)	(0.045876)	(0.038935)	(0.052547)
Exam influence	0.734785**	-0.142888	-0.116997	1.605888**	0.537591
	(0.250856)	(0.530515)	(0.468262)	(0.418555)	(0.493489)
Observations	1747	1043	1058	1091	1505

The estimates are obtained using education of the household head as instrument for network, and all the dependent variables are binary. Each regression also includes household size (number of male members and number of female members), sex of the respondent, and police station fixed effects. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 12: Tobit Estimates, Network is instrumented

Variables	(1) Bribe for admission	(2) Bribe for stipend	(3) Extra fee	(4) Total bribe
Network	-24.26	-342.63+	-224.63	-2,486.89+
	(464.51)	(176.27)	(137.43)	(1,342.46)
Age	-3.43	-2.02**	-0.19	-12.17+
	(2.76)	(0.64)	(0.54)	(6.59)
sex	-280.9	56.54	20.52	-174.56
	(190.45)	(36.05)	(32.60)	(346.19)
religion	-4.38	73.09	-28.66	-115.51
	(32.25)	(50.99)	(31.70)	(238.18)
land	0.0345	-0.04	-0.09*	-0.33+
	(0.0466)	(0.04)	(0.03)	(0.20)
expenditure	34.6	-9.13	-20.77	4.16
	(145.82)	(33.86)	(24.84)	(298.93)
girl	7.81736	119.19**	23.17+	274.40**
	(22.58)	(20.08)	(12.83)	(80.71)
boy	44.61	2.21	28.05*	205.52+
	(34.82)	(17.43)	(11.52)	(112.92)
Regular class	50.46	-12.08	43.77*	287.00
	(50.72)	(32.28)	(21.57)	(185.85)
Private tuition	36.96	-8.42	20.16	-0.27
	(60.43)	(26.55)	(21.87)	(145.99)
Exam influence	64.71	89.60*	80.21**	601.68*
	(72.92)	(36.50)	(27.13)	(280.11)
Observations	1748	1844	2849	3212

The estimates are obtained using education of the household head as instrument for network, and run Tobit regression in the second stage where the dependent variables indicate illegal payments or bribe. Each regression also includes household size (number of male members and number of female members), sex of the respondent, and police station fixed effects. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 13: Using a different definition of Network: Probit Marginal Effects

Variables	(1) Faced any irregularity in school	(2) Victim of admission	(3) Did you Bribe for admission	(4) Harassed to get stipend	(5) Donation without receipt
network	-0.212318**	0.033874	-0.053052*	0.001317	-0.039509+
	(0.033235)	(0.022891)	(0.022207)	(0.026219)	(0.023723)
Observations	2461	1237	1116	1438	2054

Each regression includes full set of covariates and police station fixed effects. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Table 14: Coefficient estimates of Tobit regression for new Network variable

(dependent Variable: Amount of bribe (in taka) for different purposes)

Variables	(1) Bribe for admission	(2) Bribe for stipend	(3) Extra fee	(4) Total bribe
network	-115.05	-7.64	-23.63	-172.76+
	(183.88)	(18.44)	(18.11)	(89.18)
Observations	2473	1419	2183	2474

Each regression includes full set of covariates and police station fixed effects. Standard errors are reported in parenthesis and they are clustered at the police station level. **, * , + denote significant at 1, 5, 10 percent level, respectively.

Appendix A.3 Variable definitions

Variables	Description
Age	Age of the head of the household
Sex	of the head of the household
Education	Years of educational attainment of the household head
Religion	binary variable (1=Muslim, 0=others)
Household size	two separate variables, number of male adults and number of female adults
	Sex of the respondent
Girl	number of girls studying in school
Boy	number of boys studying in school
Land	Amount of land owned by the household
Expenditure	log of total household expenditure to proxy permanent income
Regular class	whether school holds regular class during school period
Private tuition	whether teachers force students to go to private tuition (under teachers' private arrangement)
Exam influence	whether teachers influence exam results
Network	dummy variable equal to one if household has network and zero otherwise
Victim of admission	Whether parents were victim of seeking admission of their child to school in last one year
Did you bribe for admission	whether paid bribe for admission into school in last one year
Bribe for admission	Amount of money paid as bribe for child's admission in last one year
Harassed to get stipend	whether harassed in school to get government's stipend money
Bribe for stipend	amount of money paid for getting stipend in last one year in last one year
Extra fee	amount of money paid for different fees on top of official fee of school in last one year
Donation without receipt	whether paid any donation without receipt to school teachers in last one year
irregularity in school	whether faced any irregularity in school in last one year
Total bribe	Amount of total bribe paid for admission, stipend, and other purposes in last one year.

References

Abed, G. T. and Gupta, S. (2002). Governance, corruption, and economic performance. Washington, D.C: International Monetary Fund.

Aidt, T. S. (2003). Economic analysis of corruption: a survey. *The Economic Journal*, 113: F632–F652.

Alam, S. (1989). Anatomy of corruption: An approach to the political economy of underdevelopment. *American Journal of Economics and Sociology* 48(4): 441–456.

Alesina, A. and Angeletos, G.-M. ,(2005). Corruption, inequality, and fairness. *Journal of Monetary Economics* 52(7): 1227–44.

Ali, A. M. and Isse, H. S. (2003). Determinants of economic corruption: A cross-country comparison. *Cato Journal* 22(3): 449–466.

Banerjee, A.V. (1997). A theory of misgovernance. *The Quarterly Journal of Economics* 112(4):1289–1332.

Banerjee, A. V. and Pande, R. (2007) . Parochial Politics: Ethnic Preferences and Politician Corruption, Working Paper Series, Harvard University, John F. Kennedy School of Government.

Bardhan, P.(1997). Corruption and development: a review of issues. *Journal of Economic Literature 35* (3): 1320–1347.

Bardhan P.K .(2006). The economist's approach to the problem of corruption. *World Development* 34(2):341–348.

Begović, B. (2007). Economic Inequality and Corruption, Central European University, http://pdc.ceu.hu/archive/00003699/01/economic_inequality_and_corruption.pdf

Biswal, B. (1999). Private tutoring and public corruption: a cost-effective education system for developing countries. *The Developing Economies* 37(2): 222—40.

Chaudhury, N., Hammer, J., Kremer, M., Muralidharan, K., and Rogers, F. H. (2006). Missing in action: Teacher and health worker absence in developing countries. *The Journal of Economic Perspectives*, 20: 91–116.

Cockcroft, A. , Andersson, N., Omer, Kh., Ansari, N., Khan, A. and Chaudghry, U. U. (2002). Social audit of governance and delivery of public services. Baseline Report - Pakistan. http://www.ciet.org/en/documents/projects_library_docs/2006224174624.pdf

Çulea, M. and Fulton, M. (2009). Business culture and tax evasion: Why corruption and the unofficial economy can persist , *Journal of Economic Behavior & Organization* 72 811–822

Deininger, K. and Paul .M. (2004). Does Greater Accountability Improve the Quality of Public Service Delivery? Evidence from Uganda. *World Development* 33(1): 171–191.

Dincer, O. C. (2008). Ethnic and religious diversity and corruption. *Economics Letters* 99: 98–102

Directorate of Primary Education Bangladesh (2008) "BANBES

Di Tella, R. and Schargrodsky, E. (2003). The Role of Wages and Auditing During a Crackdown on Corruption in the City of Buenos Aires. *Journal of Law and Economics*1: 269–292.

Fisman, R. and Gatti, R. (2002). Decentralization and Corruption: Evidence Across Countries. *Journal of Public Economics* 83: 325–345.

Fisman, R. and Svensson, J. (2007). Are corruption and taxation really harmful to growth? Firm level evidence. *Journal of Development Economics* 83(1): 63–75.

Foellmi, R. and Oechslin, M. (2007). Who gains from non-collusive corruption? *Journal of Development Economics* 82, 95–119.

Galtung, F. (2006) *Measuring the Immeasurable: Boundaries and Functions of (Macro) Corruption Indices,* in Measuring Corruption, Charles Sampford, Arthur Shacklock, Carmel Connors, and Fredrik Galtung , Eds. Ashgate, 101-130.

Glewwe, P., Kremer, M., Moulin. S. (2000). Textbooks and Test Scores: Evidence from a Prospective Evaluation in Kenya. Working paper, Harvard university

Gupta ,S., Davoodi, H. and Alonso–Terme, R. (2002). Does Corruption Affect Income Inequality and Poverty? *Economics of Governance* 3: 23–45.

Gyimah-Brempong, K. (2002). Corruption, economic growth and income inequality in Africa. *Economics of Governance 3*: 183–209.

Heckman, J. (1981). The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process, in Charles Manski and Daniel McFadden (eds.), *The Structural Analysis of Discrete Data*. Cambridge: MIT Press.

Hunt, J. (2007b) *Bribery in Health Care in Peru and Uganda*. NBER Working Paper 13034,

Hunt, J. (2004). Trust and Bribery: The Role of the Quid Pro Quo and the Link with Crime, NBER Working Papers 10510.

Hunt, J. (2007a). How corruption hits people when they are down, *Journal of Development Economics*, 84(2):574-589.

Jain, A.K. (2001).Corruption: A Review, *Journal of Economic Surveys*, 15: 71–121.

Kaufmann, D. and Wei, Shang-Jin (1999). Does 'Grease Money' Speed Up the Wheels of Commerce? National Bureau of Economic Research, NBER working paper 7093,

Keefer, P. and Knack, S. (1997). Why don't poor countries catch up? A cross-national test of institutional explanation. *Economic Inquiry* 35: 590–602.

Kenya Urban Bribery Index, http://www.transparency.org/dnld/kubi.pdf

Kingston , C. (2007). Parochial corruption, *Journal of Economic Behavior & Organization,* 63: 73–87

Kingston , C. (2008). Social structure and cultures of corruption, *Journal of Economic Behavior & Organization* 67: 90–102

Knack, S. and Keefer, P. (1995). Institutions and economic performance: cross-country test using alternative institutional measures. *Economics and Politics* 7: 207–227.

Khalil, F. , Lawarrée, J. , Yun, S. (2010). Bribery versus extortion: allowing the lesser of two evils. *RAND Journal of Economics*, 41(1):179-198.

Kremer, M., Muralidharan, K., Chaudhury, N., Hammer, J., & Rogers, F. H. (2005). Teacher absence in India. *Journal of the European Economic Association*, 3: 658–667.

Mauro, P. (1995). Corruption and growth. *Quarterly Journal of Economics* 110: 681–712.

Li, H., Xu, L.C. and Zou, H.F. (2000). Corruption, Income Distribution, and Growth, *Economics and Politics* 12:155-182.

Mocan, N. (2008). What determines corruption? International evidence from microdata. *Economic Inquiry 46*(4): 493–510.

Murio, P. (1995). Corruption and Growth, *Quarterly Journal of Economics* 110(3): 681-712

Olken, B. A. , and Barron, P. (2009). The Simple Economics of Extortion: Evidence from Trucking in Aceh. *Journal of Political Economy* 117(3): 417-452, 06.

Olken, B. A. (2006). Corruption and the costs of redistribution: Micro evidence from Indonesia, *Journal of Public Economics* 90: 853-870.

Olson, M. Jr., Sarna, N. and Swamy, A. (2000). Governance and Growth: A Simple Hypothesis Explaining Cross–Country Differences in Productivity Growth. *Public Choice*, 102: 341–64.

Shleifer, A. and Vishny, R. W. (1993). Corruption. *The Quarterly Journal of Economics* 108 (3): 599–617.

Sik, E. (2002). *The Bad, the Worse and the Worst: Guesstimating the Level of Corruption*, in Political Corruption in Transition: A Skeptic's Handbook, Stephen Kotkin and Andras Sajo, Eds. Budapest: Central European University Press, 91-113.

Svensson, J. (2003). Who Must Pay Bribes and How Much? Evidence from A Cross Section of Firms. *The Quarterly Journal of Economics* 118 (1): 207—230.

Swamy, A., Knack, S., Lee, Y. and Azfar, O. (2001). Gender and Corruption. *Journal of Development Economics* 64: 25–55.

Tanzi, V. (2000). Policies, institutions and the dark side of economics. Cheltenham, UK ; Northampton, Mass., USA: E. Elgar.

Tanzi, V. and Davoodi, H. R. (1998). Roads to nowhere : how corruption in public investment hurts growth. Washington, D.C.: International Monetary Fund.

Tanzi, V. and Davoodi, H. R. (2000). Corruption, growth, and public finances. IMF working paper; WP/00/182. Washington, D.C.: International Monetary Fund, Fiscal Affairs Department.

The World Bank's Voices of the Poor survey v.2 (1999). World Bank Publications/Oxford University Press.

Transparency International Bangladesh (2006), Corruption Database Report 2005 TIB, Dhaka

Treisman, D. (2000). The Causes of Corruption: A Cross–National Study. *Journal of Public Economics* 76 (3): 399–457.

Véron, R., Williams, G., Corbridge, S. and Srivastava, M. (2006). Decentralized Corruption or Corrupt Decentralization? Community Monitoring of Poverty-Alleviation Schemes in Eastern India. *World Development* 34(11): 1922–1941.

World Bank (2007). Chapter 7: Governance and Growth: The Bangladeshi Conundrum, in Bangladesh: Strategy for Sustained growth. Working Paper, World Bank, Report No. 41425

World Bank (2003). Improving the Investment Climate in Bangladesh. World Bank, Washington, D.C

You, J.S. and Khagram, S. (2005). A Comparative Study of Inequality and Corruption, *American Sociological Review*, 70: 136-158.