

Why farm households have differences in corruption experiences? Evidences from Bangladesh

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Abstract: The article explores the household-level determinants of corruption and its different forms in Bangladesh. It also identifies the micro-level factors for which households pay different amount of bribe. To attain these objectives, experiences of 210 Bangladeshi farm households belonging to six different districts of the country are analyzed. The econometric analyses show that the households with higher expenditure are more likely to face corruption and bribery, and also pay a higher amount of bribe. However, these households are less likely to face the negligence of duty and nepotism or favouritism. Such differences in the impact of the expenditure variable can be argued to be the outcome of a situation where corruption is pervasive and the officials have the bribe maximizing objective. Relationships with different power entities reduce the households' probability to face corruption and its different forms, and can avoid a higher bribe payment. The results argue for several policy actions for combating corruption in the country.

Key words: corruption, Cragg's double hurdle model, probit model, Tobit model

There are several good reasons for the economists to be interested in the corruption research. Success of any government program largely depends on the government's ability to control corruption. Good governance is in the core of most of the development strategies or policies, especially in developing countries. The donors and international development organizations have set up this as a precondition for development aids. Furthermore, foreign investors may prefer to avoid host countries where corruption is high. Rampant corruption from the part of power entities is one of the important motivating factors behind the recent uprising in different African and Arabic countries – which is popularly known as the 'Arab Spring'. Svensson (2003) identified three common features of the available corruption literature. These are (1) cross-country analyses (e.g. Keefer and Knack 1995; Mauro 1995; Kaufmann et al. 2003, etc.), (2) analyses based on perception indices (e.g. Keefer and Knack 1993 use data from the International Country Risk Guide, whereas Lambsdorff (2003) use data from the Transparency International's Corruption Perception Index, etc.), and (3) foreign experts' assessments on the overall corruption in a country (e.g. among different data sources used for constructing the Transparency International's Corruption Perception Index and the World Bank's Governance Indicators

database some are foreign experts survey). The literature explains corruption as an outcome of the countries' policy-institutional environment. Svensson (2003) also mentioned some common limitations or drawbacks of these studies. Due to the aggregated nature of the data, cross country analyses can hardly tell anything about variations within the country. Moreover, concerns about perception biases really question the acceptability of these studies.

The literature about micro-level determinants of corruption is limited. Due to the secretive nature of corruption, it is difficult to find direct witnesses of it, especially when there is a win-win situation (Johnston 2000). Furthermore, the unavailability of micro-data regarding corruption versus the relatively easy availability of the aggregate-level data is perhaps another limiting factor (Mocan 2008).

The available studies on micro-level determinants of corruption identify several important factors which may effect the probability of being exposed to corruption. For example, the rich have a higher probability to be exposed to corruption, specifically bribery (Hunt 2004; Torgler and Valev 2006; Mocan 2008), mainly due to the fact that their higher demand for services and the ability to pay bribe. Gender is identified as another important determinant of corruption and most of the available literature argues for a lower

probability of women to experience or to be involved in corruption (Swamy et al. 2001; Hunt 2004; Mocan 2008). Differences in the willingness to pay bribe among different professional groups are results of the differences in perceptions about corruption among the groups (Čábelková and Hanousek 2004). Student's perception about honesty of their educational institution and positive thinking about their future career potentiality can influence their involvement in bribery (Shaw 2009). Trust network may substitute bribe through implicit *quid pro quo*, and people with trust network are less likely to pay bribe (Hunt 2004). The interaction with public sector increases the Ugandan firm's probability of being exposed to bribery. The amount of bribe paid by these firms depends on their 'ability to pay' and 'refusal power' (Svensson 2003). However, as corruption has socio-cultural, ideological and legal dimensions, its definition and the people's perception may vary across country and time (Tanzi 1995; Johnston 1996; Jain 2001). Hence, the findings and recommendations about corruption are country-specific and generalizations of such findings avoiding cultural aspects may not bring the desired results.

For Bangladesh, two studies are found related to the topic of interest. One of these is conducted by Anik and Alam (2011) which answers why for the same service households pay a different amount of bribe. Through a Tobit model, this study finds that among different household level characteristics, only the household's income influences the amount of bribe to be paid in service sectors. Households with a higher income are observed to pay a higher amount of bribe. The other is done by Anik et al. (2010). The effort of this study is to identify the determinants of both corruption experiences and the amount of bribe. By using the household's expenditure instead of income, this one also finds rich households to pay higher bribe amounts. While analyzing the household's corruption experiences, this study finds that households living in peri-urban areas and having relation with different power entities are less likely to face corruption.

Determinants of different forms of corruption except bribery are not available in the literature. Bribery and corruption are used as synonyms in the literature. A common tendency of the literature (Hauk and Sáez 1999; Swamy et al. 2001; Torgler and Valev 2006; Shaw 2009) is to begin with corruption in the title and then to focus mostly on bribery. However, the underlying reasons, forms, and consequences of bribery and other forms of corruption (e.g. negligence of duty, nepotism, extortion, and embezzlement) might be completely different from each other. Berg (2001) mentioned that when an official practices

nepotism by hiring a family member instead of the best applicant, the official may not get any financial benefit but he/she will gain in terms of the 'family standing'. In extortion, fraud, embezzlement, or using official resources to operate an under-the-table business, the officials do not need to do anything in exchange, whereas the official does something in return for a bribe (Johnston 2000). The first step to save or protect the households from the curse of corruption should be to know why households face corruption, i.e. to know the determinants of corruption. As the underlining reasons for different forms of corruption are different, the determinants of corruption might also be different. Hence the existing research gaps may be critical from the policy point of view.

Understanding the scarcity of research, even though there is a strong need in Bangladesh, where corruption is rampant and affects people's daily life, the efforts are extended to explore the household-level determinants of corruption. While doing so, this study has contributed to the existing pool of literature in a number of ways. By differentiating among the forms of corruption, this article not only identified the determinants of corruption, but it also explained its different forms. It shows how a single variable may have a different effect on different types of corruption. Thus it establishes the importance of distinguishing between different forms of corruption. Moreover, this study analyzes some specific relationship variables which may be crucial for understanding a household's corruption experiences, e.g. the relationships with different government officials, community organizations, etc. Such a detailed breakdown of relationship variables is not currently available in the existing literature.

METHODOLOGY

Sampling techniques and data

To identify the household level determinants of corruption, data collected from 210 Bangladeshi farm-households are analyzed. The reference period of the survey was July 08–June 09 and the focus was on the rice growers' corruption experiences. This study focused on rice as it is the major crop of the country in terms of production (33 540.32 thousand metric tons), area coverage (75% of the total cropped area and over 80% of the total irrigated area) and the contribution to national income accounts (one-half of the agricultural GDP and one-sixth of the national income) (BRRI 2012).

The households were selected through a multi-stage sampling from six villages of six different districts. The districts with the above-median rice production in 2008/09 were first selected. The selection purposes here were twofold. Firstly, to select the areas where extension services (e.g. training, demonstration plots and advisory services, etc.) for paddy are more concentrated. Furthermore, these areas consume a relatively high share of the agricultural subsidy allotted for paddy. These districts were then ranked based on the proportion of households which experienced corruption in service sectors and the top three and bottom three districts had been chosen.¹ The intention here was to have a balanced representation from the areas with the high and low level of corruption. From each district, the upazila² with the highest rice production, and inside the upazila, the village with the highest rice production was selected. The purposes here were same as they were in the first stage. Finally, 35 farm-households from each village were selected randomly from the list of farmers available with the local extension agents.

A semi-structured interview schedule was designed to collect the necessary data needed for the study. The interview schedule was designed for detailed information about the household's demography and its different socio-economic characteristics such as education, income and expenditure patterns, land holding, relationship with different organizations and power entities, etc. It also collected information about the household's interactions with ten different service sectors, namely agricultural extension, banking, education, electricity, health, judiciary, land administration, law enforcement agencies, local government and NGOs. One open section was also included to incorporate the household's experiences with any other sector except these. During the interview, the enumerators discussed in details with the households their interaction experiences with service sectors or institutes. Then the households were asked to classify their experiences according to different forms of corruption. In case of the households' lack of awareness or failure to understand, the enumerators explained to the households the meaning of corruption and its different forms like the negligence of duty and nepotism/favouritism. Some practical examples were also cited for easy understanding of the respondents. However, an attention was given that the data collection process did not influence the household's opinion. In the case of the bribery data,

instead asking a direct question about the amount of bribe the households were asked for regarding their paid cost or price for the service. The difference between the household's paid price and the service delivery institution's announced price are considered as the amount of bribe.

Model specifications

This section describes different empirical models (e.g. the Probit, Tobit and Cragg's double hurdle model) used to identify household-level determinants of corruption and its different forms. The definition and measurement techniques of the variables used in these models are given in the Appendix tables (Table A.1 and Table A.2).

Models for identifying the factors behind corruption and its different forms

First, probit models are developed to identify the household level determinants of corruption and its different forms. A probit model is used to identify the households which are more vulnerable to corruption. Here, the dependent variable is binary in nature and taking the numeric value 1 if a household has faced corruption at least in one service sector during July 08–June 09; 0 is assigned otherwise. Similarly, three different probit models are developed for the three most common forms of corruption: bribery, negligence of duty, and nepotism or favouritism. In the models used to identify the determinants of a specific form of corruption, the dependent variable is a household's experience to face that specific form of corruption and it is constructed as the dependent variable in the first model; e.g. in the model for negligence of duty, the dependent variable in the household's experience about the negligence of duty, whereas the household's experience about nepotism or favouritism and bribery are used as dependent variables in the models for the determinants of nepotism/favouritism and bribery, respectively. The general form of the probit model is as follows:

$$\Pr(y_i = 1 | x_{1i} \dots x_{ki}) = \Phi(\beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} + \varepsilon_i) \quad (1)$$

where \Pr is the probability; y_i is the i^{th} household's corruption experience; and x_{1i}, \dots, x_{ki} are different socio-economic characteristics of the i^{th} household that may influence corruption experiences.

¹The ranking here was done using the Transparency International Bangladesh's (TIB) database of 'National Household Survey 2007 on Corruption in Bangladesh'.

²An administrative unit in Bangladesh which is above the village level but below the district level.

Models for identifying factors influencing the amount of bribe

Among the 205 service recipient households, 45% reported to pay bribes, and the remaining enjoyed services without paying bribes. Therefore, the dependent variable here consists of 116 households with zero observation. To deal with such censored dependent variable, the Tobit model specification is used (Tobin 1958).

However, the Tobit model or other censored data models might be inadequate or improper when the households do not decide about paying bribe and the amount of bribe simultaneously (Moffatt 2005). In order to address such situations, the Cragg's double hurdle model is also used (Cragg 1971).

Tobit model

According to Tobin (1958), y_i is observed if $y_i^* > 0$ and is not observed if $y_i^* \leq 0$, and the observed y_i is defined as:

$$y_i = \begin{cases} y_i^* + \beta x_i + \mu_i & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases} \quad (2)$$

The error term is distributed as $N(0, \sigma^2)$. Following Gujarati (2003), the specified model for the households which have paid a bribe and for the households which have not paid one can be written as:

$$y_i = \begin{cases} \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} + \mu_i & \text{if HH's bribe amount} > 0 \\ 0 & \text{otherwise} \end{cases} \quad (3)$$

where x_{1i}, \dots, x_{ki} are different socio-economic characteristics of the i^{th} household which may influence the amount of the bribe.

Cragg's double hurdle model

The first stage of the Cragg's model is a probit model to analyze the determinants of participation, whereas the second stage is a truncated model for the determinants of the level of participation. If d_i^* is the latent variable describing a household's decision to pay a bribe, y_i^* is the latent variable describing its decision on the amount of the bribe, and d_i and y_i as their observed counterparts, then based on the specification by Cragg (1971) and Moffatt (2005), the two hurdles for the households are:

$$d_i^* = \alpha z_i + v_i \quad (4)$$

$$y_i^* = \beta x_i + \varepsilon_i \quad (5)$$

where,

$$d_i = \begin{cases} 1 & \text{if } d_i^* > 0 \\ 0 & \text{if } d_i^* \leq 0 \end{cases} \text{ and } y_i = \begin{cases} y_i^* & \text{if } y_i > 0 \text{ and } d_i^* > 0 \\ 0 & \text{if otherwise} \end{cases}$$

Here, z_i is a vector of variables explaining whether a household pays bribe; x_i is a vector of variables explaining how much bribe the household pays; and v_i and ε_i are the error terms and are assumed to be randomly and independently distributed.

As the Tobit model is nested in the Cragg's model, these two models can be tested using the following standard likelihood ratio test (Greene 2000):

$$\Gamma = -2[\ln L_T - (\ln L_P + \ln L_{TR})] \sim \chi_k^2 \quad (6)$$

where L_T , L_P and L_{TR} are log-likelihoods of the Tobit, probit, and the truncated regression model, respectively. Rejection of the null hypothesis ($\Gamma > \chi_k^2$) argues for superiority of the double-hurdle model over the Tobit model.

Econometric consideration: Problem of endogeneity

The econometric models described so far may have potential endogeneity problems due to the simultaneous causality between the expenditure variable and the dependent variables. Corruption imposes some costs on the households. Bribe reduces the households' disposable income and hence expenditure. Negligence of duty reduces the quality of services, and the household might need to look for alternatives, which might be expensive. Corruption may also induce indirect costs in the form of time being wasted. Bribe and/or nepotism may help the households in the reduction of taxes or to get some financial allowances from the local government. Whatever the form and cause, there are possibilities that corruption may effect the expenditures.

To address the endogeneity of the expenditure variable, a two stage least squares (2SLS) estimation technique is chosen, which is the most common among different instrumental variable (IV) methods (Murray 2006; Bascle 2008). In this method, the expenditure variable is first regressed on the instrument(s) and other exogenous regressor(s), and the resulting fitted value of the expenditure variable is used in the second stage regression.

The structural equation by considering the variables of interest can be specified as follows (Maddala 1992; Wooldridge 2002):

$$y_{1i} = \beta_0 + \beta_1 y_{2i} + \beta_2 x_i + u_i \quad (7)$$

where y_{1i} is the household's corruption experience; y_{2i} is the endogenous variable which is the household's expenditure; x_i are the household and community level characteristics of the household which may influence corruption experiences; and u_i is the error term.

Table 1. Testing endogeneity for the expenditure variable

Models	Smith-Blundell test of exogeneity	Wald test of exogeneity	Durbin-Wu-Hausman test
Models for corruption and its different forms			
Corruption	0.406	0.385	
Negligence of duty	0.063	0.044	
Nepotism/favouritism	0.631	0.610	
Bribery	0.256	0.229	
Models for determinants of the amount of bribes			
Tobit model	0.601	0.600	
Cragg's model			0.202

p-values of different tests are reported

Endogeneity of y_{2i} means that it is correlated with the error term u_i , and hence the coefficients are not consistent. According to the IV method, some additional information in the form of new variables is to be incorporated in the structural equation. The new variables are called instruments. Based on the insights from the field survey, land holding (ha/person) and off-farm income (BDT/person)³ are selected as the instruments for the expenditure variable. Log of land holding (ha/person) is also used in the regression. These three selected instruments and other exogenous variables are regressed on the endogenous regressors, which is the household's expenditure. This regression can be explained as follows:

$$y_{2i} = \alpha_0 + \alpha_1 x_i + \alpha_2 z_{1i} + \alpha_3 z_{2i} + \alpha_4 z_{3i} + \varepsilon_i \quad (8)$$

where y_{2i} is the household's corruption experience; z_i are the instruments; x_i are the household and community level characteristics of the household which may influence corruption experiences; and u_i is the error term.

In the final stage, instead of the observed value of the endogenous variable, the predicted value of expenditure (generated from the Equation 8) is included along with other independent variables in the regressions. The final stage of the regressions can be written as follows:

$$y_{1i} = \beta_0 + \beta_1 \hat{y}_{2i} + \beta_2 x_i + u_i \quad (9)$$

where \hat{y}_{2i} is the predicted value of expenditure; x_i is the same vector of explanatory variables used in the first stage of equation; and u_i is the error term.

³This instrument can also be endogenous due to its simultaneous causality with the expenditure variable. To be sure about this suspicion, five variables are used as instruments. These are: dummy of location, age of the household head, dummy of membership with NGOs, number of active adult members in the family and distance from the nearest market. Along with these five instruments, the exogenous variables in equation 7 are regressed on the off-farm income variable. Then following Davidson and MacKinnon (1993) the Durbin-Wu-Hausman test statistics is generated to test the endogeneity of the off-farm income variable. The estimated insignificant test statistics suggest that in none of the models the off-farm income variable is endogenous.

Testing endogeneity

As there is no ready endogeneity test available for the Cragg's model, the Durbin-Wu-Hausman test is conducted to test the endogeneity of the expenditure variable. The Smith-Blundell test of exogeneity is conducted to test the endogeneity of the expenditure variable in the probit and Tobit models (Smith and Blundell 1986). The null hypothesis for the test is that all explanatory variables are exogenous. The Wald test of exogeneity examines the correlation between the error terms in the structural equation and the reduced-form equation for the endogenous variable. The significance of these residuals' coefficients is tested through this (Wooldridge 2002). Rejection of the null hypothesis means that the error terms in both stages are correlated, and therefore following the IV approach would be appropriate.

According to these test results presented in Table 1, the expenditure variable is endogenous only in the regression for the negligence of duty. For this model, the IV method is followed.

RESULTS AND DISCUSSIONS

Descriptive statistics of the variables used in the models

Of 210 sample households, 205 reported to interact with at least one service delivery entity during the reference period. Among the service recipients,

Table 2. Household's corruption experiences

Forms of corruption	Mean
% of households faced corruption	72
% of households faced negligence of duty	21
% of households faced nepotism/favoritism	11
% of households paid bribes	45
Household's annual amount of bribe (BDT/person) ^a	133.5

^a1 US\$ is approximately 81.9 BDT

Source: Bangladesh Bank (2012)

nearly three out of every four (72%) reported to face corruption. Such high proportion establishes the fact that corruption severely exists in the service sectors. Bribery is the most common form of corruption and it is reported by the 45% service recipients. Bribery is followed by negligence of duties and nepotism/favouritism. Annually, a farm household pays 133.5 BDT per person as bribe (Table 2). From these descriptive statistics, one can argue that corruption is to some extent a common feature in the service sectors in Bangladesh and bribery is the most likely solution if the households want to enjoy services.

One out of every three households is from the peri-urban areas. Off-farm income contributes around 44% of the total household's income. The average education of the household head is below the primary level. The respondents are mostly small farmers with 0.15 ha/person of land. The dependency ratio of 0.3 implies that ten economically active persons

between 15 and 64 years are expected to support three other inactive individuals within the households, though age may not necessarily indicate whether an individual is economically active or not. Among the sample households, 33%, 5%, 20% and 27% have the relationship with public representatives, upazila executive officer's office, other government offices, and community organizations, respectively (Table 3).

Determinants of corruption, its different forms and amount of bribe

The household-level determinants of corruption, negligence of duty, nepotism or favouritism, and bribery are presented in the second, third, fourth, and fifth columns of Table 4, respectively. Table 5 presents the results of the Tobit and Cragg's model estimates, which give insights about the determinants of the bribe amounts. In such a situation, it is important to know which model is a better option for ascertaining how the households decide on the bribe amounts. The better model is identified through a log-likelihood test. The calculated test statistic is $\Gamma = 137.27$ and it is well above the tabulated value $\chi^2_k(11) = 24.73$ at 1% level of significance. This implies that a household's decision to participate in bribery and the amount of bribe to be paid are made in two different stages. This may not be surprising since a household may have to pay a bribe at different stages. The discussion and policy recommendations regarding the determinants of amount of bribe are based on the findings of the Cragg's model.

Table 3. Summary statistics of the explanatory variables used in the models

Variables	Mean
% of households living in peri-urban areas	0.33
Off-farm income share	0.44
HH head's education (years)	4.89
Number of member(s) enrolled in different educational institutes	1.42
Land holding (ha/person)	0.15
Expenditures (BDT/person)	2195.7
Dependency ratio	0.30
% of households having relationship with	
public representatives	0.33
office of the upazila executive officer	0.05
other government offices	0.20
community organizations	0.27

(a) Who are more vulnerable to experience corruption: Poor or Rich?

In all the models, the expenditure has a significant impact. The variable has a positive coefficient in the models for corruption and bribery, but a negative one in the models for nepotism/favouritism and negligence of duty. Such results imply that the households with higher expenditures are more likely to face corruption and bribery compared to their counterparts with lower expenditures. However, in the case of the negligence of duty and nepotism or favouritism, the households with relatively lesser expenditures have a higher likelihood to be exposed to these two forms of corruption (Table 4). According to the Cragg's model, the households pay higher bribes with increasing expenditures. The estimated coefficient of expenditure implies that if a household observes a 1000 BDT increase in their per capita annual expenditures, they will pay by around 35% more in bribes (Table 5).

A higher probability for the households with higher expenditures to face corruption and bribery is in line with the findings of Hunt (2004), Torgler and Valev (2006), Mocan (2008), Anik et al. (2010) and Anik and Alam (2011). The literature mentions several reasons for such probability. Households with higher expenditures have higher ability to pay bribe than those with lower expenditure. Compared to the poor, the rich have higher demands for services and hence interact more with the service delivery entities. A higher interaction increases the probability of facing corruption and bribery. Besides, since the marginal cost of the same amount of bribe is likely to be relatively less for the rich than the poor, the households with higher expenditures can be assumed to be less reluctant to enjoy services through bribes.

By paying bribes, the rich can reduce the probability of facing the negligence of duty. On the other hand, since the poor are less capable of paying bribes, corrupted officials may be reluctant to provide quality services to them. For corrupted officials, the rich are wise options for practicing nepotism or favouritism compared to the poor, since doing this with the rich will increase the probability of a government official being rewarded with higher bribes. Ultimately, the households with relatively low expenditures are more

likely to face nepotism or favouritism, but in favour of the rich households.

(b) *Does relationship with power entities reduces corruption?*

Relationship with public representatives significantly reduces a household's probability to face corruption and all its different forms. Households having relationships with different officials belonging to the upazila executive officer's office have a lower probability to face corruption and bribery (Table 4). Relationships with the upazila executive officer's office and community organization(s) significantly reduce the amount of bribes (Table 5).

These results are in line with the findings of Hunt (2004). The author argued that trust networks help the households to find substitutes for bribery in the form of quid pro quo and to reduce the probability of experiencing bribery. By ensuring services to the households having a relationship to some power entity, the service delivery officials can expect something in return from the power entity. Moreover, rational officials are expected to be willing to avoid problems and conflicts with power entities. Hence they are less likely practice corruption with the households having a relationship with a power entity.

Table 4. Factors influencing the probability of corruption and its different forms

Regressors	Corruption (probit)	Negligence of duty (ivprobit)	Nepotism/ favouritism (probit)	Bribery (probit) ^a
	marginal effect (standard error)			
Expenditures (BDT/person)	0.00008** (0.00003)	-0.0001** (0.0001)	-0.00005** (0.00002)	0.00013*** (0.00004)
Land holding (ha/person)	0.206 (0.305)	0.405 (0.328)	0.042 (0.139)	-0.383 (0.312)
Dependency ratio	0.296 (0.186)	-0.213 (0.165)	0.056 (0.075)	0.108 (0.206)
Off-farm income share	-0.004 (0.021)	0.022 (0.033)	0.011 (0.011)	-0.033 (0.043)
HH head's education (years)	-0.004 (0.008)	0.006 (0.007)	-0.002 (0.004)	-0.004 (0.009)
Number of members enrolled	-0.006 (0.035)	0.081*** (0.031)	0.002 (0.014)	-0.037 (0.039)
Dummy of location (1 = peri-urban)	-0.090 (0.079)	0.138* (0.078)	0.021 (0.037)	-0.018 (0.085)
<i>Relationship variables (1 = have a relationship)</i>				
Public representatives	-0.338*** (0.077)	-0.256*** (0.052)	-0.096*** (0.033)	-0.296*** (0.077)
Upazila executive officer's office	-0.669*** (0.121)	0.114 (0.260)	0.199 (0.276)	-0.457*** (0.054)
Other government offices	-0.122 (0.089)	-0.033 (0.074)	-0.048 (0.031)	0.017 (0.098)
Community organizations	-0.063 (0.079)	-0.001 (0.071)	0.042 (0.045)	0.133 (0.090)
Prob. > χ^2	0.0000	0.0000	0.0020	0.0007
Log likelihood	-100.432	-1833.370	-57.314	-125.179
No. of observations	205	205	205	205

^aTier 1 of Cragg's "two-tier"; *, **, *** indicate significance levels of 10%, 5%, and 1%, respectively

Table 5. Determinants of bribe amount

Regressors	Tobit model		Cragg's model ^a coefficient
	coefficient	marginal effect	
Expenditures (BDT/person)	0.00104*** (0.0003)	0.00038*** (0.0001)	0.00035*** (0.0001)
Land holding (ha/person)	-3.674 (2.669)	-1.334 (0.964)	-1.350 (0.959)
Dependency ratio	-0.039 (1.950)	-0.014 (0.708)	-0.231 (0.740)
Off-farm income share	-0.478 (0.556)	-0.173 (0.200)	-0.500 (0.271)
HH head's education (years)	0.005 (0.081)	0.002 (0.029)	0.019 (0.028)
Number of members enrolled	-0.375 (0.383)	-0.136 (0.139)	-0.044 (0.147)
Dummy of location (1 = peri-urban)	-0.075 (0.796)	-0.027 (0.288)	-0.038 (0.284)
<i>Relationship variables (1 = have a relationship)</i>			
Public representatives	-2.908*** (0.847)	-0.993*** (0.269)	-0.044 (0.326)
Upazila executive officer's office	-8.641*** (2.900)	-1.931*** (0.375)	-4.922*** (1.522)
Other government offices	0.357 (0.939)	0.131 (0.351)	0.407 (0.354)
Community organizations	0.873 (0.847)	0.326 (0.325)	-0.642** (0.324)
Constant	0.046 (0.929)		4.513*** (0.320)
Prob. > χ^2		0.0002	0.0095
Log likelihood		-340.402	-271.767
No. of observations		205	205

Figures in parentheses are standard errors

^aTier 2 of the Cragg's double hurdle model; *, **, *** indicate a significance level of 10%, 5%, and 1%, respectively

(c) *Does corruption vary between rural and peri-urban areas?*

The location variable has a significant impact only in the model estimated for the negligence of duty. However, its associated signs in different models show some specific patterns and deserve some discussion. Compared to the households living in rural areas, the peri-urban ones have a higher probability of facing the negligence of duty and nepotism. These households have a lower probability to face corruption and bribery (Table 4). The peri-urban households pay a lower amount of bribe than their counterparts in rural areas (Table 5). The corruption, bribery and Cragg's model contradict the findings of Hunt (2004) and Mocan (2008). The literature argues for a higher probability of corruption in the areas where the interactions are less personal, the population density is high, and people live for a shorter time. Compared to rural areas, the peri-urban areas are more likely to have such characteristics. However, the results indicate that rather than these factors, the hypothesis of structural differences between rural and peri-urban areas which were suggested by Anik et al. (2010) is applicable in the study areas. Peri-urban areas generally have more alternative service delivery points. In these areas, the media

as well as civil society are more likely to be vocal and active against corruption. Moreover, the peri-urban residents are more conscious and aware of their civic entitlements and rights than their rural counterparts. All these may reduce the peri-urban household's probability of facing corruption and lower the amount of bribes. On the other hand, since the peri-urban households generally have a higher exposure and awareness, they are likely to be more efficient and capable of identifying corrupt practices such as the negligence of duty and favouritism. However, more personal types of interaction may reduce the probability of the negligence of duty and favouritism in rural areas.

(d) *Does education influences household's corruption experiences?*

In the model for the negligence of duty, both the education variables have positive signs though the coefficient is significant only for the number of members enrolled in educational institutes. Such results imply that the households with a better educational status are more likely to face the negligence of duty (Table 4). One should not interpret this as the officials' intentional discrimination against educated households. Probably such relationship exists as the

educated households' are likely to be more capable to identify the negligence of duty.

(e) *The relationship between different forms of corruption*

The expenditure variable positively contributes to the households' corruption experiences and the amount of bribe paid. However, the same variable reduces the households' probability of experiencing other forms of corruption like the negligence of duty and nepotism/favouritism. A corrupt official with the bribe maximizing objective will try to extract the maximum amount of bribe from a service recipient. But in case of service recipients who do not pay bribe, the official may be reluctant to provide service. Thus the failure to pay bribes may leave households unattended and make them vulnerable to experience the lack of duty from corrupt officials. Such phenomenon is likely to occur in a situation where corruption is widespread and the officials' motive is to maximize the bribe. TIB estimated that about 84.2% of the households in Bangladesh experience corruption while interacting with the service sectors or institutions, and the total estimated amount of the bribe paid by the households in the country for accessing different services is 1.4% of the national Gross Domestic Product (GDP) (TIB 2010).

CONCLUSION

The econometric results show that the households' socio-economic characteristics can influence their probability to be exposed to corruption and its different forms. Household's expenditures and its relationship with different power entities play the most decisive role here. Households with higher expenditures are more likely to experience corruption and bribery and pay a higher amount in bribes. By paying bribe, the rich households enjoy better services and hence they are less vulnerable to face the negligence of duty. Contrary, less bribing ability makes the poor more vulnerable to experience the negligence of duty. The inverse relationship of the expenditure variable with bribery and negligence of duty indicate a widespread corruption in the service sector. Here, it is noteworthy to mention the administrative structure of Bangladesh which allows the service delivery entities to have some degree of discretionary power. Furthermore, the absence of alternative service delivery entities and the lack of accountability enable officials to extensively exercise their discretionary power. Such discretionary power allows the officials to discriminate among the

service recipients and to perform corrupt practices with some service recipients depending on their socio-economic characteristics. In such circumstances, a corrupt official whose main objective is to maximize the bribe extraction will try to find households having a higher ability to bribe. For these corrupt officials, rich households are also attractive options to practice nepotism or favouritism, as they can pay more bribes. Relationships with different power entities significantly help the households to counter the probability of facing corruption and its different forms. Relationship with different power entities also help to reduce bribe amounts. The fear factor or willingness to avoid conflicts with power entities or the desire for some sort of benefit from the power entities may encourage the officials to establish relationships with them. These results indicate that the officials discriminate among the service recipients depending on their socio-economic characteristics. Hence, some immediate policy interventions to reduce the official's discretionary power are needed to reduce the corruption incidences. Competition among different service providers and within the service entities will enable the service recipients to have more options and thus it will help them to turn down the corruption incidents. An efficient monitoring system should be introduced in the service entities. Poor salaries may force some officials to corruption. So the salary structure might be revised and it can be need-based. Incentive schemes for a special performance and punishment for wrong-doing, e.g. the 'carrot and stick' policy, needs to be introduced. Finally, in the educational curriculum, attention should be given to teach students to distinguish between the ethical and unethical behaviour. In addition, awareness programs should be undertaken and in doing so, along with the government, the media and NGOs should play a proactive role.

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APPENDIX

Table A.1. Models and dependent variables

Models	Dependent variables
Probit models	
Determinants of corruption	1 = if the household has faced any form of corruption in at least one service sector during the referenced period, 0 = did not face
Determinants of negligence of duty	1 = if the household has faced negligence of duty in at least one service sector during the referenced period, 0 = did not face
Determinants of nepotism/favouritism	1 = if the household has faced nepotism/favouritism in at least one service sector during the referenced period, 0 = did not face
Tobit model: Determinants of amount of bribe	log of per capita amount of bribes (BDT/person)
Cragg's model	
Tier 1: Determinants of probability to face bribery	1 = if the household paid bribe in at least one service sector during the referenced period, 0 = did not pay
Tier 2: Determinants of amount of bribe	log of per capita amount of bribes (BDT/person)

Table A.2. Definitions and measurement techniques of the explanatory variables used in econometric models

Variables	Unit of measurement
Peri-urban location	dummy, 1 = peri-urban, 0 = rural
Off-farm income share	ratio of household's off farm income to total income
<i>Household's educational status</i>	
HH head's education (years)	household head's formal years of schooling
Number of member(s) enrolled	number of family member(s) enrolled in different educational institutes during July 08 to June 09
<i>Economic condition of the households</i>	
Land holding (ha/person)	total quantity land owned (ha) by the household divided by the number of family members
Expenditures (BDT/person) ^a	household's total annual expenditure (BDT) divided by the number of family members
Dependency ratio	calculated by adding up the number of elderly (> 65 yrs) and children (≤ 15 yrs) divided by family size
<i>Dummy of relationship variables (1 = Have relation)^b</i>	
Public representatives	Elected public representatives who might be at the local or national level
Office of the upazila executive officer	Office of the upazila executive officer
Other government offices	Law enforcement agencies, the judiciary office, and the local administration
Community organizations	Different religious, social, and cultural organizations and clubs, etc.

^aTo avoid seasonality, instead of income expenditure is used. The reliability of information and high response rate of expenditure data compared to income data are also noted in the literature (Subramanian and Deaton 1996; Garrett and Ruel 1999).

^bA household is identified to have relationship only when all the following three conditions are satisfied: The household has family member(s) and/or relative(s) and/or friend(s) as public representatives or working in the institution(s) or organization(s) that hold some influence over the service delivery entities.

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