Inquiries into Causes of Corruption: Instrumental Variable (IV) Approach

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1 Introduction

Corruption is considered as one of the nagging barrier for development. As a research topic it is relatively new. The last two decades experienced growing bodies of literature on corruption. As most of these literatures addressed aggregate determinants of corruption; little clues about relationship between corruption and individual agents is available from these works. There has been limited research on micro level corruption. According to SVENSSON (2002), macro level studies on corruption can tell little about the relationship between corruption and individual agents. Moreover, within country variation in corruption cannot be explained through these studies. Hence it is difficult to draw effective policy guidelines from these literatures.

The National Household Survey on Corruption 2007 (NHSC 2007), conducted by Transparency International Bangladesh (TIB), estimated that during the fiscal year 2006-07, households in Bangladesh paid BDT[1] 54.4 billion as bribe to different public or private service delivery organizations (TIB, 2008), which is estimate to be 1.2 per cent of national GDP. The country ranked the lowest in the global ranking of Corruption Perception Index (CPI) developed by Transparency International (TI), consecutively for five years from 2001 to 2005. Since 2005, the country showed improvement, and in 2010 the country ranked 12th from the below which is 134th among 178 countries included in the index (TI, 2010).

Farm household's interaction with public service delivery organizations sometimes result in bitter experiences, like corruption. These corruption experiences of households are dealt in this article. Specifically, this article tries to seek answer of two questions. The first one is: whether all households are equally vulnerable to corruption or not. Then, it tries to identify the reasons for which household's amount of bribe defers.

2 Material and Methods

This article uses survey data collected through a multi-stage random sampling technique. The survey covered six villages belonging to six different districts of the country. A total of 210 farm households have been interviewed during the survey. The reference period of the survey was July'08-June'09.

To identify which households are more prone to corruption, the following probit model is used:

$$\Pr\left(Y_i = 1 | x_{1i} .... x_{ki}\right) = \Phi\left(\beta_1 x_{1i} + \beta_2 x_{2i} + ... + \beta_k x_{ki}\right) \tag{1}$$

Where, $\Pr$ is the probability, Y_i is the i th household's experience about corruption and is binary in nature, Φ is the cumulative distribution function (CDF) of the standard normal distribution,

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[1] 1 euro is approximately 97.5 BDT.

and $x_{1i}..........x_{ki}$ are different socio-economic characteristics of the i th household those may have influence on corruption experiences.

The following tobit model is used to identify socio-economic factors those may influence amount of bribe paid by the households:

$$z_i = Tobit(\delta_1 + \delta_2 x_{1i} + \delta_3 x_{2i} + ... + \delta_3 x_{ki}) \qquad (2)$$

Where, z_i is the annual amount of bribe (BDT) paid by the i th household while receiving services, $\beta_1...............\beta_k$ are the unknown parameters to be estimated, and $x_{1i}..........x_{ki}$ are the explanatory variables referring to different socio-economic characteristics of the i th household. The explanatory variables used in both the models along with their unit of measurement and expected sign are presented in Table 1.

Table 1: Measurement unit for the explanatory variables and their expected sign

Variables	Unit of measurement	Expected sign	
		Probit model	Tobit model
Dummy of household having member with government job	1 =With government job, 0 = Without government job	-	-
Dummy of households having member with government job	1 =With government job, 0 = Without government job	-	-
Education of the household head	Year of schooling	-	-
Expenditure of the household[2]	BDT/per person	+/-	+
Dummy of household's location	1 = Peri-urban, 0 = rural	-	-
Dummy of relationship variables			
Public representatives	1 = Have relationship, 0 = No relationship	-	-
Sub-district executive officer's (UNO) office	1 = Have relationship, 0 = No relationship	-	-
Other government offices	1 = Have relationship, 0 = No relationship	-	-

As both the probit and tobit model can be biased due to endogenity, we adopt a 2SLS estimation technique which is most common among different IV approaches (SARGAN, 1958; BAUM ET AL., 2003; HAMILTON and NICKERSON, 2003; MILUKA ET AL., 2007; ADKINS, 2008; BASCLE, 2008). Two variables are used as instruments in both the models: dummy of relationship with parties (1=Have relationship) and dummy of relationship with community organizations (1=Have relationship). Our instrumented variable is relationship with public representatives (RPR). The first stage for both the probit and tobit model is as follows:

$$RPR_i = \mu + \gamma_1^* RCO_i + \gamma_2^* RPP_i + \lambda x_i + \varepsilon_i \qquad (3)$$

Where, RPR_i is relationship with public representatives for the i th household, RCO_i is the i th household's relationship with community organizations, RPP_i is the relationship with political parties for the i th household; x_i is the household and community characteristics of the i th household those may influence corruption experiences and amount of bribe; and ε_i is the error term. In the second stage, the predicted value of RPR_i is included as an independent variable in both regressions on the right-handside.

3 Results and Discussions

3.1 Proportion of household's experiencing corruption in different sectors

Among the service recipient households, 70.00 per cent reported to experience corruption. Land administration can be considered as the top most corrupt sector, as proportion of households' experiencing corruption is highest here. In the land administration, 92.50 per cent of the service

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[2] Instead of income, expenditure is thought to better option to reflect household's economic capability. As our sample households are farm households, their income are subject to seasonality. Moreover, expenditure is more or less stable, as low income at a particular period of time is balanced with savings from earlier time.

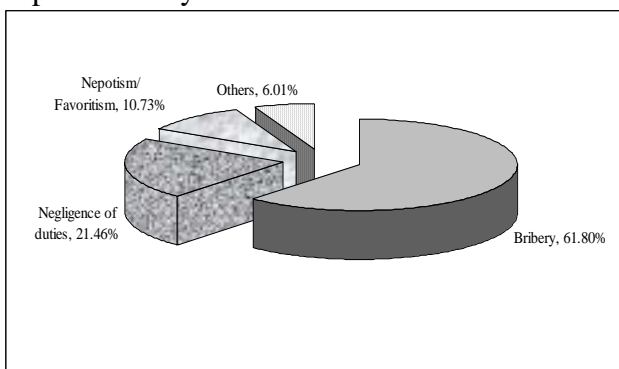recipient households experience corruption. Prevalence of corruption is similarly notorious in law enforcement agencies and judiciary. In law enforcement agencies and judiciary, 90.91 per cent and 90.00 per cent of households experience corruption, respectively. Corruption also prevails in notable extent in local government (60.47 per cent) and bank (48.39 per cent). Sectors like NGO and agricultural extension can be considered comparatively fair, as proportion of service recipient households experiencing corruption is relatively less in these two sectors (Table 4.1).

Table 2: Proportion of households experiencing corruption in different sectors

Name of the sector	% of HHs experiencing corruption
Agricultural extension	8.10
Bank	48.39
Education	20.61
Electricity	24.51
Health	15.11
Judiciary	90.00
Land administration	92.50
Law enforcement agencies	90.91
Local government	60.47
NGO	3.53
All sectors	70.00

Source: Field survey 2009.

3.2 Different forms of corruption faced by farm households

Corruption has different faces and forms. Different forms of corruption faced by the sample farm households are presented in Figure 4.1. Bribery is the most common form of corruption faced by the farm households. Among the households, who experienced corruption, 61.80 per cent reported to experience bribery. Briber is followed by negligence of duties, and nepotism/favoritism. Corruption in the form of negligence of duties is experienced by 21.46 per cent of the households. Incidence of nepotism/favoritism is reported by 10.73 per cent of the respondents. Existence of other forms of corruption like extortion, embezzlement, deception is really sporadic. During the survey 6.01 per cent of corruption experienced households could report about existence of these types of corruption.

Figure 1: Different forms of corruption experienced by households

Source: Field survey 2009.

3.3 Household's socio-economic factors influencing corruption experiences and amount of bribe

3.3.1 Testing the relevance and validity of instruments

One of the most challenging parts in IV estimation is the selection of instruments itself. Unfortunately, for limited dependent variable specifications, no proper test is available to ensure validity and strength of instruments. Such difficulties are also faced by MILUKA ET AT. (2007), as their dependent variables were also censored in nature. As a solution, they did diagnostic on the uncensored specification, and then used the selected instruments in their censored specification. The same footway is followed in our work. All the test statistics generated for IVPROBIT and IVTOBIT regression are presented in the lower portion of Table 3.

To test whether our instruments are sufficiently strong or not, we run the joint significance test of the instruments in the first stage regression. The estimated Cragg-Donald F statistics for the IVPROBIT and IVTOBIT model are 13.99 and 14.07, respectively. Since in both the models, our estimated statistics are above the value of 10, which is suggested as a rule of thumb by STEIGER

AND STOCK (1997), we can conclude with some degree of confidence that the chosen instruments are relevant and sufficiently strong. Sargan test statistics, which tests the endogeneity of the instruments, are insignificant in both the models. These insignificant statistics imply that the orthogonality condition is satisfied and our instruments are valid. The endogeneity test for the regressors is carried out using the Durbin-Wu-Hausman (DWH) test using. The test statistics for both the IVPROBIT and IVTOBIT model are significant. Through these significant values we can reject the null hypothesis and conclude that the instrumented variable is endogenous.

3.3.2 Farm household's socio-economic factors influencing corruption experiences

Among seven explanatory variables of the IVPROBIT model, only two variables turn out to have significant impact on farm household's experiences about corruption. These two variables are farm household's location and their relationship with UNO office. The associated signs of these variables imply that households having relationship with UNO office, and living in urban areas are more likely not to experience corruption than their counterparts (Table 3).

Table 3: Farm household's socio-economic factors influencing corruption experiences (IVPROBIT) and amount of bribe (IVTOBIT)

Regressors	IVPROBIT estimates	IVTOBIT estimates
Household member with govt. job	-.0428 (.4477)	867.4938 (1489.686)
Education of household head	-.0098 (.0211)	-113.3414 (72.2369)
Expenditure	.00007 (.00006)	.5967* (.2288)
Dummy of location	-.4231* (.2147816)	-101.7979 (775.7356)
Relationship variables		
Public representatives	-.68620 (.5625)	1793.35 (2081.693)
UNO office	-.76628* (.3924)	-766.5509 (1580.976)
Other govt. offices	-.22492 (.3796)	-1664.138 (1285.939)
Wald test of exogeneity	1.79	0.08
Cragg-Donald Wald F statistic	13.99	14.068
Sargan test statistic	0.001	0.169
Prob > chi^2	0.0018	0.035
Durbin-Wu-Hausman	0.5469***	0.97037***
Number of obs.	209	209

Note: Robust Standard Errors Reported in Parenthesis
* Significant at 10% level, ** Significant at 5% level, *** Significant at 1% level.
Source: Field survey 2009.

In the administrative context of Bangladesh, the UNO office has immense influence as this is the prime authority for implementing and monitoring different government programmes and projects in their respective locality. The sub-district executive officer himself is involved with different committees, formed for proper functioning and monitoring of public service delivery institutes. Private and non-government institutes also have to have accordance of work this office. Such influences can easily be used by the service recipient households to enjoy hassle free services, and hence households having relationship with UNO office are more likely to avoid corruption than those who have no such relationship.

Compared to peri-urban areas, availability of both public and private services in rural areas are limited. Besides media, civil society organizations, and awareness of people are relatively less in number, and effective in rural areas. Ultimately anticorruption activities and propaganda are less likely to be in rural areas than the peri-urban areas. Hence probability of rural households to experience corruption is higher than their counterparts, who live in peri-urban areas.

3.5 Farm household's socio-economic factors influencing amount of bribe

The results of the IVTOBIT model, through which intend to know which socio-economic characteristics of the farm households affect amount of bribe, show that among different socio-economic characteristics of the farm households, only household's expenditure has positive

significant impact on bribe amount (Table 3). This suggests that service recipients' socio-economic status except capability to pay bribe does not get consideration whenever they fall on bribery. The rent seekers only discriminate service recipients depending on their economic status; as they find rich households more suitable to devour higher sum of bribe.

5. Conclusions

It has been observed that corruption notoriously exists in public service delivery organizations, and bribery is the most common form of corruption. Rural households are relatively more prone to corruption. Relationship with UNO office can help the households to circumvent the probability of experiencing corruption. When it comes to bribery, amount of bribe is higher for relatively wealthy households.

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