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Determinants of Corruption and Its Impact on Firm Performance: Global Evidence

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Abstract

This paper examines two important aspects of the firms, firstly, it identifies the factors responsible for firm-level corruption, and secondly it investigates the impact of corruption on firm performance in 147 economies using the data set of World Bank's Enterprise Survey. Two indicators, that is, firm's annual real sale growth and export performance are used to gauge the firm performance. Logistic regression is employed to estimate the determinants of corruption and Ordinary Least Square is employed to estimate the impact of firm's corruption on its performance. It is found that corruption augments firm's sale and export performances in the aggregate analysis of 147 economies. In the disaggregated analysis, it is found that corruption increases the firm's sale and exports in low income economies while it reduces the firm's performance in high and middle income nations.

Keywords: corruption, product innovation, firm performance, bureaucratic hurdles, export performance.

1. Introduction

Corruption is a worldwide phenomenon at the national as well as micro-level like at firm, profession, industry and economic sector. Both the developed and developing countries are facing this complex issue of corruption. Neither the size of enterprise nor the size of economy matters for the intensity of corruption. The corruption affects the country economically, politically and socially at the national level. It reduces investment and impedes economic growth (Mauro, 1995), decreases public trust in institutions and makes a hurdle in sustainable development (Aidt, 2009; Khan & Farooq, 2019), and distorts government expenditures (Shleifer & Vishny, 1993). At the firm level the corruption has an adverse effect on production and investment decisions due to higher cost and greater uncertainty (Olken & Pande, 2011). It reduces investment growth (Asiedu & Freeman, 2009), and adversely affects the innovative capabilities of the firms (Paunov, 2016).

According to the World Enterprise Survey, firms pay 26.13, 10.44, 20.80 and 12.82 percent informal payment for obtaining licences and permits in low income, high income, lower-middle and upper-middle income economies respectively. However, the literature about the implications of firm level corruption is comparatively rare. One of the reasons for this scarcity may be the non-availability of firm-level data. Recently, the World Enterprise Survey has provided the firm level data for the economies globally. Hence, to probe the determinants and consequences of corruption at firm level becomes interest of the researchers. In this paper, we probe the determinants of firm-level corruption and the impact of such type of corruption on firm performance for global aggregate of 147 economies and disaggregated global economies by their income level. We use the data set of World Bank's World Enterprise Survey. To measure the firm performance, we have taken two indicators, i.e. firm annual real sale growth and export performance. In order to control endogeneity and quantify the impact of corruption on firm performance, control variables such as bureaucratic problems, innovation capabilities, firm's age, size of the firm, foreign ownership of the firm and external audit have been added.

Regardless of enormous studies on firm's performance, to the best of our knowledge, none of the studies has investigated the issues like the factors of corruption and its impact on firm's performance by using the data set of global economies. Corruption may affect firm performance differently in various income groups of the world economies. It invokes the need for analysis of disaggregated global countries by income groups which makes the clarity about the different impact of corruption on firm performance in different income groups of the economies. The attempt to empirically investigate the impact of corruption on firm performance using World Enterprise Survey database will be an addition to the literature.

2. Literature Review

The empirical research on impact of corruption provides heterogeneous evidences at national and firm-level tracks. The researchers and policymakers at one strand consider that hypothesis of "sand the wheels" is valid for both tracks. Some of the macro level studies concluded that corruption is negatively linked with economic growth (Aidt, 2009; Méon & Sekkat, 2005; Ugur & Dasgupta, 2011; Zelekha & Sharabi, 2012). Similarly some of the studies at firm-level concluded that corruption reduces investment and suppressed the output (Asiedu & Freeman, 2009; Fisman & Svensson, 2007). Kong, Dongmin, Wang, and Wang (2017) used Quasi-natural experiment to find out effect of anti-corruption on firm performance. They concluded that anti-corruption deteriorates private firm's performance and augments performance of public enterprises. Van Vu, Tran, Van Nguyen, & Lim, (2018) utilized GMM on small and medium scale enterprise survey to find the impact of corruption on financial performance of firms in Vietnam. They also indicated that bribe intensity reduces firm performance.

On the other hand, the hypothesis of "grease the wheels" is also found valid by national and firm-level studies. At the macro level some of the studies showed the positive effect of corruption on economic growth (Dreher & Gassebner, 2013; O'Toole & Tarp, 2014). On the same lines some of the firm-level studies also concluded that corruption increases profitability of private firms (Jiang & Nie, 2014), improves the growth of firms (Vial & Hanoteau, 2010), and improves firm performance (Mendoza, Lim, & Lopez, 2015; Sequeira & Djankov, 2014). Wu (2009) found that most Asian firms are involved in corrupt practices. Corruption is institutionalized, and firms are willingly paying informal

payments to accelerate the production of goods and services. Collins, Uhlenbruck, and Rodriguez (2009) examined the causes of firm-level corruption in India and found that managers are engaged in corrupt practices with public officials to get benefits and being competitive. Manager's relationships with public officials, ignoring the laws regarding corruption, membership in political parties, and support for political activities are major determinants of corruption in India. Williams and Kedir (2016) tested two contending hypotheses "sand the wheels" and "grease the wheel". They found that corruption increases sales, employment and productivity across 40 African countries. Riaz and Cantner (2019) investigated the impact of judicial, political, petty and grand corruption on innovation. The results showed that petty and grand corruption has positive impact on innovation, while the effect of corruption on services sector innovation was considerable as compared to innovation in manufacturing.

3. Data and Methodology

This paper uses World Bank Enterprise Survey (EBES) data of 147 countries conducted by the World Bank. It is divided into three income groups, i.e. high income countries comprising 29 nations in the sample, middle income countries comprising 91 countries in the sample (47 upper-middle income and 44 lower-middle income), and low income countries comprising 27 countries in the sample. The sample consists of total 62460 firms, while 8033 (12.86 percent) belong to high income countries, 47319 (75.75 percent) belong to lower and upper-middle countries, and 7109 (11.38 percent) belong to low income countries.

3.1 Measuring Corruption and Firm Performance

The firm-level corruption[1] is measured through the WBES question j7a. It is the "percent of firms expected to give gifts to public officials (to get things done)". We have converted it into dummy variable, by taking bribe payment = 1, otherwise, = 0. To measure firm performance, we have used real annual sale growth and exports of the firms in percentage.

3.2 Model Specification

Categorical nature of the dependent variable suggests the use of the Logit model to find the determinants of corruption. The probability that a randomly drawn firm pays bribes is represented by the following equation.

$$\Pr(CORR_{\mathrm{i}} = 1) = \alpha + \pi_1 \mathrm{BUREAU} + \pi_2 \mathrm{TAXCONS} + \pi_3 \mathrm{EXP} + \pi_4 \mathrm{FAGE} + \pi_5 \mathrm{FSIZE} + \pi_6 \mathrm{MANEXP} + \pi_7 \mathrm{EXAUDIT} + \pi_8 \mathrm{CRI} + \varepsilon_{\mathrm{i}} \quad (1)$$

It is hypothesized that bureaucratic hurdles (BUREAU), tax constraint (TAXCONS), crime (CRI), firm age (FAGE), firm size (FSIZE), and higher manager experience (MANEXP) increase the probability of corruption, while chance of corruption is supposed to be lower in case of external audit (EXAUDIT) and exports (EXP).

Sharma and Mitra (2015) used the following specification to quantify the impact of corruption on firm performance.

$$FP_i = \alpha + \beta_1 Corruption_i + €_x X_i + \gamma_y Y_i \quad (2)$$

[1] For measurement of firm level corruption, See Sharma and Mitra (2015).

Where FP_i is the firm performance, measured by two factors, real annual sale growth, and export performance. X_i is bureaucratic hurdles. Y_i is a vector of firm-specific characteristics that include the variables like innovation, ownership of the firm, age of the firm, firm size and external audit. The econometric specification to measure the impact of corruption on firm performance is given by the following equation.

$$FP_i = \Omega_0 + \Omega_1 \mathrm{CORR_i} + \Omega_2 \mathrm{BUREAU_i} + \Omega_3 \mathrm{INNOV_i} + \Omega_4 \mathrm{FORFIR_i} + \Omega_5 \mathrm{FAGE_i} + \Omega_6 \mathrm{FSIZE_i} + \Omega_7 \mathrm{EXAUDIT_i} + \varepsilon_i \quad (3)$$

It is hypothesized that corruption (CORR) and bureaucratic hurdles (BUREAU) reduce the firm performance while, innovation (INNOV), foreign firm (FORFIR), external audit (EXAUDIT), age of firm (FAGE) and firm size (FIZE) increases the firm performance.

Table 1: Definitions of the Variables

Names of Variables	**Unit of Measurement**	**Survey Question (World Bank Enterprise Survey, 2013)**	**The question in the Survey**
Corruption (CORR)	Dummy Variable Bribe payment=1 Otherwise=0	Percent of firms expected to give gifts to public officials	**J7a**
Bureaucratic Problems (BUREAU)	Dummy Variable Time Spent=1 Otherwise=0	Senior management time spent in dealing with requirements of government regulation	**J2**
Crime (CRIM)	Dummy Variable Yes=1 No=0	In fiscal year did this establishment experience losses as a result of theft, robbery	**i3**
Foreign Firms (FORFIR)	Percentage	Percentage of firms that have at least 10% owned by private foreign individuals, companies, or organizations	**b2b**
Firm Age (FAGE)	Years	In what year did this establishment begin operations (2013 the year of survey minus the year of establishment begin operations)	**b5**
Real Sale (LSALE)	Percentage	Last completed fiscal year's total sales.	**d2**
Exports (EX)	percentage	The proportion of total sales that are exported directly	**d3c**

Manager Experience (MEXP)	years	Years of experience of the top manager working in the sector	**b7**
External Audit (EXAUD)	Dummy Variable Yes=1 No=0	Percentage of firms with their annual financial statement reviewed by an external auditor	**k21**
Product Innovation (INNOV)	Dummy Variable Yes=1 No=0	Did this establishment introduce any innovative product or service	**hb1**
Tax Constraint (TCON)	Dummy Variable Yes=1 No=0	Percent of firms identifying tax rates as major constraint	**j30a**

Table 1 shows the unit of measurement and definition of variables. World Enterprise Survey provides objective measures of variables by asking different question. Bureaucratic hurdles is the independent variable and it is measured through the WBES question j2. It is the "senior management time spent in dealing with requirements of government regulation". We have converted it into dummy variable, by taking time spent=1, otherwise, = 0. Crime is the independent variable and it is measured through the WBES question i3. That is, "In fiscal year did this establishment experience losses as a result of theft, robbery". We have converted it into dummy variable, by taking time spent=1, otherwise, = 0. Foreign firm is another explanatory variable and it is measured through the WBES question b2b. That is, "Percentage of firms that have at least 10% owned by private foreign individuals, companies, or organizations". It is continuous variable measured in percentage. Firm age is another explanatory variable and it is measured through the WBES question b5. That is, "In what year did this establishment begin operations". It is continuous variable measured in years. Firm age is equal to survey year minus the year of establishment of business. Real sale is dependent variable and it is measured through the WBES question d2. That is, "Last complete fiscal year total sales". It is continuous variable measured in percentage. Export is dependent variable and it is measured through the WBES question d3c. That is, "The proportion of total sales that are exported directly". It is continuous variable measured in percentage. Manager experience is independent variable and it is measured through the WBES question b7. That is, "Years of experience of the top manager working in the sector". It is continuous variable measured in years. External audit is measured through the WBES question k21. That is, "Percentage of firms with their annual financial statement reviewed by an external auditor". We have converted it into dummy variable, by taking Audit=1, otherwise, = 0. Innovation is measured through the WBES question hb1. That is, "Did this establishment introduce any innovative product or service". We have converted it

into dummy variable, by taking Innovation=1, otherwise, = 0. Tax constraints is measured through the WBES question j30a. That is, "Percent of firms identifying tax rates as major constraint". If yes=1, otherwise, = 0.

4 Empirical Results and Discussion

Table 2: Descriptive Statistics

Variable	Observations			Mean	Min	Max
	Complete	Imputed	Total			
Corruption (COR)	46960	15500	62460	0.177811	0	1
Bureaucratic Hurdles (BURHUR)	57272	5188	62460	0.603873	0	0
Tax Constraints (TAXCON)	61852	608	62460	0.688526	0	1
Exports (EXP)	61711	749	62460	7.459691	0	100
Firm Age (FAGE)	61542	918	62460	19.1769	0	340
Firm Size (FSIZE)	42300	20160	62460	0.5950356	0	1
Foreign Firms (FORFIR)	61,852	608	62460	6.885258	0	100
Innovation (INNOV)	51,337	11123	62460	0.359721	0	1
External Audit (EXAUD)	61057	1403	62460	0.571564	0	1
Crime (CRI)	60,849	1611	62460	0.168417	0	1
Real Sale (LSALE)	54,783	7677	62460	7.344966	0	14.698

Note: Authors' calculations using STATA.

Table 2 presents the results of the descriptive statistics. There was 15500 missing value of corruption, 5188 of bureaucratic hurdles, 608 of tax constraints, 749 of exports, 918 of firm age, 20160 of firm size, 608 of foreign firms, 11123 of innovation, 1403 of external audit, 1611 of crime and 7677 of real sales. We have used the method of multiple

imputations[2] to impute the missing values. It can be seen from the table that 62460 firms report that they pay 17.78 percent bribe on average to public officials to get things done. For bureaucratic hurdles, firms reported that on average their senior management spent 60.4 percent time in dealing with requirements of government regulation with bureaucracy. The 68.52 percent of the firms reported that taxes are hurdle in the growth of their business. Average exports of the firms are 74.59 percent. The average age of the firms in the sample is 19.17 years. The 59.50 percent of firms are larger firms, 68.45 percent of firms in the sample are foreign firms and 35.97 percent of the firms are involved in innovative activities. The 57.15 percent of the firms in the sample reported that their income statements and balance sheets are reconciled by external auditors and 16.84 percent of firms reported criminal activities in the business.

Table 3: Determinants of Firm-Level Corruption

	High Income	Middle Income	Low Income	Aggregate Analysis
Bureaucratic Hurdles (BURHUR)	.3321049* (.0710528)	.2159121* (.0309312)	.3326605* (.0478742)	.2108152* (.0162007)
Tax Constraints (TAXCON)	.0026852* (.0010484)	.0023641* (.000653)	.0001354 (.0008082)	.0021577* (.0003392)
Exports (EXP)	-.109943 (.1100399)	-.474368* (.0498798)	-.3978779* (.0637609)	-.3346392* (.0251142)
Firm Age (FAGE)	-.0088984* (.0017481)	-.0042243* (.0010683)	-.0071956* (.0018533)	-.0015875* (.0005559)
Firm Size (FSIZE)	-.251856* (.0552538)	.2325697* (.0313844)	.0065255 (.0478152)	.0043418 (.015957)
Manager Experience (MANEXP)	-.017228* (.0024709)	-.0135898* (.0014874)	-.0081879* (.0026166)	-.0084306* (.0007696)
External Audit (EXAUD)	-.1659823* (.0545351)	-.0485704 (.0301888)	-.3069534* (.0490247)	-.1618092* (.0160038)
Crime (CRI)	.6407795* (.0537105)	.5785249* (.0378293)	.4493355* (.0553461)	.2894477* (.020161)
Constant	-1.240618* (.1414747)	-.5903466* (.0613783)	-.1111226 (.0714229)	-.3380517* (.029757)
Observation	8032	47319	7109	62460

Notes: * and** denote level of significance at 5 and 10 percent respectively. Robust standard errors are reported in parentheses.

[2] See for example Collins, Schafer, and Kam (2001).

The estimated results of firm-level determinants are shown in table 3. In this table the dependent variable is corruption. It is a dummy variable taking the value of one in the case of bribes payment and zero otherwise. The bureaucratic hurdle has a positive and significant coefficient in the aggregate analysis as well as in the disaggregate analysis of high, middle and low income nations, which shows that bureaucratic hurdles increase the likelihood of corruption. This is in line with the findings of Svensson (1999). A firm that spent more time with bureaucrats to avoid procedural hurdles is more likely to pay bribes (Kuncoro, 2004). The coefficient of tax constraint is positive and significant in the aggregate analysis as well as in the disaggregate analysis of high and middle nations, which shows that tax constraint increases the probability of corruption. Tax avoidance is a typical type of financial extortion among firms that stood up with a high tax rate (Palda, 2001). Opportunities for tax evasion provide firms having an incentive to bribe tax collectors to forget the fraud or to minimize the sanctions, and that's why one might anticipate that firms facing large taxes could have higher propensity to pay bribes because firms consider tax as one of the major obstacles in the expansion of their business. The coefficient of export is negative and statistically significant in the aggregate analysis as well as in disaggregate analysis of middle and low income nations, which shows that firms that export their output are less likely to offer a bribe to a public official to get things done. Exporting firms participate less in bribery since they are not as vulnerable to local corrupt environments and might get more preferential treatments, particularly in emerging countries where export-oriented policies are ardently supported (Luo & Han, 2009). Additionally, exporting companies may have higher access to outside financing and so have more bargaining power in negotiations for loans with local banks or government officials (Barth, Lin, Lin, & Song, 2009). The coefficient of firm age is negative and statistically significant in the aggregate analysis as well as in disaggregate analysis of high, middle and low income nations, which shows that the older firm is less likely to offer a bribe to a public official as compared to infant firms (Čábelková & Hanousek, 2004; Kuncoro, 2004).

The older firms are less inclined to pay since they are more likely to have established a continuing relationship with government officials, which reduces bribes in a strong tie with officials that makes an advantageous place for private firms. In the aggregate analysis, larger firms are more likely to offer bribes to public officials. In disaggregate analysis, larger firms in the high income nation are less likely to pay bribes while in middle and low income nations the larger firms are more likely to pay bribes. The coefficient of manager experience is negative and statistically significant in aggregate and disaggregate analysis, which shows that firms with greater manager experience are less likely to offer a bribe to a public official as compared to newly appointed managers. This is in line with the findings of Collins et al. (2009), that the odds of a firm engaging in corruption is significantly affected by an experienced manager social ties with officials because he can handle public official optimally. The coefficient of external audit is negative and statistically significant in aggregate and disaggregate analysis, which shows that firms with an external audit are less likely to offer a bribe to a public official. Careful bookkeeping practices and auditing are basic to detecting and preventing bribery. Poor bookkeeping practices may represent another significant boundary to endeavors to diminish bribery (Wu, 2009). A firm with yearly inspections of the book of accounts is less likely to pay a bribe (Safavian, Graham, & Gonzalez-Vega , 2001) thus, weak institution lead individuals to trespass legality and increase the willingness to pay bribes. Barth et al. (2009) also provide the same argument. The coefficient of crime is positive

and significant in aggregate and disaggregate analysis, which shows that firms that experience losses as a result of theft or robbery are more likely to be involved in corrupt practices. This is in line with the findings of Goldberg, Kim, and Ariano (2014).

Table 4: Impact of Corruption on Firm Performance

	High Income		**Middle Income**		**Lower Income**		**Aggregate Analysis**	
	Real Sale	**Exports**	**Real Sale**	**Exports**	**Real Sale**	**Exports**	**Real Sale**	**Exports**
Corruption	-0.6826* (0.1972)	-0.5109 (1.5596)	-0.5379* (0.0294)	-1.7895* (0.4383)	0.6288* (0.0833)	1.7757* (0.7512)	0.4427* (0.0279)	1.1115* (0.3816)
Bureaucra-tic problem	-0.7117* (0.1253)	-0.6796 (1.3939)	-0.4647* (0.0216)	-2.2854* (0.3157)	0.0957 (0.0796)	1.4319** (0.8087)	0.4062* (0.0201)	1.8448* (0.2790)
Innovation	0.4508* (0.0650)	0.4611 (0.8658)	0.3391* (0.0208)	1.1199* (0.3375)	0.2101* (0.0806)	0.5907 (0.8462)	0.3367* (0.0194)	1.0273* (0.2995)
Foreign ownership	0.0050* (0.0012)	0.1976* (0.0309)	0.0065* (0.0005)	0.2178* (0.1411)	0.0046* (0.0016)	0.1508* (0.0253)	0.0059* (0.0006)	0.2023* (0.0115)
Firm age	0.0136* (0.0012)	-0.0503** (0.0291)	0.0097* (0.0007)	0.0237* (0.0100)	-0.0000 (0.0023)	0.0073 (0.0278)	0.0099* (0.0006)	0.0163* (0.0089)
Firm size	1.0569* (0.0720)	3.0159* (0.9593)	0.2963* (0.0223)	3.2031* (0.3075)	0.2293* (0.0773)	1.3981* (0.7480)	0.3747* (0.0208)	3.0779* (0.2754)
External audit	0.1711* (0.0780)	2.6614* (0.9063)	0.2726* (0.0235)	2.0330* (0.3134)	0.5420* (0.0771)	2.2209* (0.8231)	0.3060* (0.0211)	2.4176* (0.2756)
Constant	5.1221* (0.1373)	5.2557* (1.4531)	6.7897* (0.0290)	1.5162* (0.3268)	6.4938* (0.0820)	0.5520 (0.6989)	6.6681* (0.0263)	1.5630* (0.2903)
Observation	8032	8032	47319	47319	7109	7109	62460	62460

Notes: * and ** denotes significant at 5% and 10% respectively. Robust standard errors are reported in parentheses.

The estimated results of the effect of corruption on firm performance are shown in table 4. In the aggregate analysis of 147 nations corruption has a positive and significant impact on firm performance. It is in line with the findings of Vial & Hanoteau, (2010). Egger and Winner (2005) show that corruption stimulates beneficial trades and improves efficiency. It has also been argued that corruption can lead to a more efficient allocation of licenses and government contracts (Lui, 1985). In disaggregated analysis impact of corruption on firm performance in high income and the middle income nations is negative and in the low income nation, it has a positive impact on real sales and export of the firms. Bribing to government officials increases firm's sales and exports due to the corrupt bureaucratic system and ill-functioning of the government institutions in low income countries. Institutions are relatively stronger in higher and middle income nations, and corruption is one of the hurdles in these economies, so it reduces firm's sales and exports. Sharma and Mitra (2015) provided the same type of results for India. Bureaucratic hurdles show a negative impact on firm performance in high and middle-income nations while it shows a positive impact on firm performance in aggregate as well as in the low income nation. All other variables related to firm characteristics, i.e. innovation, foreign-owned firm, firm age, and size increases the sales and exports of high, middle and low income countries' firms. The impact of firm age on exports of the firms in high income nations and on sale of the firms in low income nations shows negative association. The external audit has a positive association with firm performance in aggregate as well as in disaggregate analysis.

5 Conclusion and Policy Implications

There is consensus on researchers and policymakers in the literature that corruption has both greasing and sanding effect on firm performance. Our study also provides similar results. In the aggregate analysis, corruption increases firm performance. In the disaggregated analysis, it increases firm performance in low income nations while reduces the sales and exports of high income and middle income nations. Therefore, the evidence supports the hypothesis of "grease the wheels" in low income and the hypothesis of "sand the wheels" in high and middle income nations.

It is clear from the results that bureaucratic hurdle is the key factor for corruption. To reduce the probability of corruption there is a greater need for good governance. Bureaucratic hurdles could be reduced through simplifying the procedure for obtaining license and permit, and by allowing the firm to start its operation through less documentation and less interaction with public officials. Malfunctioning of the public officials could be reduced by increasing the quality of the institutions. The government should propagate the information that corruption is the social and economic evil and encourage honest officials and firms by economic and social rewards. There should be better tax compliance and tax law must be promoted and enforced properly. For proper enforcement of tax laws, there is a greater need for the functional institution of tax administration. As results indicate that crime also increases the probability of corruption, the government should take appropriate measures to reduce the chances of losses as a result of theft and robbery. As exported firms are less corrupted, so governments should provide subsidy for export promotion. The external audit also reduces the chance of corruption for the firms, so government and firms both should appoint qualified and experienced auditors by giving them efficiency wages. To improve firm performance in the low income nations we do not suggest corrupt practices. The benefits (regarding customs, taxes, licenses, regulation, services) that firms obtained through paying bribes to public official are either temporary or increase firm sale only in the short run, therefore we do not encourage corrupt practices and suggest that the government should take measures to reduce procedural hurdles in getting various services. The measures taken in this regard should be both demand and supply side oriented. Firm willingness to pay bribes to a public official to get things done is due to the result of only supply side anti-corruption policies. Demand-side anti-corruption measures should be taken as per law to reduce firm willingness to offer bribes. The individuals, communities and the government should play their role to reduce corruption.

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