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Socioeconomic Determinants of Corruption: A Cross Country Evidence and Analysis

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Abstract

Corruption has significantly contributed towards slow economic growth, terrorizes security, damages individual's trust and public confidence in the systems, and thereby, affect individuals' daily lives. The aim of the study is to empirically investigate socioeconomic determinants of corruption using panel data set of Developing Eight (D-8) countries and GMM estimation method. The results suggest that economic development, government size, income inequality, urbanization and education have statistically significant impact on corruption. An increase in economic development, government size and education level lowers the corruption, where as, skewed income distribution and urbanization enhance its level. However, inflation, economic competition and female labor force participation are found statistically insignificant. The study findings are based on data set for D-8 countries, which are all Muslim nations. Therefore, study's results should be taken with caution in formulating the policies. But, still, these results have important implications; economic managers should focus on the policies that promote education, economic development, less skewed income distribution and government size to control the corruption in the country.

Key Words: Corruption, Socioeconomic determinants, Panel data analysis, D-8 countries.

JEL Classification: C33, C36, D02, D40, D72, H8, K4

1. Introduction

The common and persistent global corruption significantly contributed towards low investment and thereby, decline in the pace of economic growth. It has also restrained the provision of public services and increased income inequality. Therefore, it is considered as the single greatest obstacle in the way

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of economic and social development. The World Bank (2004) estimates indicate that US$1 trillion were paid in bribes each year. Similarly, African Union estimated the cost of corruption about 25% of Africa's GDP (US$148 billion annually). Asia is the most corrupt region in the world, where 25 to 40 percent politicians and 15 to 33 percent public servants are corrupt (Jain, 2001). Pakistan has lost more than US$94 billion in corruption, tax evasion and bad governance during the last four years (Transparency International Pakistan, 2012). In addition, the occurrence of contemporaneous corruption scandals and increased degree of media attention played a significant role in forming the people's electoral behaviour. In result, some governments were thrown out of their office on the allegations of corruption. For example, collapse of Rajiv Gandhi's government in India, Chuan Leekpai's government in Thailand, Suharto and Abdurarahman Wahid's governments in Indonesia, Pakistan People Party and Pakistan Muslim League (Nawaz) governments in Pakistan and Genaral Sani Abacha's administration in Nigeria.

In 1996, the corruption issue was catapulted on the world stage with the World Bank president Wolfensohn's statement, "corruption is one of the greatest inhibiting forces to equitable development and to the combating of poverty". This statement highlighted the issue of corruption and placed it at the political and economic agenda of international organizations, political scientists and public economists. For example, World Bank Group President Jim Yong Kim stated that "Every dollar that a corrupt official or a corrupt business person puts in their pocket is a dollar stolen from a pregnant woman who needs health care; or from a girl or a boy who deserves an education; or from communities that need water, roads, and schools"[2]. Thus, corruption has not only lowered the quality of life, it has injured the democratic norms, violated human rights, and increased threats to social welfare (Das, Marie, & Parry, 2011).

Therefore, it is very essential to identify the socioeconomic determinants of corruption to address it effectively; as the advancement of effective anti-corruption policies is mainly based on the thorough investigation of corruption problem. Empirical literature on corruption has

[2] For detail see, World Bank Group President Jim Yong Kim address on December 19, 2013 on the event, "Speak Up Against Corruption".

been considerably piled up with the measurement techniques of corruption, developed during the decade of 1990s. The studies that investigated the determinants of corruption have generally emphasized the socioeconomic, political, judiciary and cultural aspects of a country. Therefore, it is essential to consider the corruption as a social deviation instead of defining it as an individualistic action. It is assumed that human behaviour is influenced by the sophisticated relations among social, political, economic and cultural structures of the society. Since, it is convenient to say that corruption behaviour of individuals depends on the circumstances, which not only include economic factors but also consider social elements. The majority of studies have analyzed the relationship between socioeconomic factors and corruption without addressing the issue of bi-causality between corruption and these factors, which results in endogeneity problem. Therefore, this study has considered the impact of variable on corruption by addressing the issue of endogeneity, using panel data for D-8 countries.

The rest of the study is organized as follows. Section 2 presents the review of existing literature. Section 3 provides theoretical background and analytical framework. Section 4 deals with data, panel data modeling and estimation methods. Section 5 presents empirical results along with their discussion. Section 6 ends with some conclusions and policy implications.

2. Literature Review

The study of corruption phenomena was initially confined to the disciplines of history, political science, sociology and criminology. According to these discipline scientists, corruption should be considered as the result of deviation from nation's social, political, legal and cultural framework, which sketches the individual behaviour. The first published research work on corruption that received world-wide attention is Rose-Ackerman (1975), and it became the focal point of economic managers and policy makers due to its increasingly observable connection to the economic performance. Literature on corruption analysis documented a number of studies that have investigated the causes of corruption.

2.1. Economic Determinants

The most important and interesting reality about corruption is that, it not only varies across countries but also with time within a given country, as Paldam (1999) found the strongest factor that lowers corruption is 'the move from poor to rich'. Because richer country can devotes more resources

towards the detection and prevention of corruption, and general conclusion of empirical research is that a nation's wealth is the most significant determinant of corruption, even though Kaufmann et al. (1999) and Hall and Jones, (1999) have questioned the relationship between corruption and per capita income. This negative association between income level and is supported by the findings of Treisman (2007) Shabbir and Mumtaz, (2007); Blackburn and Forgues-Puccio, (2010); Ata and Akif, (2011); Blackburn (2012); Dong and Torgler, (2012). The empirical literature also includes the studies, which deviate from the general conclusion and indicate a positive relation between income level and corruption such as Braun and Di Tella, (2004), and Frechette, (2001).

The government activities that results in restriction on economic freedom always breads corruption, so increase in economic competition reduces opportunities for economic rents and corruption. Ades and Di Tella, (1997) reported a negative correlation between economic freedom and corruption, which is further verified by the findings of Herzfeld and Weiss, (2003), Gurgur and Shah, (2005). Economic and social heterogeneity are also considered as determinant of corruption, as it indirectly affects the probability of detection. For example, You and Khagram, (2005) argue that "the poor are more vulnerable to extortion and less able to monitor and hold the rich and powerful accountable as income inequality increases". This implies that income inequality enables the richer groups to abuse their power for private benefits and corruption. Davoodi et al*.,* (1998) investigated the relationship between income inequality and corruption using Gini coefficient as a measure of income inequality, and found a positive correlation between corruption and income inequality. Li et al., (2000) also investigated the same relation and found that the nature of relationship between income inequality and corruption is not linear rather inverted U-shaped. This implies that lower income inequality is attached with high as well as low level of corruption. On the other hand, Husted, (1999) reported that income inequality has no significant impact on the level of corruption. Paldam, (2002) investigated the relation between income inequality and corruption and argued that a skewed income distribution may increase the inducement to make illicit gains/corruption. Brown et al., (2005) found no evidence in favor of positive relation between income inequality and corruption. Recently, Saha and Gounder, (2013) has investigated this relation in non-linear framework using Gini coefficient as a measure of income inequality, and concluded that higher income inequality contributes positively in the level of corruption.

The most important function of government is to provide public services like security, infrastructure and the consolidation of the legal system in a country. The literature on the relationship between government size and corruption presents different points of view; an increase in government size breads corruption as it increases the opportunities of rent-seeking for politicians and bureaucrats (Rose-Ackerman, (1978, 1999). This implies that a bigger government size increase the expected payoff of illegal activities and, as a result, give an incentive for more illegal activities, such as corruption (Kotera, Okada, & Samreth, 2012). Ali and Isse, (2003) also reported similar findings. In contrast, empirical literature includes some studies that suggest larger government size promotes a system of checks and balances, and strengthens accountability. Therefore, an increase in the government size lowers the level of corruption, as shown in case of developed nations. Empirical findings reported by Billger and Goel, (2009); La Porta, Lopez-de-Silanes, Shleifer, and Vishny, (1999) also support this viewpoint.

There are plenty of studies on corruption and its economic reasons but very few studies have focused on the relationship between inflation and corruption (Piplica, 2011). These limited number of studies found a strong relationship between corruption and inflation, but direction of causation is not unique. Some studies proposed that inflation causes corruption, whereas some claimed that corruption causes inflation. Braun and Di Tella, (2004) examined the relationship between inflation and corruption and found that inflation rate has positive and statistically significant impact on corruption. Tosun, (2002) also reported similar findings. Getz and Volkema (2001) mentioned that the existence of economic depressions due to inflation, unemployment and recession results in an increase in corruption. Because appearance of these problems in an economy is an important cause that generates distrust towards the central authority. Following Goel and Rich (1989), Goel and Nelson, (1998) used state unemployment rate to capture the macroeconomic influences on corruption. The results of the study indicate a positive relationship between state unemployment rate and corruption. Similar findings are reported by Saha, Gounder and Su, (2009).

2.2. Social Determinants

The literature on corruption also identified the role of socio-cultural factors in determining the level of corruption. The study in hand has focused the education, urbanization, and female participation in labour force as social determinants of corruption. Education is commonly viewed as a driver of

moral perspectives and actions (Hauk & Marti, 2002). Empirical findings of studies like Ali and Isse, (2003); Brunetti and Weder, (2003); and van Rijckeghem and Weder, (1997) reported a negative relationship between human capital and corruption. Truex, (2011) investigated the impact of education on corruption in Nepal and found a significant negative relation between educated Nepalis and corruption. Saha and Gounder, (2013) found that higher level of educational attainment intensively discourage the corrupt activities through increasing employment opportunities and equal income distribution. In contrast, Frechette, (2001) found a positive relation between schooling and corruption using panel data fixed effects model.

Another interesting variable of this brand is female labor force participation. Azfar et al., (2001) investigated the differential incidence of corruption by gender using cross-country data for 93 countries, and argued that a higher female labour participation lowers the level of corruption. Elbahnasawy and Revier (2012) also investigated the relation between female labor force participation and corruption found a significant negative correlation. In contrast, Shaw, (2005) explored this relation for Ukraine, and found that women tend to have a higher propensity to bribe to enter an educational institution and to bribe on exams. Thus, the relationship between gender and corruption remains unsettled.

Contrary to the established literature, Alam, (1995) argued that larger portion of variations in corruption can be explained by the differences in People's ability to counteract corruption. This ability is a function of specific and global factors, and urbanization is one of the global factors. Meier and Holbrook, (1992) argued that urbanization promotes conditions conducive to corruption. Because in urban environment, family and religion lose their control required to take countervailing actions against corruption. Billger and Goel, (2009) investigated this relationship and concluded that urbanization lowers corruption but not consistently throughout the conditional distribution. Dong, Dulleck, and Torgler, (2012) analyzed the impact of urbanization on corruption and reported that larger cities are more corrupt as compared to small ones.

3. Theoretical Background and Analytical Framework

The methodology of the study is primarily based on the work of Becker (1968), which argued that incidence of illegal behaviour has direct relation with the potential gains from illegal activity and inverse relation with

the probability of detection and the severity of punishment. Benefits of corrupt act are determined by the discretionary power of public official and economic rents associated with it, and its cost depends on probability of detection and punishment. Klitgaard, (1998) specified the corruption function as:

$$CORR = F(\overset{+}{DP}, \overset{+}{ER}, \overset{-}{AC}) \quad (1)$$

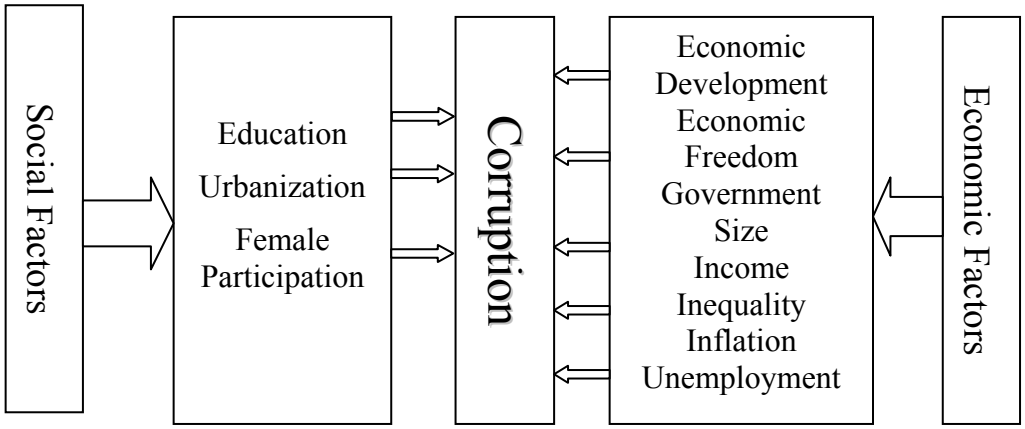
This function indicates that increase in discretionary power (DP) and economic rents (ER) promote corruption where as enhancement of accountability level (AC) reduces the corruption. It is theorized that regulations and delegation of power affects corruption through public official's discretionary power. The government size and economic competition influence corruption via economic rent. Nation's levels of education, economic development, urbanization, women participation, and inflation jointly determine the corruption through nation's accountability system. So, economic development, income distribution, economic freedom, government size, unemployment, and inflation are economic determinants of corruption. On the other hand, education, urbanization and female participation in labour are social determinants of corruption. Thus, socioeconomic determinants of corruption are shown in the Figure-1. The relationship between socioeconomic factors and corruption shown in the figure can be shown with the help of the following functions.

$$CORR = f\left(\overset{-}{ED}, \overset{-}{GS}, \overset{-}{EF}, \overset{+}{II}, , \overset{+}{IN}, \overset{+}{UN}\right) \quad (2)$$

$$CORR = f\left(\overset{-}{EU}, \overset{-}{FP}, \overset{+}{UR}\right) \quad (3)$$

Where, CORR shows the level of corruption, ED economic development, GS government size, EF economic freedom, II income inequality, IN inflation,

Figure-1: Socioeconomic Determinants of Corruption



UN unemployment rate, EU education, FP female participation rate in labor force and UR urbanization. Literature on socioeconomic determinants on corruption reported mixed findings. Hence, equation (4) is used to investigate the impact of economic factors on corruption.

$$CORR_{it} = \beta_0 + \beta_1\ ED_{it} + \beta_2\ GS_{it} + \beta_3\ IN_{it} + \beta_4\ II_{it} + \beta_5\ UN_{it} + \beta_6\ EF_{it} + \ \mu_{it} \quad (4)$$

Subscript i is used to present the country (i = 1, 2,…...., n) denotes the i^{th} country and (t = 1, 2,….,T) denotes the time and μ is an error term. The negative value of the coefficient of economic development ($\beta_1 < 0$) shows that corruption is inversely related with the level of economic development. The expected sign of the coefficient of government size is negative ($\beta_2 < 0$) because an increase in the size of government reduces corruption as it promotes a system of checks and balances, and strengthens accountability. The sign of inflation coefficient is expected to be positive ($\beta_3 > 0$) as an increase in general price level due to higher money supply, causes moral erosion and creates more opportunities for illegal and unethical behaviors like jugglery or cheating (Braun and Di Tella, 2004).

Income inequality and corruption also move in the same direction ($\beta_4 > 0$) because income inequality enables the richer to cluster to abuse their power for private benefits. The sign of the coefficient assumed that unemployment rate must be positive ($\beta_5 > 0$) because public officials might be offered more bribes during the periods of high unemployment because a greater number of individuals want favors in periods of economic downturns. The sign of the coefficient of economic freedom is expected to be negative ($\beta_6 < 0$), as greater

the barriers to entry and exit (faced by firms) raises the level of distortions existing in the competitive environment, and results in more corruption In addition, high barriers to international trade encourage private agents to bribe public officials, so trade openness increases the competition and transactions transparency, and lead to lower level of corruption.

We used equation (5) to estimate the impact of social factors such as education, urbanization and female participation in the labor force on corruption.

$$CORR_{it} = \alpha_0 + \alpha_1 ED_{it} + \alpha_2 EU_{it} + \alpha_3 FP_{it} + \alpha_4 UR_{it} + \varepsilon_{it} \quad (5)$$

Following Apergis, Dincer, and Payne, (2009), we included economic development measured by the real GDP per capita as a control variable in the analysis to minimize the omitted variable bias. The expected sign of education (EU) is negative ($\alpha_2 < 0$). This implies, literacy that development brings will increase the likelihood that an act of corruption will be discovered and punished Literature predicts that increase in female participation in the labor force (FP) lowers the level of corruption, so expected value of the coefficient of this variable is negative ($\alpha_3 < 0$). In contrast, the impact of urbanization (UR) on corruption is positive ($\alpha_4 > 0$), as greater concentration of the population in urban areas increases their discount rates, making them more eager to "jump the queue" via illegal (corrupt) means. In addition, there are also greater opportunities for interaction between potential bribe takers and bribe givers in urban areas, resulting in more corrupt deals.

4. Data and Empirical Methodology

The study has used the log of corruption perception index (CPI) to measure corruption, constructed by Transparency International (TI). This index is based on a 'poll of polls' showing the impressions of business people, the local population of relevant countries, and risk analysts, who have been surveyed. This index scaled the world's nations from 0 to 10. The higher value of scale indicates lower level of corruption and vice versa. This index is rescaled by subtracting country scores from 10 and higher values show higher perceived levels of corruption.

First and most empirically observed determinant of corruption is economic development or economic prosperity measured by the GDP per capita. Following Goel and Nelson, (2010), we used log of Purchasing Power Parity (PPP) adjusted Real Gross Domestic Product (GDP) per capita to

measure economic development from World Development Indicator (2013). The other variables for which data is taken from WDI are; government size measured by the log of government consumption expenditure, inflation measured by annual percentage change in general price level (consumer price index), urbanization measured by the percentage urban population of the total, female participation in the labor force measured by labor force participation rate, education measured by gross secondary school enrolment rate, income inequality measure by Gini index. The lowest value of Gini index is 0, which indicates perfect equality and highest 100 shows perfect inequality. The data on unemployment is collected from World Economic Outloook (WEO), an IMF publication. Following Dong et al., (2012), we have also used log of globalization index as a proxy for economic competition through openness. The data on this index is provided by Dreher (2006) and updated subsequently. Globalization index measures three main dimensions of openness: economic, social and political globalization. The value of the index varies between 0 and 100. Higher value of the index indicates higher degree of globalization and vice versa.

We assemble a panel data set consisting of D-8 countries covering the time period 1995-2013. Panel data sets are preferred by the social researchers due to greater information, as it combines the data for N cross-sections and T time periods. The panel data analysis is a good deal in addressing the multicollinearity problem. Besides, it addresses the issue of measurement error of various variables. The panel data models mostly used for the analysis are fixed effects model and the random effects model. The fixed effects model assumes that the unobservable country-specific effects are fixed; whereas random effects model (or error component model) assumed it to be a random disturbance that is distributed independently of the idiosyncratic or "remainder" disturbance that varies over time and across countries.

In examining the socioeconomic determinants of corruption, we estimated the following standard linear model of corruption to investigate the socioeconomic determinants of corruption.

$$CORR = \alpha + X\theta + \xi \qquad (6)$$

Where:

CORR = Level of Corruption

X = Set of socioeconomic variables, which includes:

X1 = Economic Development X2 = Economic Freedom

X3 = Income Inequality X4 = Government Size

X5 = Inflation rate X6 = Unemployment rate

X7 = Education X8= Female labor participation

X9 = Urbanization

Here, θ shows the slope coefficients of socioeconomic variables (from 1 to 9) and ξ is the error term. We used F-test to test the null hypothesis that all dropped dummy parameters are zero, against the alternative hypothesis that at least one dummy parameter is not zero. The p-value of the F-test supports to rejection of null hypothesis and concludes that we should include fixed effects in the model, which implies that intercepts are not same and fixed effects model is better than pooled OLS.

We initially estimated the panel data model coefficients using the random effects model. The value of the Hausman test's chi-squared statistic forced to reject the null hypothesis of no correlation between the regressors and the individual country-specific random effects. Thus, we abandoned the random effects model estimates in favour of fixed effects model estimates. The least square estimation method assumes exogeneity of regressors; the disturbances are not correlated with any regressors. The violation of this assumption creates the problem of endogeneity, which makes OLS estimators inconsistent. According to Kotera et al., (2012), the OLS estimator may be biased due to endogeneity issues resulting from reverse causality, omitted variables and measurement error. Following Mauro (1995), we examine the causality between corruption and socioeconomic determinants, and found reverse causality between corruption and income per capita. Literature mentioned that it is extremely difficult to find appropriate instruments for all variables (Kotera et al., 2012), thus we used GMM estimation. This estimation method uses internal (lagged) variables as the instruments to deal with this difficulty regarding appropriate instruments. In addition, it also controls the time invariant components (religion, geographic and historical factors), taking the first-difference. Griliches and Hausman (1986) pointed out that panel data with measurement error provides consistent estimators of the parameters without any external information such as validation or replicate data set. We also use the Wald-test for the testing that instruments are highly correlated with endogenous explanatory variables. Test of over identifying restrictions

(Hansen J-statistic) is used to test whether the extra excluded instruments are uncorrelated with the error term or not.

5. Empirical Results and Discussion

We have used GMM estimation method by opting two stages least square (TSLS) weighting matrix and cross-section weights (PCSE) robust covariance methodology to address the problem of cross-section correlation (period clustering). We estimated three models; economic determinants of corruption, social determinants of corruption and socioeconomic determinants of corruption. The p-value of Hausman test predicts that fixed effects estimates are better than random effects estimates. Therefore, we have reported only fixed effects model results. The p-value of Wald-test shows that instruments are highly correlated with the endogenous explanatory variable and J-statistic's p-value has confirmed the validity of instruments as well as estimation method.

5.1. Economic Determinants of Corruption

The results shown in column (1) of Table-1 indicate that all variables are significant except economic freedom and inflation. The signs of economic development and government size predict a negative relationship with corruption. The value of the coefficient of economic development indicates that 10% increase in the income per capita reduces the level of corruption by12.36%. This might be the result of rise in education, literacy rate and depersonalized relationship resulting from higher income per capita. Because each one increases the chances to notice and challenge the abuse of power (Treisman & Angeles, 2000). In addition, rise in per capita income make possible to allocate more resources for the detection and prevention of corruption. These findings are also supported by the data, which indicates countries having greater average value of GDP per capita as Malaysia (4592.22) and Turkey (6086.94) are seen to be less corrupt. The coefficient of government size predicts that 10% increase in the government size lowers the corruption level by 0.21%. Generally, developed countries and, Scandinavian countries particularly have larger government size and are the least corrupt, as per Transparency International various surveys.

Economic and social heterogeneity also determine the level of corruption, as it indirectly affects the probability of detection. Therefore, we test the hypothesis that income inequality has no impact on the level of

Table: 1 Socioeconomic Determinants of Corruption

Variable	(1) Economic	(2) Social	(3) Socioeconomic
Constant	4.3753 (2.751)***	3.3415 (12.231)***	2.6029 (3.703)***
Economic Development	-1.2365 (-3.021)***	-0.4231 (-4.011)***	-0.5691 (-4.829)***
Government Size	-0.0210 (-3.330)***	-----	0.0129 (1.257)
Economic Freedom	0.7473 (1.193)	-----	-----
Inflation	0.0004 (0.746)	-----	-----
Income Inequality	0.2401 (2.002)**	-----	0.2535 (2.387)***
Unemployment	-0.0072 (-3.833)***	-----	-----
Urbanization	------	0.0041 (2.194)**	0.0054 (3.541)***
Education	------	-0.0018 (-2.471)***	-0.0022 (-2.457)***
Female Participation	------	0.0010 (0.279)	0.0025 (0.7621)
R-squared	0.9155	0.8965	0.9044
Adjusted R-squared	0.8921	0.8878	0.8945
J-statistic	3.6575	3.9124	3.5216
(P-Value)	(0.3009)	(0.4179)	(0.6201)
Wald-Test (P-Value)	(0.000)***	(0.0000)***	(0.000)***
Observations	139	141	139
Hausman Test Stat.	28.0780	21.3789	84.8067
(P-Value)	(0.0001)***	(0.0003)***	(0.000)***

The asterisks ***, **, and * indicate 1%, 5%, and 10% level of significance, respectively.
In parentheses, robust t-statistics based on cross-section weights (PCSE) are reported.

corruption. We found a positive relationship between income inequality and corruption, which implies higher income inequality breads more corruption. The results show that 10% increase in income inequality increases the level of corruption by 2.4%. As it is argued that income inequality enables the richer groups to abuse their power for private benefits and become corruption. The results of the study indicate an inverse correlation between corruption and

unemployment. This implies that more employment results in higher corruption. The results show that 10% increase in employment (or decrease in unemployment) increases the corruption by 0.07%. This result is opposite to the empirical findings of previous studies such as Goel and Rich (1989), Goel and Nelson, (1998b), and Saha, Gounder and Su, (2009b). In addition, it is mentioned that if high unemployment is due to structurally high joblessness, and is further correlated with low income of public officials, then, unemployment may be positively correlated with the incidence of corruption. Therefore, unemployment in the sample countries is not result of structurally high joblessness; rather it is due to poor prevailing economic conditions, lack of education and relevant technical skills, social and demographic norms, and poor law and order situation prevailing in the countries. Besides, all sample countries are developing Muslim countries, so people are not able to offer bribes during unemployed period due to low income but after getting job, people make bribes and misuse their offices for higher designations and highly paid jobs. Moreover, social values of poor people are more religiously based than those of rich ones; so they are more reluctant to offer illegal payments for jobs than richer one.

5.2. Social Determinants of Corruption

We have estimated the model of corruption considering only social factors. Following Saha, Gounder, Campbell, and Su, (2014), we have included the log of GDP per capita as a control variable in the regression. The results are reported in the columns (2) of the Table 1. Almost, all variables have expected sign and significant except female labor force participation.

The results shown in column (2) indicate that urbanization has positive impact on corruption and the value of the coefficient of urbanization predicts that 10% increase in the rate of urbanization increases the corruption by 0.04%. The general perception is urbanization lowers the control of family and religion over norms, required to take countervailing actions against corruption, so raises the level of corruption. According to Dong, Dulleck, and Torgler, (2012), larger cities are more corrupt as compared to small ones. This might be due to larger scale of economic activities and more varied in scope in larger cities that result in a higher level of government contacts. Moreover, in larger cities, government officials may be less personal than smaller cities which may reduce the opportunity costs of bribing (Mocan, 2008).

The coefficient associated with education indicates that 10% increase in the secondary school enrolment lowers the level of corruption by 0.02%. The coefficient of female labor force participation is insignificant, as female labor force participation in the sample countries is very low such as 16% in Iran, 18.8% in Pakistan and 22.8% in Egypt; and highest one is 58.6% in Bangladesh. On the other hand, female labor force participation in least corrupt countries remained above 70%; for example 75% in Denmark, 73.9% in Norway and 71% in Finland. Similar findings are reported by the Ali and Isse, (2003); Brunetti and Weder, (2003); Billger and Goel, (2009); Truex, (2011) and Saha and Gounder, (2013).

We have combined the important economic factors with social factors to explore the impact of socioeconomic factors on corruption. The results are reported in the columns (3) in the Table 1. The results indicate that all variables have expected sign and significant except government size and female labor force participation. The remaining results are almost similar in terms of sign and significance. Thus, it is concluded that economic factor as well as social both are important to affect the level of corruption in D-8 countries, but intensity of economic factors is greater than the social factors. So, government should focus the economic factors more as compare to social factor to curb the corruption.

6. Conclusions and Policy Implications

We have analyzed the impact of socioeconomic factors on corruption using the panel data for developing eight countries for the period 1995 to 2013. We have measured the corruption level by the corruption perception index prepared by the Transparency International. The list of socioeconomic variables that affect corruption includes economic development, economic freedom, government size, unemployment, inflation, income inequality, education, urbanization and female labor force participation. Literature documented the inverse relationship between economic development, economic freedom, government size, education, female labor force participation and corruption, whereas variables inflation, unemployment, income inequality and urbanization have direct relationship with corruption.

We estimated fixed effects and random effects panel data models by GMM method to address the endogeneity problem, which arises due to reverse causality between corruption and income per capita. The p-value of Hausman test predicts that fixed effects estimates are better than random effects estimates. The p-value of Wald test confirms that instruments are

highly correlated with the endogenous explanatory variables; and the p-value of J-statistic indicates that instruments are uncorrelated with the error term. In GMM method, Hansen J-statistic is also used to test the over-identifying restrictions in the model.

The empirical results indicate that 10% increase in the income per capita reduces the level of corruption by 5.69%, as rise in per capita income makes it possible to allocate more resources for the detection and prevention of corruption. The countries in the sample such as Malaysia, Turkey and Egypt are less corrupt than Bangladesh, Pakistan and Nigeria, because of higher income per capita. The coefficient of income inequality indicates 10% increase in income inequality increases the level of corruption by 2.53%. The skewed income distribution enables the richer groups to abuse their power for private benefits and become corrupt. The value of the coefficient of urbanization variable predicts that 10% increase in the rate of urbanization increases the corruption by 0.05%. This might be the result of urban environment that affects the family and religion control over norms. Urbanization lowers the control of family and religion over norms required to take countervailing actions against corruption, so raises the level of corruption. The value of the coefficient of education indicates that 10% increase in the secondary school enrolment lowers the level of corruption by 0.02%. The value of the magnitude of the coefficient is small, that might be due to lower enrolment rate in the sample countries than that in the developed nations; for example, the sample average value of secondary school enrolment in Nigeria, Pakistan and Bangladesh is 30.28, 30.60 and 46.8, respectively.

The empirical findings of the study have important implications for policymakers of developing eight countries in dealing with policies to curb corruption. Economic development has adverse impact on corruption, so to achieve further development, it is necessary to efficiently utilize funds which are used inefficiently because of corruption. Another worthy mention implication of the study is that increase in the government consumption expenditures reduces the corruption, so economic managers of the sample countries should focus the government size as well in reducing the corruption level. Study's results also indicate that skewed income distribution enhances the level of corruption; government should also focus the policy options that reduce the income gap between poor and richer to properly address the issue of corruption in these nations. Findings of the study also indicate that secondary school enrolment adversely affects the corruption level, thus, it is

essential for policy designers to increase the education expenditures to curb corruption, which are much smaller than developed nations. Last implication of the study is that economic managers should provide the basic facilities like education, health and sanitation to rural areas, as these are the main incentives for rural immigrant to restrict the rural to urban migration.

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Appendix

Table A1: Summary of Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	No. of Obs.
CORR	1.945012	1.974081	2.231089	1.543298	0.165077	151
ED	3.603734	3.590104	4.169517	2.910277	0.371694	152
EF	1.712568	1.726691	1.893373	1.4146	0.111934	152
TO	4.064593	3.956168	5.395475	3.336823	0.53224	152
UN	8.415571	8.3	23.9	2.38	4.067001	152
IN	13.11142	8.896757	88.1077	0.583308	16.54337	152
GS	9.128232	10.36468	13.19888	4.257172	2.682308	148
II	4.124004	4.112735	4.267597	3.92888	0.099879	147
EU	3.972464	4.086273	4.485729	3.146315	0.395512	149
UR	48.84917	45.1101	73.362	21.693	15.17839	152
FP	36.22035	37.35	60.1	11	15.6162	152

Source: calculated by the author.

Table: A2 Summary of Correlation Coefficient

	CORR	ED	EF	TO	UN	IN	GS	II	EU	UR	FP
CORR	1										
ED	-0.7822***	1									
EF	-0.6348***	0.4899***	1								
TO	-0.6495***	0.4970***	0.6475***	1							
UN	0.3170***	0.0246	-0.1014	-0.1747**	1						
IN	0.0410	0.1653***	-0.00177	-0.1596*	0.1091	1					
GS	-0.4866***	0.7738***	0.3421***	0.3400***	0.1496*	-0.0531	1				
II	0.3781***	-0.4365***	-0.2731***	-0.5510***	-0.2893***	-0.1846**	-0.1411*	1			
EU	-0.4743***	0.7014***	0.118336	0.1459*	0.0281	0.0722	0.8156***	-0.0812	1		
UR	-0.6574***	0.9251***	0.4375***	0.5381***	0.2192***	0.2132***	0.6828***	-0.6663***	0.5690***	1	
FP	0.0675	-0.3795***	0.12806	0.3353***	-0.3266***	-0.1565*	-0.1979**	-0.0698	-0.1794**	-0.2922***	1

Source: calculated by the author. The levels of significance 1%, 5% and 10% are shown by ***, ** and *, respectively.

Figure: A1 Economic development and Corruption

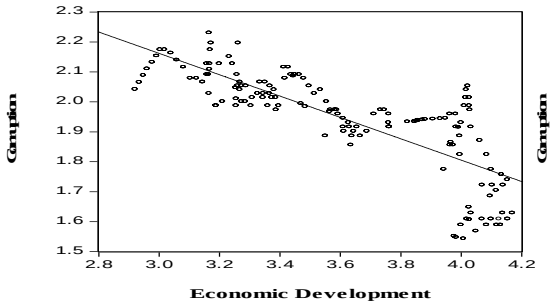

Figure: A2 Economic Freedom and Corruption

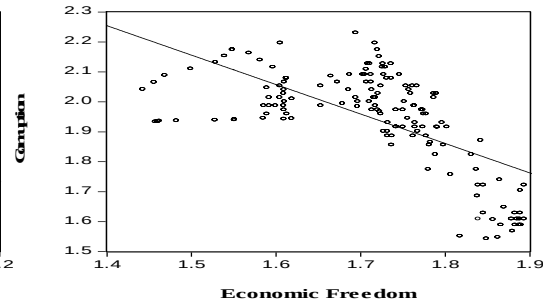

Figure: A3 Government Size and Corruption

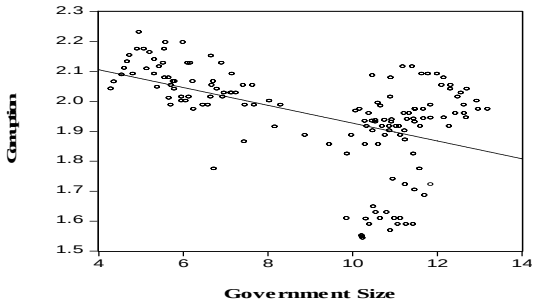

Figure: A4 Unemployment and Corruption

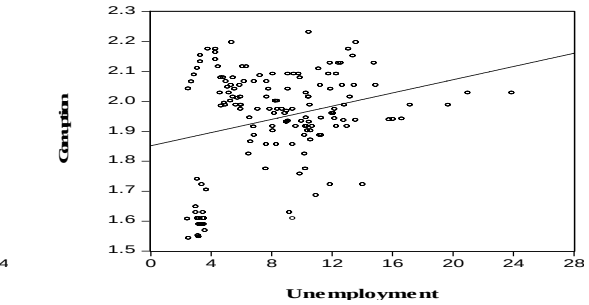

Figure: A5 Income Inequality and Corruption

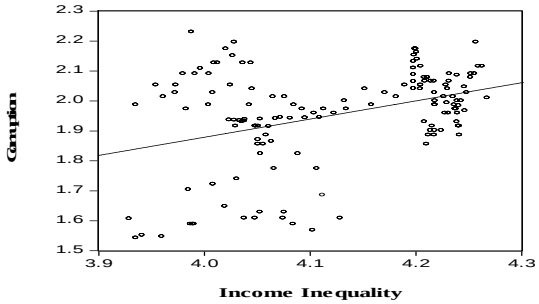

Figure: A6 Inflation and Corruption

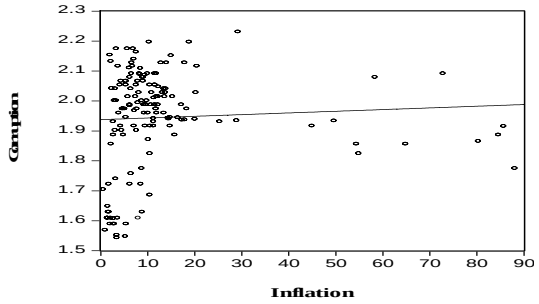

Figure: A7 Education and Corruption

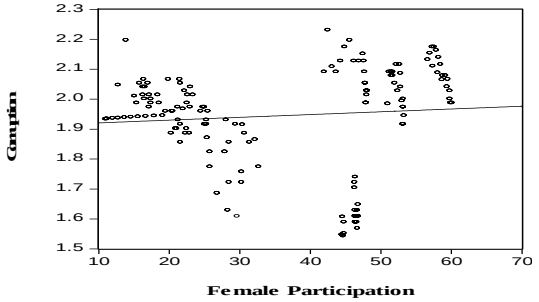

Figure: A9 Female Participation and Corruption

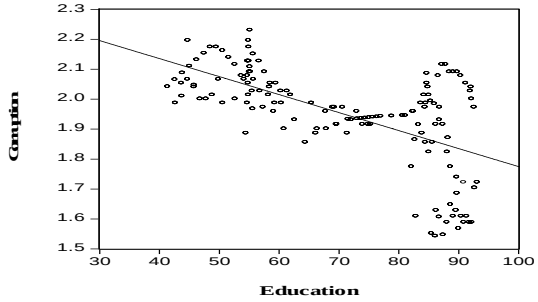

Table A3: Economic Determinants of Corruption

	Common Effects		**Fixed Effects**	
	PLS		**PLS**	
Variable	(1)	(2)	(3)	(4)
Constant	2.9725 (7.908)***	3.7970 (37.977)***	3.1848 (3.252)***	3.3687 (3.200)***
Economic Development	-0.3585 (-12.353)***	-0.3994 (-13.908)***	-0.4896 (-1.682)*	-0.6416 (-2.187)**
Government Size	0.0124 (4.282)***	0.0163 (4.485)***	-0.0212 (-2.263)**	-0.0262 (-2.880)*
Economic Freedom	-0.3687 (-5.039)***	-0.3877 (-6.406)***	-0.1209 (-0.499)	0.0954 (4.048)***
Inflation	0.0016 (5.069)***	0.0017 (4.665)***	4.6300 (0.104)	-1.2300 (-0.029)
Income Inequality	0.1621 (2.198)**	------- -------	0.2386 (2.118)**	0.1795 (1.705)*
Unemployment	0.0114 (6.017)***	0.0097 (6.762)***	-0.0068 (-2.504)***	------ ------
R-squared	0.8304	0.8254	0.9198	0.9243
Adjusted R-squared	0.8231	0.8192	0.8980	0.9046
F-stat. (P-value)	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Jarque-Bera (p-value)	(0.4429)	(0.4412)	(0.1463)	(0.0692)
CS F-Stat (P-value)	--------	--------	(0.000)***	(0.000)***
CS Chi-S Stat (P-value)	--------	--------	(0.000)***	(0.000)***
Observations	146	147	146	146

Table A4: Pairwise Dumitrescu Hurlin Panel Causality Tests

GDP Per Capita does not homogeneously cause corruption	12.3990	9.56443	0.0000
Corruption does not homogeneously cause GDP Per Capita	5.20716	2.68134	0.0073
Income Inequality does not homogeneously cause corruption	14.2920	10.6185	0.0000
Corruption does not homogeneously cause income inequality	3.07336	0.55423	0.5794
Economic freedom does not homogeneously cause corruption	3.97148	1.49871	0.1339
Corruption does not homogeneously cause economic freedom	1.30259	-1.05562	0.2911
Government size does not homogeneously cause corruption	7.53753	4.69579	0.0000
Corruption does not homogeneously cause government size	1.29852	-1.05027	0.2936
Education does not homogeneously cause corruption	4.43436	1.87787	0.0604
Corruption does not homogeneously cause education	6.73878	4.03362	0.0000
Unemployment does not homogeneously cause corruption	4.33303	1.84473	0.0651
Corruption does not homogeneously cause unemployment	1.19823	-1.15550	0.2479
Urbanization does not homogeneously cause corruption	13.4006	10.5231	0.0000
Corruption does not homogeneously cause urbanization	2.69084	0.27304	0.7848
Female participation does not homogeneously cause corruption	7.35850	4.74033	0.0000
Corruption does not homogeneously cause female participation	3.34149	0.89576	0.3704
Inflation does not homogeneously cause corruption	2.08469	-0.30709	0.7588
Corruption does not homogeneously cause inflation	2.12670	-0.26688	0.7896