Corruption, Political Stability and Economic Growth

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This paper gives insight of the role of political stability in investigating the two competing hypotheses in Developing Eight Muslim countries, and also investigates whether conditional liaison between corruption and political stability matters or not. The empirical findings indicate that investment, population and political stability play positive role in promoting economic growth. Corruption not only impact growth but also influenced by the institutional quality that a nation experiences. Corruption acts as sands in the wheels in the nations having higher degree of political stability, and greases the wheels in less politically stable countries such as Nigeria and Pakistan. Thus, political stability is conducive to growth, as it reduces the social unrests, political turmoil, and encourages investment, and there by economic growth.

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1. INTRODUCTION

The institutional efficiency played a very significant role in determining the corruption-growth relationship, because corruption phenomenon is a reflection of nation's socioeconomic, cultural and political values, and thereby is product of poor policy decisions. According to Djankov, *et al.* (2003), "corruption can be a result of bad policy options or inefficient institutions that are put in place to collect bribes from individuals seeking to get around them". So, corruption can be defined as, "unfair and illegal activities of a person in power". These activities include bribes, rent seeking or any other one that is associated with the power.

Bribes and rent-seeking are not similar, because second one is the result of government's interference in the economy, and hence become socially costly [Tollison (1997)]. On the other hand, bribes are only money transfers from one person to other. There are many other activities that do not include transfer payments, but are named as acts of illegal activities. For example, a government servant that claims to be a sick but enjoys the vacations. It does not include illegal payment but is a misuse of public office for personal benefits. Similarly, country's president advice to build an airport near to his

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native residency does not show money transfers but is an abuse of discretionary power. Thus, according to Tanzi (1998), "acts of corruption include bureaucratic (petty) or political (grand), cost-reducing or benefit enhancing, briber-initiated or bribe-initiated, coercive or collusive, centralised or decentralised, predictable or arbitrary and involving cash payments or not. Undoubtedly, other classifications could be added to this list".

The corrupt acts impacts nation's socioeconomic and political structure directly and indirectly through institutional setup. It influenced the efficiency of public office bearers, distorted public policies and hindered the execution of law and order. It slowed down the pace of socioeconomic development through resources misallocation. It weakened the national judicial system, denied victims and escorted to the violation of basic human rights in many countries. Consequently, it corroded the transnational community's abilities to deal with crimes and terrorism. Therefore, estimation of corruption cost and its remedial measures become the top most agenda of many international development organisations. For example, World Bank estimated the figure of bribes about US$1 trillion in 2004 and African Union estimated the annually corruption cost in Africa about 25 percent. Transparency International (TI) started ranking the world nations on corruption scale in 1995. TI surveys indicate that none of the nation on world globe if free from this social evil and issue is more severe in developing countries as compare to developed ones.

Almost, all developing countries are ranked as most corrupt ones in the world and especially located in Asia and Africa. In Asia twenty-five to forty percent politicians and fifteen to thirty-three percent public office holders are corrupt [(Jain (2001)]. In Egypt, about US$57.2 billion illegal money were taken out of the country through illegal means during 2000-2008 [Global Financial Integrity Organisation (2011)]. Indonesia paid US$238.6 million in the form of corruption in 2011 [Ezra (2012)]. Besides, Indonesian people and enterprises made expenditures in the form of illegal payments are about 1 percent and 5percent of their monthly income, respectively. According to Transparency International Pakistan (2012), "Pakistan paid cost of in corruption, tax evasion and bad governance more than US$94 billion during the last four years of Pakistan People Party (PPP) tenure". The illegal payments figure reached to Rs.3 trillion during the PPP regime, and it does not include money robbed from mega scandals like Hajj scam, Pakistan Steel mills and Rental Power Plants [Transparency International (2011)]. Country Reports on Human Rights Practices (2012) estimated the government money looted in Nigeria is about US$6.8 billion due to widespread corruption and entrenched inefficiency. In addition, some governments have resigned in these sub-continents due to corruption allegations e.g. Rajiv Gandhi's government in India, Chuan Leekpai's government in Thailand, Suharto and Abdurarahman Wahid's governments in Indonesia, Genaral Sani Abacha's administration in Nigeria, Pakistan Muslim League (N) and Pakistan People Party governments in Pakistan.

Developing Eight organisation (D-8) includes all Muslim countries such as Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkey. Almost 60 percent population of Muslim world and 13 percent of whole world reside in these countries. Total GDP of these nations is about $2.88 trillion and workforce is about 385 million. All religions including Islam do not permit the misuse of public funds and office for personal benefits, but corruption level in D-8 countries is very high. Bangladesh,

Indonesia and Nigeria, were ranked the most and Pakistan second most corrupt nations in the world by TI various surveys. Thus, it is very essential to investigate the impact of corruption on economic growth, especially focusing the Muslim world. Corruption-growth debate hypothesised that corruption 'greases-the-wheals' or 'sands-the-wheals' of bureaucracy. Corruption promotes economic growth when it helps to remove the bureaucratic rigidities and illegal small amount of money has much power to overcome administrative barriers and hence encourage growth [Leff (1964)]. This implies that bribes acts as speed money or trouble-saving device, and help to increase investment and growth. Second stream of debate claims that corruption is poisonous to economy's health, as it makes officious procedures sluggish, expensive and unproductive, and slows down the economic growth by redirecting resources to wasteful activities. In addition, it hampered the pace of nations' economic growth facing the problem of political stability.

The empirical research on bureaucratic efficiency provides mixed findings. For example, Acemoglu and Verdier (1998) have justified some forms of corruption that are required to implement property rights. The empirical findings of Knack and Keefer (1995) authenticate that the institutions required to protect property rights are indispensable to investment and growth.

But Ades and Di Tella (1997) documented the results, which support the hypothesis corruption acts as 'sand-in-the-machine'. Mo (2001) empirical findings show that corruption creates socio-political instability and uncertainty, which hurts economic growth. Corruption impacts government projects and thereby economic growth [Mauro (1995)]. Pellegrini and Gerlagh (2004), and Dridi (2013) identified political stability as a transmission channels through which corruption adversely impacts economy's growth.

Thus, we have empirical investigated the impacts of corruption on growth, through political stability in developing eight Muslim countries considering the need of the time.

The rest of the study is organised as follows. Section 2 presents the review of literature. Section 3 theoretical background and model specification. Section 4 gives detail of data description. Section 5 provides empirical findings and discussion. Section 6 deals conclusions and policy implications.

2. LITERATURE REVIEW

The number of studies on corruption-growth relationship has significantly increased but their findings are heterogeneous due to differences in measurements of corruption and growth, estimation techniques, country coverage, and sample periods. Some early studies argued that corruption promote economic growth due to its potential to enhance effectiveness. For example, Huntington (1968), considered corruption as the necessary lubricant (grease) required to lubricates the jammed wheels of bureaucracy, which might not be possible due to higher holdups of bureaucracy in highly-regulated economies, as had been observed in the 1870s and 1880s in USA, where railroad, utility and industrial corporations' corruption faster the pace of growth. Corruption promotes growth by removing the bureaucracy's malfunctioning, as Lui (1985) developed a model and argued that corruption reduces time cost efficiently (queue hypothesis), but it is empirically contested by Kaufmann and Wei (1998). In the same wisdom, Acemoglu and Verdier (1998) proved that corruption acts as a piece-rate paid to officials for their speedy

services (speed money hypothesis). Bailey (1966) documented that corruption improves administrative services through enhancement of public officials' quality and thereby, enhance growth. Another established notion among economists is that corruption lead to misallocation of resources and performed as sands in the wheels of bureaucracy. Besides, corruption itself shows the symptoms of basic institutional inadequacies, which provide chances to politician to maximise illegal payments through increasing the administrative bottlenecks [Myrdal (1968)].

Empirically, Ehrlich (1999) documented negative relationship between corruption and per capita income across different stages of economic development. It is argued that relationship between corruption and economic performance is the result of endogenous outcome of competition (between growth-enhancing and socially unproductive investments) and its reaction to exogenous factors (especially public involvement in private economic affairs). A number of studies reported similar findings such as Keefer and Knack (1995), Mauro (1997), Tanzi and Davoodi (1997), Bardhan (1997) Hall and Jones (1999), Sachs and Warner (1997), Wei (2000), Lambsdorff (2003a, 2003b), Khwaja and Mian (2005), Johnson, *et al.* (2011) Ahmad, *et al.* (2012).

However, some researchers put questioned on the robustness this empirical relationship between corruption and economic growth, as findings of a number of studies not reported a significant relationship and is quite sensitive to the inclusion of other factors important to growth. For example, Brunetti, Kisunko, and Weder (1998) failed to discover any significant relationship between corruption and economic growth. Abed and Davoodi (2000) reported that corruption becomes statistically insignificant with inclusion of structural reforms index in the regression. Mo (2001), Pellegrini, and Gerlagh (2004) and Pellegrini (2011) documented similar findings that corruption coefficient become insignificant after controlling the effects of other determinants of growth such as investments, human capital, openness, and political instability.

Economists' recent view on this relationship is that impact of corruption on growth can't be explained without considering the role of nation's institutional framework. Empirical findings of various studies argued that corruption-growth relationship is non-linear and it varies across countries depending on performance of their institutional setting. For example, Scully (1988) documented the role of informal institutions, which are statistically significant to explain the inter-country differences in growth rates. Mendez and Sepulveda (2005) reported a non-monotonic relationship between corruption and economic growth, and dependent on nation's degree of political freedom. Aidt, Dutta, and Sena (2008) documented negative correlation between corruption and growth in countries having higher institutional performance and zero impact where quality of institutions in poor. Méon and Weill (2010) argued that corruption is less harmful in nations exercising less effective institutional structure. This finding is supported by the results of Heckelman and Powell (2010).

Vaal and Ebben (2011) developed a model to incorporate the institutional role in explaining corruption-growth relationship, and reported that relationship becomes ambiguous when institutional variables political stability, property rights and political systems are included in the regression. But, corruption lowers growth, when degree of political stability or property rights protection exceeds some threshold level. Ahmad, *et al.* (2012) examined the corruption-growth relationship using panel data set for 71

countries and GMM. Empirical findings reported that corruption level to be zero is not essential to maximise growth, nature of relationship between corruption and long-run growth is hump-shaped, and public institutions' quality is very important for long run economic growth. Thus, it is acknowledged that the interaction between corruption and institutional factors determine the way corruption impacts growth. The review of the existing theoretical and empirical literature indicates that it is not clear, how corruption-growth relationship is affected by the quality and structure of underlying institutions. It is assumed that corruption influences the effects of institutions on the economy such as burden imposed on the productivity of input provided by the public sector, and hence impacts on economic growth [Acemoglu and Verdier (2000); Aidt (2009); de Vaal and Ebben (2011); Rajkumar and Swaroop (2008)].

The existing literature generally lacks in explaining the explicit role of institutions, especially political stability in corruption-growth relationship, and especially focusing on Muslim world separately. Thus, we have investigated the corruption-growth relationship taking into account the effect of corruption, political stability and interaction of both on economic growth in D-8 countries to fill the existing gap in literature on corruption. Because, by doing so, one will be able to understand the corruption-growth association in existing institutional framework of Muslim World. It is also important, as good understanding of how corruption affects economic performance is very essential to formulate and implement the effective development policies.

3. THEORETICAL BACKGROUND AND MODEL SPECIFICATION

Political scientists and economic philosophers have a common opinion that corruption retards growth by misallocation of resources and promotes it through overcoming the administrative rigidities. Last 35 years' theoretical and empirical literature on corruption debate concluded that, on one side corruption reduces the speed of economic growth by diverting the resources from public gains to private ones and consequently deadweight loss to society [Shliefer and Vishny (1993); Mauro (1995); Tanzi (1997)]. Alesina (1992) argued that corruption retards growth by discouraging private investment (as it increases the administration cost), creating social contents and political instability. Ehrlich (1999) documented adverse effect of corruption on per capita income across different stages of economic development. The author argued that corruption-growth relationship is an endogenous effect of competition between growth-enhancing and socially unproductive investments, and its response to exogenous factors (especially government involvement). Keefer and Knack (1995), Sachs and Warner (1997), and Hall and Jones (1999) also reported similar findings. According to Pellegrini and Gerlagh (2004) did not reported direct statistically significant impact of corruption on growth once other relevant factors are controlled, but has indirect effects through investment, schooling, trade policies and political stability. Kaufmann, Kraay, and Zoido-Lobaton (1999b), Neeman, Paserman, and Simhon (2004) and Welsch (2004) also reported similar findings.

On the other hand, corruption also promotes growth by surmounting the government inefficiencies at lower costs [Huntington (1968); Friedrich (1972)]. It is also argued in favor of corruption views bribery that it acts as speed money, illegal payments, which speed up the administrative procedures. Lui (1985) model of corruption minimises

the costs of "standing in line" by using bribes but empirical validity of this hypothesis was contested by Kaufman and Wei (1998). Barreto (2001) found significantly positive impact of corruption and GDP per capita.

North (1990) argued that institutional role (political stability, quality of government, independent judicial system, political rights, property rights etc.) is very essential in determining the nation's economic performance in the long-run. Many researchers modified the above mentioned growth models to investigate theoretically and empirically impacts of institutional development on economic growth. Some studies uses corruption or corruption control to measure institutional performance. Corruption directly impacts growth through factor productivity and indirectly via physical and capital investment. Swaleheen (2012) investigated the impacts of corruption and political stability on growth using the interaction term between absence of corruption and average of the annual changes in corruption. Ahmad, *et al.* (2012) explored the linear quadratic empirical corruption-growth relationship. Empirical findings show that a reduction in corruption level raises the growth rate in an inverted U-shaped style.

3.1. Model Specification

Following Becker (1968), Polinsky and Shavell (1979, 1984) developed a model to analyse the individuals' behaviour to be a corrupt. They argued that expected gains must be greater than expected cost of corruption for its incidence. Two competing hypotheses whether corruption 'sands the wheels' or 'greases the wheels' of bureaucracy emerge from the corruption-growth debate. Following Solow (1956) and Mo (2001), we used standard production function to investigate the corruption-growth relationship as follows:

$$Y_{it} = A_{it}F(K_{it}, L_{it}) \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (1)$$

Where Y_{it} is the total output, T_{it} is total factor productivity, K_{it} is the capital stock and L_{it} is the total labour in the country i at time period t. Adelman (1961), identified two components (growth and development) that influence the development of an economy. Growth components include the growth rates of inputs (capital and labour) and development ones are social and technological changes, which are related to the forces that determine total factor productivity growth. Total factor productivity (TFP) growth measures the variations in output due to technological changes, efficiency improvements, and all other factors' growth not included in inputs. Therefore, it is rational to assume that corruption adversely effects efficiency achieved from technological and efficiency improvements. Thus, corruption impacts growth through TFP growth and growth rate function becomes as below in Equation (2).

$$GR = F(a_{it}, IY, GL) \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (2)$$

Where GR indicates the growth rate of real output, a_{it} is the total factor productivity, IY shows the investment-output ratio, and GL is the growth rate of labour. Levine and Renelt (1992) identify the factors, which are robust in determining the economic growth such as share of investment in GDP, population growth rate, initial level of real GDP per capita, and human capital. The first two factors are considered as growth component, whereas the last two are related to the development component. Ahmad, *et al.* (2012) included a

set of conditioning variables in the model such as government expenditure, external competitiveness, population growth rate, primary school enrolment, secondary school enrolment rate, foreign direct investment and risk-to-investment, corruption, and institutional quality indicators for determining the rate of productivity growth. In addition, they estimate long-run growth as a linear-quadratic function of corruption to capture the growth-enhancing and growth-reducing effects of corruption on growth, instead of using interaction term between corruption and institutional quality indicators in the growth equation. But Meon and Sekkat (2005) argued that two competing corruption hypotheses can only be tested by using interaction term between corruption and institutional quality in the model. Thus, we included the interaction term between corruption and political stability in the model to test the hypotheses whether it promotes or retard the economic growth as below in Equation (3).

$$a_{it} = f\left(CORR_{it}, X_j, \text{PS}, CORR_{it} \times \text{PS}\right) \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (3)$$

Where $CORR$ is the level of corruption; X_j is the j conditioning variables such as investment-output ratio, Government expenditure, population growth rate and education; PS is political stability and $CORR \times PS$ is the interaction term between corruption and political stability. Combining Equation (2) with Equation (4), we get the Equation (4) without interaction term and (5) with interaction term for estimation.

$$GR_{it} = \alpha_0 + \alpha_1 CORR_{it} + \alpha_2 PS_{it} + \sum \beta_j X_{ijt} + \mu_{it} \qquad \dots \qquad \dots \qquad \dots \qquad (4)$$

The dependent variable (GR_{it}) is the growth rate of GDP per capita, and explanatory variables are corruption ($CORR_{it}$), political stability (PS_{it}), and set of control variables (X_{ijt}). Following Mo (2001) and Pelligrini and Gerlagh (2004), we used four control variables such as government expenditures, investment-output ratio, population growth rate and education[1] to analyse the effect of corruption on growth, thus:

X_1 = Government expenditure X_2 = Share of investment in output
X_3 = Population growth rate X_4 = Education

Subscript i is used to present the country ($i = 1, 2,\dots\dots, n$) and t is used for time ($t = 1, 2,\dots\dots, T$), and μ is an error term. The focus of study is on the impact of corruption on growth, so α_1 is the coefficient of main interest in this regression. The positive sign of the coefficient of corruption ($\alpha_1 > 0$) supports the hypothesis that corruption 'greases the wheels'; whereas its negative sign ($\alpha_1 < 0$) implies that corruption 'sand the wheels'. The expected sign of the coefficients of political stability is positive ($\alpha_2 > 0$) that implies political stability enhances the economic growth. De Vaal and Ebben (2011) demonstrated that political stability is a very essential element of the institutional framework, which affects production and hence growth. A certain level of political stability is a necessary condition for production and growth; as it encourages trust and confidence required to facilitate investment and production.

The coefficient of population growth captures the impact of demographic growth on economic growth. Empirical literature predicts that effect of demographic growth on growth rate of GDP per capita is negative. This implies that higher population growth

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[1]Education is also used as a measure of human capital [see, Mina and Ndikumana (2008)].

rate retards the GDP per capita growth rate. According to Mankiw, *et al.* (1992), the impact of human development measured by the education is positive on growth rate of GDP per capita, and the expected sign of the education coefficient is positive. The expected sign of the investment-output ratio is also positive that implies increase in investment-output ratio promotes economic growth. Lastly, following Mauro (1995) we have control the impact of government expenditure that is expected to be negative.

Following Meon and Sekkat (2005), the study in hand included the interaction term in Equation (4) to test the 'grease the wheels' or 'sand the wheels' hypotheses.

$$GR_{it} = \alpha_0 + \alpha_1 CORR_{it} + \alpha_2 PS_{it} + \alpha_3 (CORR_{it} \times PS_{ik}) + \sum \beta_j X_{ijt} + \mu_{it} \qquad \ldots \qquad (5)$$

The parameters of interest in the regression are α_1 and α_3. Under 'grease the wheels' hypothesis, corruption should have a positive impact on growth if the quality of institution such as political stability is very low. With poor institutional quality α_1 should be positive for corruption to have a positive impact on growth. On the other hand, with higher political stability the impact of corruption should become negative, and it supports the 'sand the wheels' hypothesis. In order to get such an impact, α_3 should be negative. Hence to hold the hypothesis i.e., corruption 'grease the wheels' α_1 should be positive with α_3 should be negative ($\alpha_1 > 0$ and $\alpha_3 < 0$). So, corruption only affects growth positively in case of lower political stability.

Under the 'sand the wheels' hypothesis, corruption retards growth and becomes increasingly detrimental as governance deteriorates. It is argued that corruption affects economic growth adversely if the threshold level of political stability is low enough [Blackburn (2012)]. In this case, the sign of corruption coefficient should be negative ($\alpha_1 < 0$) to still have a negative impact on growth if the quality of institution is very low. Besides, these hypotheses can be tested simply by differentiating Equation (5) with respect to corruption, as shown below.

$$\frac{\partial GR}{\partial CORR} = \alpha_1 + \alpha_3 \times PS \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (6)$$

This indicates that corruption effect on growth depends on the coefficient α_3.

4. DATA DESCRIPTION

There are various quantitative measures used for corruption that researchers have used for cross-country comparisons. For example, Mauro (1995) used Business International Corporation corruption index, Wei (2000) used World Economic Forum's Global Competitiveness Report's index for corruption analysis. Third indicator of corruption is the combination of both such as Corruption Perception Index (CPI), and used by Tanzi and Davoodi (2001), Dreher and Herzfeld (2005), Shabbir and Mumtaz (2007), Evrensel (2010), Kotera, Okada, and Samreth (2012), Pieroni and d'Agostino (2013) etc. CPI is constructed by Transparency International (TI) and 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 macroeconomic variables are GDP per capita, government expenditures, investment-output ratio, education and population growth rate; first one is used as

dependent variables and remaining are used as control variables. The data concerning GDP per capita, government expenditures, investment-output ratio and population were found in the macroeconomic data series of The World Economic Outlook (WEO) database. GDP per capita is expressed in Purchasing Power Parity (PPP) dollars per person. It is derived by dividing the nation's GDP in PPP dollars by total population. Government expenditure is measured by general government total expenditure as a percentage of GDP. Investment-output is measured by the total investment, which is expressed as a ratio of total investment and GDP. Population has been measured by the total population of the country. We have measured the education level by the total adult literacy rate (% of people ages 15 and above) and data is taken from the World Development Indicators (WDI). Data on political stability is collected from World Bank Governance Indicators Database. World Governance Indicators (WGI) reflects the perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. We used two measures for political stability such as WGI estimate (index) and WGI percentile rank among all countries instead of estimates of governance. The value of index varies between −2.5 to 2.5, and the value of rank ranges between 0 and 100. The lower value of rank indicates more perception of the likelihood that the government will be destabilised or overthrown by means of unconstitutional sources or violent (or lower quality of governance). This implies that a low value of rank shows more political instability and its higher value indicates more political stability.[2]

5. EMPIRICAL FINDINGS AND DISCUSSION

We have used panel data set for the cross section of D-8 countries from 1995 to 2013 to test the hypothesis whether corruption 'grease the wheel' or 'sand the wheel'. The correlation coefficients[3] indicate that correlation coefficient between GDP per capita and corruption is negative and significant, which support the hypothesis corruption 'sands the wheels'. This implies that both variables move in opposite direction. For example, Pakistan has high average value of corruption index (7.66) and low average value of GDP per capita (3.86). The correlation coefficient between growth and political stability is positive and significant that implies higher political stability promotes economic growth in the sample nations. These relations are also confirmed by the scatter diagrams and fitted regression line.

Following Mo (2001), Méon and Sekkat (2005) and Ahmad, *et al.* (2012), we have used investment-output ration, population growth rate, government expenditure and human capita (education) as a control variables in the regression to investigate the impact of corruption and political stability on GDP per capita growth rate. We used GMM to estimate the panel data models, fixed effects model and random effects model; as this method tackle the issue of endogeneity, if any exist. We applied the Redundant Fixed Effects tests to check whether intercepts are common or not across the cross-sectional entities. The p-values of cross-section F-statistic and cross-section Chi-square predict that intercepts are not same across all cross-sections.[4] GMM is basically instrumental based

[2]For detail see, Kaufmann, Kraay, and Mastruzzi (2010).
[3]Correlation coefficient table is available at request.
[4]Results are available at request.

method of estimation, thus a selection of suitable instrument is itself an issue. The main characteristics of best instrument are, it should be highly correlated with the endogenous explanatory variable and uncorrelated with the error term. For this purpose, we used Wald test and Hansen J-statistic; p-value of the Wald-test is used to check whether instruments are highly correlated with the endogenous variable or not. In GMM method Hansen J-statistic, is also used as a test of over-identifying moment conditions. We have estimated two models; without and with interaction term to see the impact of corruption and institutions on GDP per capita.

We estimated the regression without interaction term using GMM, which not only addresses the endogeneity issues but also control the unobserved country-specific effects. Besides, it does not need any external information such as a validation or replicate data set in analysing the static panel data model [Wansbessk (2001)]. We used two stage least square (2SLS) weighting matrix and cross-section weights panel corrected standard error (PCSE) robust covariance methodology to address the problem of cross-section correlation (period clustering). The p-value of Hausman test indicates that fixed effects estimates are better than random effects estimates, which are reported in the in the Table 1. The p-value of Wald test and Hansen J-statistic confirm the suitability and validity of instruments. The values of R-square and adjusted R-square are reasonably high, which indicate that explanatory variables have reasonably explained the variations in the dependent variable.

Table 1

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Variable	(1)	(3)	(4)
Constant	−0.7666 (−3.317)***	−1.6196 (−4.566)***	−5.0458 (−5.60)***
Corruption	0.0563 (1.009)	0.0591 (0.975)	0.6178 (2.5705)***
Political Stability	–	0.0148 (1.986)**	0.5906 (3.6573)***
Government Expenditure	0.0166 (0.599)	0.0073 (0.247)	0.0579 (1.4184)
Investment	0.0046 (5.376)***	0.1224 (5.628)***	0.1732 (4.6773)***
Population	0.3686 (4.006)***	0.4653 (4.467)***	1.6096 (3.8016)***
Education	−7.0316 (-0.664)	0.0411 (0.675)	−0.0116 (-0.1457)
GDP per capita (−1)	0.8803 (29.505)***	0.8583 (25.622)***	0.4905 (3.2771)***
Corruption × Pol. St.	–	–	-0.2806 (-3.5566)***
R-squared	0.9986	0.9987	0.9979
Adj. R-squared	0.9985	0.9985	0.9976
J-statistic (p-Value)	3.4271 (0.3303)	1.6483 (0.1992)	3.7193 (0.4453)
Wald Test p-Value	(0.0000)***	(0.0000)***	(0.0000)****
Observations	144	136	128
Hausman T. Stat. (P-Value)	25.48 (0.0003)***	23.32 (0.0015)***	1185.7 (0.0000)***

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

Table 1 shows the results of three regressions; regression (1) includes corruption, not political stability in the model, regression (2) includes both corruption and political stability in the model and regression (3) considers both along with interaction term between corruption and political stability[5] in the model. The coefficients of control

[5]Political stability is measured by the WGI index and percentile ranking of the countries. Both measures give almost similar results, so WGI percentile ranking results are discussed here, WGI index results are available at request.

variables have expected signs and are statistically significant except government expenditure and education. The coefficient of investment-output ratio is positive and significant in all three regressions and coefficient value is highest in regression (3). This implies that increase in investment-output ratio promotes economic growth. This result supports the findings of previous studies such as Méon and Sekkat (2005) and Hodge, Shankar, Rao, and Duhs (2011b). The coefficient of population growth rate is positive and significant in all regressions, which indicates that increase in population growth rate increases the economic growth, because population growth is also used as a proxy for labor growth. Similar findings are reported by the Méndez and Sepúlveda (2005), but does not support the findings of Ahmad, *et al.* (2012), because higher population growth may slow down economic growth due to reduction in capital per worker (for a given level of investment).

The coefficients of adult literacy rate and government expenditures remained insignificant showing zero impact on economic growth in the sample countries. The coefficient of corruption is insignificant in regression (1) and (2) but significant in (3). Mo (2001), and Pelligrini and Gerlagh (2004) reported that corruption ceases to be a significant explanatory variable for economic growth when political stability included in the regression, so support the findings of the study. The effect of political stability on growth is positive, i.e., more specifically 10 percent increase in political stability promotes growth by only 0.14 percent. Following Ahmad, *et al.* (2012), We included lag value of GDP per capita by one period in the model, as it affects the speed of convergence at which an economy converges toward its steady state, thereby affecting the growth rate.

Regression (3) results show the mutual effect of corruption and political stability on economic growth, as coefficient of interaction term is negative and significant. The results indicate that the marginal effect of corruption on economic growth depends on the degree of political stability. The corruption promotes growth when a country is facing the problem of political instability, and retards it in case of politically stable nations. We inserted the estimated coefficients of regression (3) in the Equation (6) to calculate marginal effect as below.

$$\frac{\partial GR_i}{\partial CORR_i} = 0.6178 - 0.2806(PS_i) \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (7)$$

The sign of the marginal effect of corruption on growth changes at about 9 points of political stability rank. If a country has a political stability ranking above the value of 9, the marginal effect of corruption on growth is negative and significant, which implies that corruption hypothesis 'sands the wheels' holds. In our sample countries, all countries' average political stability rank value exceeds 2.8 except Nigeria and Pakistan, which conclude that corruption lowers the growth of GDP per capita in all sample countries except Nigeria and Pakistan. Thus corruption sands the wheels hypothesis holds in Bangladesh, Indonesia, Iran, Malaysia, Turkey and Egypt. On the other hand, corruption greases the wheels hypothesis holds in Nigeria and Pakistan. Similar findings are reported by a number of studies such as Mauro (1995); Knack and Keefer (1995); Keefer and Knack (1997); Fisman and Gatti (2002); Rauch and Evans (2000); Blackburn and Forgues-Puccio (2007); Haque and Kneller (2009); Ahmad, *et al.* (2012).

6. CONCLUSIONS AND POLICY IMPLICATIONS

We have tested two competing hypotheses whether corruption 'greases the wheels' or corruption 'sands the wheels'. The study examined the effect of corruption on growth, and checked whether conditional cooperation between corruption and political stability matters or not in testing the above mentioned two corruption hypotheses. The empirical results indicate that the effect of corruption depends on the political stability, which implies that conditionality matters. The coefficient of corruption become insignificant when political stability variable is included in the regression. Political stability has positive significant impact on growth. The coefficient of interaction term is negative and significant, which implies that corruption promotes growth in the politically instable nation but retards it in politically stable countries. In our sample countries, all nations have the rank value of political stability greater than threshold level except Nigeria and Pakistan. This concludes that corruption 'sands the wheels' hypothesis holds in all D-8 countries except Nigeria and Pakistan, where corruption 'greases the wheels' hypothesis is established.

The empirical results of the study suggest that caution should be taken in drawing some solid policy implications, as the study used the panel data of only Muslim developing countries. But still, we believe that empirical results of the study suggest some very essential implications for understanding the impacts of corruption on economic growth. Therefore, it is recommended that in order to reduce the effect of corruption on growth the promotion of political stability is indispensable, because political stability reduces social unrest and political turmoil, and encourage investors to invest and thereby promote economic growth. It certainly implies that future studies on corruption-growth relationship and its social effects, should pay careful attention to the governmental sphere.

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