

Effects of Corruption on Economic Growth - Empirical Study of Asia Countries

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Abstract : *The paper is to analyze the impact of corruption on economic growth by using data of 19 Asian countries in the period of 2004-2015 with D-GMM data processing techniques and quantile regression. The study results show the corruption is a hindrance to economic growth of those Asian countries. In addition, economic growth is impacted by different levels of the corruption at different quantiles, specifically, at the quantile level from 0.1 and 0.5, corruption impacts positively on economic growth, or vice versa, from level of 0.75 and 0.90, it is negative. In addition, the result shows that institutional quality, democracy freedom and economic freedom play important roles in economic growth.*

Keywords: *corruption, institution, economic growth, quantile regression.*

1. Introduction

Recently, the anti-corruption issue is one of the top priorities in the institutional reform agenda for development in countries including Asia. For last decades, many scientists and scholars have paid their interests by their studies on evaluation to effects on corruption in countries, especially with the impact of corruption on economic growth. However, to date, this matter is still in debates in terms of ethical and economic implications. Mauro (1995) shows the impact of corruption results negatively to the investment and therefore, it causes negatively affects to the economic growth. This also gains high agreement of Brunetti & Weder (1998), Mo (2001), Choe et. al (2013).

However, with other researchers's concepts, corruption is not completely pointing to its detrimental consequences but sometimes it causes beneficial to the growth. Bardhan (1997) illustrates cases where corruption results to the promotion to economic development in Europe and America. Beck & Maher (1986) and Lien (1986) argue that corruption induces a more efficient provision of government services. Leff (1964), Huntington (2006) and Leys (1965) also point out corruption has a positive impact on economic growth by minimizing obstacles from administrative procedures, lackage of transparency of the system

juridical. From this perspective, corruption acts as a lubricant that smoothes operations especially for a bureaucracy paradigm and, hence, raises the efficiency of an economy by reducing barriers to investment and economic growth.

At the begining of the reform, corruption levels in countries around the world including Asia have developed with negative way, increased its scale and gain its diversification (Campos & Pradhan, 2007). The root of this matter is supposed in relation with low levels of democracy, limited economic freedom, poor institutional quality. In addition, the imposition of political power and the influence of civil servants on socio-economic activities are great, thus, the money is used as a lubricant unavoidably. At the time, this lubricant is also seen to have a positive effect on economic efficiency because it enables the operation of the bureaucratic government and accelerates economic growth through the "speed money" mechanism (Aidt, 2009). Therefore, the purpose of the study is to provide one more evidence empirically of the impact of corruption on economic growth on the both of positive of negative basis by using D-GMM processing. In addition, the study also uses a quantile regression to understand the effect of corruption on economic growth in different quantiles. As a result, the recommendations are made accordingly.

2. Related literature review

2.1 Corruption overview

Corruption has a diverse impact on the economic, cultural and social aspects, therefore, in the 1990s, Corruption is wide spread in real life and now also it is a popular topic in economic research. It is present in all the countries of the world. Other society. For this reason, many studies on corruption such as Treisman (2000), Glaeser & Saks (2006), Del Monte & Papagni (2007), Billger & Goel (2009), etc. come into the debate. However, there is no universal and agreed upon definition of corruption. Corruption is defined as transfer of interest from public to private sector. World Bank defines corruption as "The abuse of government office for private gain. Corruption is every

transaction between actors from the private and public sectors through collective utilities that are illegally transformed into private gains". As in Oxford dictionary (2000), corruption is described as fraudulent or illegal behavior, especially by those in government or the act of changing ethical standards into unethical behavior. Therefore, three crucial factors are included in the concept of corruption: ethical, behavioral and empowerment. Gould (1991) argues that defining corruption as the ethical i.e it is a unethical phenomena contrary to ethical norms which include a set of moral deviations from the moral social standards. According to Transparency International (TI - 2009), "corruption is the abuse of entrusted power for private gain". The abuse owns a very broad sense. However, "government office is abused for private gain when an official accepts, solicits, or extorts a bribe. It is also abused when private agents actively offer bribes to circumvent government policies and processes for competitive advantage and profit. Government office can also be abused for personal benefit even if no bribery occurs, through patronage and nepotism, the theft of state assets, or the diversion of state revenues (<http://www1.worldbank.org/publicsector/anticorrupt/corruptn/cor02.htm>)". An act of corruption can be characterized by the value of the transaction concerned. Although this is a continuous variable, the analytical distinction usually made is between low value ("petty") and large value ("grand") corruption. The petty corruption normally occurs where low- and mid-level government officials have their interactions with ordinary citizens such as schools, hospitals, police offices, government departement and local authorities, etc ... transaction size is often small and mainly affects individuals (June et al., 2008). Typically, the larger the value of the corrupt transaction, the higher the position in the government hierarchy of the government official(s) involved at where there are acts committed at a high level of government that distort policies or the central functioning of the state, enabling leaders to benefit at the expense of the public good. Sometimes this is similar to political corruption (Rohwer, 2009).

From the above analysis, the term corruption covers a broad range and diverse which depends on the research objectives and methodology. The paper aims to study the impact of corruption on economic growth through analyzing the effects of institutional quality including the quality of political institutional quality which represented by democratic quality indicators and economic institutional quality which is represented by the economic freedom indicator (Heckelman & Powell, 2010; Saha & Gounder, 2013). In line with this objective of the study, the term corruption adopted

in this paper implies that the government civil servants as their position and authority are abused to change / violate the government rules and/or circumventing precribed government procedures for their benefits and make harm the competitive business environment.

2.2 Economic growth overview

Economic growth is a very popular concept from classical to updated (modern) studies. Economic growth can be examined and undertood into 2 approaches. Those are the reproducible or production function approaches. Most of modern studies are done with the second approach which is the review of the economic growth at the surface through the numbers through indicators. According to World Bank (2004), economic growth is "quantitative change or expansion in a country's economy". In addition, the World Bank (2004) contended that "economic growth is conventionally measured as the percentage increase in gross domestic product (GDP) or gross national product (GNP) during one year". As in research of Nafziger (2006) Economic growth is an increase in a country's per capita output. Thus, economic growth is the increase in value of the goods and services produced by an economy over a period of time. The nature of economic growth is to ensure the increase of both production output and production output per capita. In general, economic growth can be measured by Gross Domestic Product (GDP), Gross National Product (GNP), national income (Naional Income) and Gross National Product (GDP) per capita and Per Capita Income (PCI).

The relationship between corruption and economic growth

2.3.1 Literature review on negative effects of corruitiopn on economic growth

According to the Neoclassical economics as represented by Solow (1956) and Swan (1956), neoclassical theory thus implies that economists can take the long-run growth rate as given exogenously from outside the economic system such as capital, labor force, and technological progress. However, the government intervention is not taking into account and therefore, it cannot make a direct analysis of the impact of corruption on economic growth. Consequently, later, many economists place the role of the government into neo-classical growth models such as Barro's model of endogenous growth theory (1991). Barro's (1997) endogenous growth theory assumes average GDP per capita is based on average private investment and average government expenditure. A Cobb-Douglas specific form for equation changes to:

$$Y = A L^{1-\alpha} K^\alpha G^{1-\alpha} \quad (1)$$

where: $0 < \alpha < 1$;

- Y = total production
- L is the amount of labor used
- K is the amount of capital used
- G : government expenditure (spending)
- A is a parameter describing technology

In addition, according to Haque & Kneller (2008), the elasticity of average output and government expenditure in Barro's (1991) production function depends on the corruption factor: $1-\alpha = \gamma(1-\phi)$ where ϕ is the index of corruption in the government sector (Haque & Kneller, 2008). If ϕ is larger, the effect of government expenditure on economic growth decreases. If $\phi = 0$, government expenditure reaches to theoretical elasticity. This implies that corruption is a hinderance to economic growth, and this concept gain high agreement of Buchanan & Tullock (1962) and Rose-Ackerman (1999). Especially for Shleifer & Vishny (1993) studies on the corruption methods in government officials' perspectives, the corruption arised when government officials are always seeking to exploit whenever possible based on economic and legal constraints. The term "the grabbing hand" appears to refer to the negative impact of corruption on economic growth.

2.3.2 Literature review on positive effects of corrutiopn on economic growth

Leff (1964) studied economic development through administrative corruption. And the hypothesis arises from the study that corruption implies that corruption may be beneficial or it is also understood to be a lubricant for the wheels of growth. This idea is only primitive. However, it is considered as the foundation of "corruption-promoting" theories for later studies such as Lui (1985), Beck & Maher (1986) and Aidt & Dutta (2008).

In addition, the other researchers and scholars have other contrast ideas on that idea and the corruption impacts of corruption on growth must be based on many other social and economic factors. As Levine & Renelt (1992), the theoretical framework identifies four variables that strongly influence to economic growth, including investment to GDP ratio, the rate of population growth, the initial level of GDP per capita, and human capital. The first two variables belong to the growth component and the others belong to the development component. Also, Levine & Renelt (1992) defines the rate of growth of productivity as follows:

$$y = y(\text{cpi}, y_0, \text{human})$$

Where

CPI means corruption perception indexs
 y_0 means the initial level of GDP per capita
 human means the human capital

The expectation of the initial level of GDP per capita is from the convergence of knowledge gaps among nations which is already addressed in theories of endogenous growth. Countries with larger knowledge gaps will be more likely to increase their productivity through technical learning, imitation and knowing from the developed economies (Barro, 1991). According to Benhabib & Spiegel (1994), human capital has a positive impact on aggregate productivity growth because trained workforce is better at learning, creating and implementing with new techniques which can thereby promote higher productivity growth. However, this theoretical framework is difficult to raise any comment The expectation of corruption of the aggregate productivity factor.

2.3 Empirical studies

Over the past decades, many researches have been done into the impact of corruption on economic growth. Generally, in all empirical studies conducted it has been observed that corruption has two separate effects: positive or negative impacts. Therefore, this paper is also conducted upon to that result.

2.4.1 Empirical negative impact of corruption on economic growth

Some studies provide results that in case, the uncertainty occurs, genereally, corruption make the economic growth. Therefore, these empirical researches give high support to the theory of "the grabbing hand". Mo (2001) makes a study on impact on economic growth through transmission channels based on cross - sectional studies in the years 1970-1985 with the 2 separate periods: 1960-1995 with data of 54 nations and 1996-2000 with data of 49 nations by OLS and 2 SLS methods of estimation to control for endogeneity to examine the model sustainability. Results show there is a negative impact on economic growth through transmission channels on the investment and human capital and corruption has a positive and significant effect on political instability through transmission channels

As a research of Ugur & Dasgupta (2011), 1,002 studies have been found and obtained on corruption. The study provides a synthesis of the existing evidence on the relationship between corruption and economic growth - controlling for effect type, data sources, and country groupings. The study is done with low-income countries and

high-income countries names. However, the findings indicate that corruption has a negative effect on GDP per-capita growth overall and corruption is relatively more detrimental in mixed countries as opposed to low-income countries only and that indirect effects of corruption on economic growth (through the human capital and public finance channels) are larger than its direct effects. Also, in low income countries, a one-unit fall in the perceived corruption index can be expected to lead to an increase of 0.59 percentage-points in the growth rate of its GDP per-capita. For the mixed-country group (i.e, for country groups that include both LICs and Non-LICs), the total (direct and indirect) effect on GDP growth per capita is higher - at -0.86)

As a consequence of the review on the literature and empirical studies on the relationship between corruption and economic growth, the institutional quality of a country will effect to research results. Aidt et al. (2008) has developed a model of interdependence between corruption and institutionalization, the technique of panel data analyses through the threshold effect of distinguishing between high quality institutions and low quality institutions. As a consequence, it is also found no relationship between corruption and growth in countries with low quality political institutions but they reach conflicting conclusions in countries with high quality political institutions

Venard (2013) analyzes the relationship between institutional quality, corruption level, and economic development using cross-national data of 120 countries developed by the World Bank on perceived levels of corruption, institutional framework quality and economic development. Data has been collected for four years 1998, 2001, 2004 and 2007 and the method of estimation the Partial least squares (PLS) is used to evaluate the proposed scheme. The empirical result shows the impact of both institutional framework quality and corruption on economic development is negative. At the same time, the study also found the interaction between corruption and institutional quality to growth. Improvement of institutional quality and corruption reduction are more effective for economic development in countries with lower institutional quality than those of high institutional quality. This empirical research supports the 'sand in the wheel' school of thought in relation to the effects of corruption on economic development.

Tarek & Ahmed (2013) examines the impact of corruption on the growth of 30 developing countries in the period 1998-2011. The result show that corruption has a detrimental effect on economic activities and corruption level is higher and more serious in low-income and weak

economy-integrated countries. Corruption will be more serious in developing countries as a weak legal system and low income levels of civil servants are existing.

2.4.2 Empirical positive impact of corruption on economic growth

On the constrast with the above studies, there are many other researches as evidence proving the corruption served as a helping hand, Grease of wheel.

Méon & Sekkat (2005) assesses the relationship between the impact of corruption on growth and investment and the quality of governance in a sample of 63 to 71 countries between 1970 and 1998. Variables of corruption are used from sources of World Bank and Transparency International. The result shows corruption has a negative impact on growth independently from its impact on investment. These impacts are, however, different depending on the quality of governance. Aslo, it is concluded that corruption not only impacts growth through reduced accumulation of capital but also through other channels that have yet to be determined. In particular, the marginal impact of corruption on growth is positive in less politically and/ or politically or politically. In other words, corruption is positively correlated with efficiency in countries with "ineffective" institutions This result is again confirmed by Méon & Weill (2010).

Egger & Winner (2005) using data from 73 developed and underdeveloped countries to understand the relationship of corruption as a stimulus to attract FDI since corruption helps businesses avoid cluttered regulations and administrative constraints. The general idea is that corruption facilitates beneficial transactions which should not have happened. As its consequence, it enhances the efficiency of the economy by allowing individuals in the private sector to correct or eliminate government failures.

Aidt & Dutta (2008) develops a theoretical model of the impact of corruption on economic growth with different institutional structures. The results show that the nature of the impact of corruption depends on the specific regimes and countries are divided into different regimes based on their institutional quality. In particular, in countries with good institutional quality, the impact of corruption on growth is negative, whereas in countries with poor institutional quality, the effect is positive (or less negative).

Heckelman & Powell (2010) study the relationship between corruption and economic growth as well as the institutional environment (democracy and economic freedom). Data from 83 countries during

1995-2005 are used and processed with the Weighted Least Squares. The study shows out very special result and this relationship mainly depends on the institutional quality of the countries. Specifically, corruption was found to be beneficial for economic growth in high democracy countries. This result seems to be quite special but it is consistent with studies by Méon (2005) and Méndez (2006). In addition, the study also is considered as evidence of corruption which

promotes economic growth in countries with low levels of economic freedom and this positive effect will be reduced as economic freedom improves.

3. Research data and methodology

3.1 Research data

Based on the above theoretical and empirical studies, the model of the impact of corruption on economic growth is established as follows:

Table 1: Variables and measurement

Code	Variables	Expectation	Interpretation	Studies	Sources
Dependent variables					
gdppc _{it-1}	The lagged dependent variable		Real GDP per capita	the natural logarithm of GDP per capita (\$)	
cor _{it}	Corruption	-	Corruption perception index	Pellegrini & Gerlagh (2004), Aidt (2009), Ugur & Dasgupta (2011), Venard (2013), Saha & Gounder (2013), Tarek & Ahmed (2013).	Transparency International - TI
		+		Méon & Sekkat (2005), Egger & Winner (2005), Aidt & Dutta (2008), Heckelman & Powell (2010).	
demo _{it}	Democracy index	+	democracy freedom index	Schumpeter (2012), Kotera et al. (2011) Heckelman & Powell (2010), Saha & Gounder (2013).	Freedom House
eco _{it}	Economic freedom index	+	the average of economics freedom index into five areas upon to the World Report	Heckelman & Powell (2010) and Peev & Mueller (2012).	The economic freedom of the world – EFW
Control variables					
invest _{it}	Investment capital	+	Investment/GDP ratio	Ekanayake & Chatrna (2010)	Work Bank
pop _{it}	growth rate of population	-	the percentage of annual population growth	Barro & Sala-i-Martin (2004), Sachs (2008).	Work Bank
top _{it}	Trade openness		the percentage of of the import and export upon to GDP	Wacziarg & Welch (2008), Wang & Liu (2006), Okuyan et al. (2012).	Work Bank
school _{it}	a measure of education	+	the percentage of pupils enrolled in primary schools (%)	Bergheim (2005), Boughanmi (2009).	Work Bank
gov _{it}	Government expenditure	-	The percentage of the government expenditure on GDP	Landau (1983), Marlow (1988), Fölster & Henrekson (2001).	Work Bank

Source: authors' research.

To collect data on variables, the unbalanced data panel is used and some of which are "missing" in variable $school_{it}$. Data are collected from 19 countries in Asia, in the period 2004-2015, from famous and prestigious websites such as Economic

Freedom of the World, Freedom House Transparency International and World Bank. Table 2 shows the results describing the mean of variables included in the study.

Table 2: Description of variables

Code	N	Mean	Min	Max	Std. Dev.
LNGDPPC	228	4.1018	3.2018	4.9437	0.4221
COR	228	6.0424	0.6000	8.5000	1.9259
DEMO	228	2.6609	0.9188	5.5070	1.0735
ECO	228	6.8348	4.1800	8.9400	0.7673
INVEST	228	27.4110	14.1206	57.9905	7.7315
GOVE	228	12.6943	5.0393	27.4451	4.9681
TOP	228	83.5131	0.1674	430.3580	62.2991
POP	228	1.9348	-0.2003	15.0326	2.3064
SCHOOL	215	0.9856	0.7329	1.2100	0.0538

source: authors' calculation.

3.2 Research model

With variables in Table 1, static panel data regressions model on the table is used to analyze the impact of corruption on economic growth as follows:

$$gdppc_{it} = \beta_0 + \beta_1 cpi_{it} + \beta_2 eco_{it} + \beta_3 demo_{it} + \beta_x X_{it} + \mu_i + e_{it}(1)$$

where: $i = 1, 2, \dots, N$; $t = 1, 2, \dots, T$

- N is the number of the countries
- T is the observed time in the model
- μ_i is the constant effect of the nation i and equally distributed independence errors $e_{it} \approx \text{i.i.d.}(0, \sigma e^2)$, $E(\mu_i/e_{it}) = 0$.

With static panel data regressions model, the three most commonly used methods are Pooled, FEM and REM, however, each method has its own advantages and disadvantages. In the Pooled method, it is seen all the nations are homogeneous which is not practical because each country has its own institutional characteristics that are almost unchanged over time but this can be correlated with variables. Thus, the Pooled method can lead to erroneous estimates when these particular effects are not controlled.

For FEM or REM methods, these separate effects can be controlled. However, if these separate effects are correlated with independent variables, the most appropriate method is FEM, or in contrast case, the REM model is more appropriate. To select Pooled or FEM, F test is used by using the Lagrange Multiplier (LM), and to select REM or FEM, Hausman test is used. Results show that inconsistencies occurs in the three method selection: Pooled, FEM and REM. Therefore, in this study, FEM model is selected because it best

fits the sampled data. However, the Breusch - Pagan test shows that the variance of the FEM model was not homogeneous. Therefore, obtained estimates from FEM are ineffective. In order to improve the effectiveness of estimation, the Generalized Least Squares (GLS) in the data panel proposed by Beck & Katz (1995) are applied.

In addition, in the study of economic growth, attention should be paid to the interaction between the growth values over time. Thus, growth models are usually built under the autoregressive model. When datasets are panel data, the appropriate model to produce unbiased and stable estimates is the dynamic panel data model (Barro, 1997). Moreover, endogenous variables are normally included in growth models. For example, when investment is high, it will lead to high growth, then high growth will promote more investment. Saha & Gounder (2013) suspects endogenousness of corruption happens when the measurement of this variable has strong correlation and increases with economic development level. Stimulously, this

leads to the deviation of traditional estimates. D-GMM is estimation technique that uses all lagged dependent variables and predetermined variables as instruments. This technique gains many advantages in comparison with the traditional estimates (FGLS and 2SLS). Traditional estimates (FGLS and 2SLS)

may result in bias in the presence of altered endogenous variances. D-GMM uses moment conditions that produce accurate estimates even when there is an inconsistency of cross-sections (Hansen, 2010; Hayashi, 2000). Therefore, the model (1) will be changed as follows:

$$gdppc_{it} = \beta_0 + \beta_1gdppc_{it-1} + \beta_2cpi_{it} + \beta_3eco_{it} + \beta_4demo_{it} + \beta_xX_{it} + \mu_i + e_{it} \quad (2)$$

Subsequently, D-GMM is continued to conduct for compliance tests, including probabilities of autocorrelation of model errors and instrumental variables. Arellano-Bond test on correlation of the hypothesis H0: None self-correlated and applied to differential error. The null hypothesis is often refused in the test of AR (1) process in first-order variance. Therefore, test of AR (2) will be done and it is more important because it tests self-correlation at different levels. The validity of instrumental variables used in the D-GMM estimation is tested by Sargan statistics. The Sargan test is an overidentifying measure. Sargan test is done with the H0 hypothesis of which the instrumental variable is an exogenous variable. This means the correlation is not occurring with the error in the model. Therefore, the Sargan statistic value is as large as possible. Also, the heterogeneity of error variance is existing in the FEM model. Therefore, the use of the quantile regression to study for the different quantiles of the growth distribution function is appropriate. The quantile regression is

introduced by Koenker & Bassett (1978) and is widely used in the world. The advantage of this approach is to examine in detail the impact of corruption on economic growth on a per-quantile (unit) basis to reinforce the evidence of impacts between low and high income countries.

4. Findings and discussion

The regression result of the function (1) is shown in Table 3. Columns 1, 2, 3 of this table indicate the estimated results of Pooled OLS, FEM and REM. Chow test results and the Hausman test in Table 3 show that the FEM model is best suited to the data collected. However, the test results show that there is an error variance of the FEM model. To improve the effectiveness of estimation, the FGLS method is used as shown in Column 4 of Table 4. However, as discussed above, FGLS still owns some limitations, as a consequence, results of D-GMM estimation are collected as presented in Column 5 of Table 3 and used for analysis.

Table 3: Regression output of corruption and institutional impacts on economic growth

Independence variables	POOLED	FEM	REM	FGLS	D-GMM
COR	0.000711 [0.86]	0.00193*** [7.97]	0.00190*** [7.83]	0.000965*** [2.87]	-0.000067** [-1.52]
DEMO	0.214*** [7.67]	0.228*** [9.11]	0.234*** [9.99]	0.206*** [13.12]	0.00524* [1.81]
ECO	0.0137 [0.34]	0.0227 [1.49]	0.0252* [1.66]	0.0528** [2.51]	0.00523*** [2.90]
INVEST	0.00202 [0.86]	-0.00338*** [-3.06]	-0.00338*** [-3.05]	0.00379*** [2.82]	0.000637*** [4.98]
GOVE	0.0188*** [4.83]	-0.00982*** [-3.23]	-0.00813*** [-2.71]	0.0147*** [7.44]	0.000505* [1.74]
TOP	0.00108*** [3.53]	-0.00017 [-1.52]	-0.00014 [-1.19]	0.000600*** [3.81]	0.0000557** [2.53]
POP	0.0459*** [5.39]	0.00442 [1.46]	0.00532* [1.74]	0.0417*** [6.56]	-0.00025*** [-3.67]
SCHOOL	0.178 [0.52]	0.167 [1.17]	0.152 [1.06]	0.129 [0.66]	-0.00701 [-0.36]
L.lngdppc					0.948***

					[83.34]
Blocking factor	2.781*** [7.27]	3.369*** [18.48]	3.320*** [17.27]	2.565*** [12.12]	0.163*** [4.20]
Observations	215	215	215	215	196
Determined correlation coefficient	0.6290***	0.4497***			
Chow Test		172.73***			
Hausman test			32.71***		
Variance deviation test		261.16***			
Autocorrelation test		259.196***			
Sargan test					0.853
AR(2) test pvalue					0.442

Note: *, **, *** represent significance at the 1%, 5% and 10%; [] is value of the standard error

Results in Column 5 of table 3 shows the extent and direction of the impact of corruption and institutions on economic growth. In addition, to

Source: authors' calculation clarify the effect of these factors on the quantiles of economic growth variables, there are results of quantile regression on function-formed table (1) which are also shown in Table 4.

Table 4: Regression output of corruption and institutional impacts on economic growth

Independence variables	Quantile regression				
	0,1	0,25	0,5	0,75	0,90
COR	0.00218** [2.27]	-0.00167 [-1.38]	0.00309*** [2.64]	-0.00303** [-0.71]	-0.00492* [-1.93]
DEMO	0.281*** [12.55]	0.287*** [9.14]	0.203*** [4.23]	0.175*** [2.75]	0.136*** [3.76]
ECO	0.0156 [0.60]	-0.00994** [-0.20]	0.106* [1.42]	0.0169** [0.18]	0.0511*** [0.97]
INVEST	-0.00335* [-1.65]	-0.00055 [-0.12]	0.00557* [1.69]	-0.00143 [-0.39]	0.00462 [1.39]
GOVE	0.0182*** [5.44]	0.0236*** [5.27]	0.0243*** [4.50]	0.000422 [0.05]	-0.00622 [-1.12]
TOP	0.000906** [2.58]	0.000987** [1.99]	0.000852*** [3.25]	0.00163*** [2.73]	0.00170*** [3.19]
POP	0.0496*** [4.44]	0.0453*** [2.99]	0.0488*** [4.32]	0.0264* [1.79]	0.0291 [1.65]
SCHOOL	-0.224	-0.497* [-1.97]	-0.477 [-0.89]	1.683* [1.90]	2.100*** [3.46]
Nation dummy variables	Yes	Yes	Yes	Yes	Yes
Blocking factor	-47.27***	-49.10***	-62.81***	1.865**	1.357**
Observations	215	215	215	215	215

Note: *, **, *** represent significance at the 1%, 5% and 10%; [] is value of the standard error

The corruption perception index (CPI) was created in 1995 by Transparency International. This is done "by their perceived levels of corruption, as

Source: authors' calculation determined by expert assessments and opinion surveys. It ranks on a scale of zero to 10, with zero indicating high levels of corruption and 10

indicating low levels. The corruption level reflects the frequency of payments for corruption and business barriers (Lambdsdorff, 2005). In this study, COR variable is an index of corruption measured by the CPI and adapted from Transparency International. This indicator is measured on a scale from 0 to 10, in which the smaller the country, the less corruption and vice versa. Thus, for this study, it is adjusted to be the larger the value getting the less corruption by subtracting 10 points from the CPI. In case, the institutional framework (democratic and economic freedom variables) and socio-economic factors are controlled, column 4 of Table 3 shows that COR coefficient of the negative variable is negative and its statistical significance is at 1%. This result again confirms that corruption is hindering economic growth in Asian countries. Specifically, if a country raises its anti-corruption to 1% point, the GDP growth rate will decrease by 0.000067%. Indeed, corruption can undermine economic growth through multiple channels at two levels.

at the micro level, many empirical studies suggest that corruption reduces efficiency in the allocation and use of production factors (Dal Bo & Rossi, 2007). The poor suffer the most from corruption. As concerned in the study of De Soto (2000), the bribes required by government officials such as taxes are harmful to businesses because they account for a larger proportion of income in small businesses in comparison with large businesses. In addition, corruption devastates the provision of government services as health care and education, which are important services for the lives of the poor. In places where officials claim bribes to provide services, the poor cannot even gain accessibility to low quality services.

- (i) at the macro level, corruption impacts negatively on GDP per capita and economic growth (Mauro, 1997; Ades & Di Tella, 1999). Indeed, countries with many erroneous policies, ineffective government expenditures, and much corruption cause the damage to macroeconomic development, negatively effects to property ownership, competitive reduction, ineffective resource allocation, degraded infrastructure and reduced educational expenditures (Murphy et al., 1991).

And table 4 shows that the extent of the COR variable impact on economic growth is different at different quantile 0.1; 0.25; 0.50; 0.75 and 0.90 of the distribution function of economic growth. In low quantiles such as 0.1 and 0.5 of the growth variable, corruption has a positive impact on economic growth at a 10% significance level, and at the higher quantile, the impact is stronger. This

result is same as a study of Lui (1985) in which advocate the corruption role in helping economic subjects avoid consequences of ineffective policies. In particular, momentum can be created from bribes for officials to speed up the process when administration is slow and corrupted officials make faster decisions. In the context of delayed administration and government's harsh regulations, corruption promotes the efficiency of the economy and positively impacts to economic growth. Bayley (1966) argued that corruption can overcome the bureaucracy system by improving institutional quality and could help private businesses avoid public policy hindrances to their businesses and thereby, assist them find positive and appropriate solutions. This also makes the efficiency of public policy to be improved. Moreover, according to Bayley (1996), it should place in government targets. As found, in the context of the institutional environment and other socio-economic factors, corruption reaches a positive impact on economic growth and at the higher quantiles of growth variable, the impact of corruption is stronger.

As a result, the D-GMM results force to show corruption has a negative impact on economic growth. Thus, by using the quantile regression, there exists a difference tendency of the impact of corruption on economic growth in the different quantiles of the growth distribution function. At low quantiles, corruption reaches a negative impact on economic growth and conversely, at the higher quantiles, the impact of corruption is stronger. Moreover, in high quantiles of 0.75 and 0.90 of the distribution function of economic growth, corruption has a negative impact on economic growth and reaches significant at 5%. This result is favor and supportive to "The Grabbing Hand" theory - corruption hinders the economic growth of the endogenous growth theory model (Barro, 1991). This has also been found in studies by Heckelman & Powell (2010), Ugur & Dasgupta (2011), Venard (2013), Saha & Gounder (2013), Tarek & Ahmed (2013).

As in column 5 of table 3, it shows the regression coefficients of the DEMO and ECO variables are positive and gain statistically significant. This means institutional quality has a positive impact on economic growth. This finding is to demonstrate the important role institutional quality in the economic growth, especially in Asian countries (Heckelman & Powell, 2010; Lee, 2008). According to the results expressed in Table 4, in general, the institutions have a positive effect on economic growth. At the higher quantiles, the impact is stronger and all reach statistical significant. Also, the two factors: democracy freedom and economic freedom, the democracy freedom and democracy needs to be more concerned in Asian countries.

Indeed, most of Asian countries are developing countries with low democracy and economic freedom. The democracy expansion and the reform boost toward the free economy will bring beneficial in enhancement of economic growth and income improvement in these countries in which democracy freedom is considered as a measure of the quality of the legal system and political stability of a country. This is essential to ensure a clean legal system which can remove obstacles in foreign investment attraction, stimulates technological change and contributes to economic growth (Campos & Prahlan, 2007; Kaufmann & Kraay, 2002; Rivera-Batiz, 2002).

As shown in column 5 of table 3, the investment rate has a positive effect on national growth with high statistical significance. This result reconfirms the important role of material capital in growth models mentioned in many previous studies. This means economic growth in Asian countries is still dependent on capital growth. The result reflects the current situation of the development level and the abilities of limited application of science and technology in production. This finding is consistent with the empirical results of Ekanayake & Chatrta (2010). The same results also are found in the quantile regression. At the quantile 0.5, investment has a positive impact on economic growth, and vice versa, at the low quantile of 0.1, it is negative and gains statistical significance at 1%. This shows, in countries with economic growth, at low quantile, investment is not effective and corruption should be controlled and investment should be more selective

Government expenditure variable gains statistically significant and positive. This interpretes government expenditure has a positive impact on growth in the surveyed countries. It can be seen that the control of government expenditure in these Asian countries is quite effective and contributes to the positive effects of growth promotion. This is in accordance with studies of Bose et al. (2007) and Acosta et al. (2013). The results of the regression analysis is supportive to the above observation. However, the government expenditure management is not identical and same as countries. Specifically, in countries with high economic growth in high quantiles, government expenditure has a strong impact on economic growth. This means that in these countries, control of government spending is better than that of countries with low growth rates. Indeed, in low-growth countries with high corruption and limited institutional quality, government expenditures make hinderance to growth unavoidably (Marlow, 1988; Fölster & Henrekson, 2001).

The regression coefficient of POPG variable is negative and reach statistically significant and this is consistent with Barro & Sala-i-Martin (2004), Sachs (2008). That means the population growth rate in Asian countries has a negative impact on economic growth. This implies economic growth does not depend on labor growth. By contrast, population growth has hindered the progress of economic development in these countries. This means the SHOOL variable is not guaranteed, and it is not affecting economic growth. Therefore, in case, population continues to increase which supplement high qualified labor force for society, this gains no meaning for economic growth and sometimes it is seen as pressure and increase in terms of socio-economic costs, and lastly, it leads to a decline in public investment (Headey & Hodge, 2009). Finally, the empirical results show that the regression coefficient of the TOP variable reaches statistically significant and positive. This has same result with in many previous empirical studies of the positive role of trade openness in economic growth. This result is consistent with Wang & Liu (2006), Wacziarg & Welch (2008) and Okuyan et al. (2012).

5. Conclusion, implications and recommendations

5.1 Conclusion

The paper uses data from 19 countries in Asia from 2004 to 2015 to study the impact of corruption on economic growth. D-GMM panel data and quantile regression are applied in this study to analyze further and detailed impact of corruption on economic growth through each quantile. The results support the hypothesis that corruption hinders economic growth in Asian countries. In addition, the impact level of corruption on growth is different from each quantile of the distribution function of growth variables. In detailed, in low quintiles as 0.1 and 0.5, corruption has a positive impact on economic growth and vice versa, in high divisions as 0.75 and 0.90, the impact of corruption is negative. Also, in the context of the different institutional and other socio-economic environment, the impact level of corruption on economic growth is different. The higher quantiles will gain the the higher the level of impact.

Institutional quality, democracy freedom and economic freedom play an important role in economic growth in Asian countries. On the other hand, according to results, generally, the institution impacts positively on economic growth. At the higher quantiles, the impact level is stronger and reaches statistically significant and the democracy freedom in Asian countries should be prioritized. The remaining variables of investment rate, government expenditure and trade openness have a

positive impact on the growth of Asian countries and however, the impact of population growth is negative.

5.2 Research implications

For Asian countries with low economic growth from 0.1 and 0.5 quantile ranges, corruption impacts positively on economic growth. However, this impact is uncertain for all countries where it appears only in some circumstances; for example, in the poor quality institutional quality.

Therefore, in that case, economic growth is likely to minimize the value of time costs for the economy. Bribes for officials are as the impetus for speeding up the process in a low administration system and officials' bribes which can make decisions faster. Besides, with corruption, the bureaucracy can be reduced by improving institutional quality and can help private businesses avoid a public policy hindering their businesses and assisting them to find positive and appropriate solutions. This could help improve the efficiency of public policy. In contrast, at high quantiles of 0.5 and 0.9, corruption has a negative impact on economic growth. Therefore, with Asian countries, effective institutional system should be established to control and identify the focus of the anti-corruption strategy in which widening the democracy level is also an important factor for the national institution system. Thus, countries should establish a framework for political institutions aimed at expanding democracy through free elections, fairness and press freedom which help to prevent and eliminate corruption more effectively. Inhabitants are free to demonstrate their right in right candidate elections, dismissal and replace when officials show unfulfillment of their responsibilities or abusive behavior for public benefit. These rights as a factor motivate them to monitor activities of the government and etc with hope to curb corruption. As a result, it contributes to improve the quality and efficiency of the use of public resources and facilitate economic development. Press freedom is also enhanced by allowing media agencies to gain more opportunity to publicize, condemn the errors of government officials and prevent future recurrence. More of that, democracy level should be extended through fair elections and free speech to eliminate corruption effectively. And the economic freedom index should be improved in these countries to reach transparent and open economic environment. Also, law enforcement and execution should be improved and upgraded. Singapore is a good example as an anti-corruption country by their strict controls and disciplines.

5.3 Research recommendation

Firstly, the empirical results show that capital investment is as a factor accelerating to the growth of Asian countries. Therefore, domestic and foreign capital should be utilized. Capital is seen as a key driver of growth in developing countries and of poverty reduction. Also, it is used to shift its economic structure to promote faster growth and integrate effectively into the global economy. The role of capital has been proved in many studies through economic models with reliable empirical results. At present, with increase of globalization and economic integration, the attraction of foreign direct investment (FDI) has been receiving much attention, especially for developing countries. FDI plays an important role in creating a growth mechanism for countries receiving investment capital. Thus, in these countries the legal system should be enhanced in the direction of development and stimulation of the attraction of investment capital for economic growth.

Secondly, the effective government expenditure management and control system should be built to enhance higher efficiency. The empirical result shows there is a mutual relationship between investment and economic growth. However, in government expenditure, especially in public investment, it is necessary to have a clear definition of the mechanism for allocating financial resources in line with the priority objectives of the development strategy. Government expenditure must be aligned with the creation of common conditions for development in priority to important national projects, especially large scale transportation and urban infrastructure, national and regional strategic projects. In order to promote investment, investment capital should also be diversified and private capital should be attracted. Therefore, governments should remain and enhance accountability and transparency in government expenditure management assuring effectiveness of public goods delivery programs. Furthermore, to promote economic growth in Asian countries, an open economy should be established to increase imports and exports of goods and services and improve domestic technology which make economic growth faster. Therefore, the production process can be more efficient and higher productive. Additionally, trade openness should also be increase to gain competitive advantage. Besides, it can also indirectly encourage growth through other channels such as technology transfer, product diversification, expansion of scale of economies and effective resource distribution and allocation in the economy and interaction with partners.

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