Impact of Governance on Economic Growth

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1.ABSTRACT

The impacts of governance on economic growth is still only partially understood. The aim of this researh to understand the impact of governance on the economic growth. This study finds that control of corruption is a critical factor for economic growth and one unit increases in control of corruption causes 6.9% increse in the economic growth. However, it is important to manage both corruption control and political stability and absence of violence/ terrorism indicators effectively to achive a higher economic growth.

In comparition to the European Union countries and the North American countries, the economic growth rate is significantly lower in all other regions except the Middle East and North Africa. The economic growth rate in high-income countries is 20% higher than the middle income countries. On the other hand, the low-income countries show 23.5% lower economic growth than the middle income countries.

This research used data from 145 countries for the period of 2002-2014. The included governance variables are control of corruption, political stability and absence of violence/terrorism, and voice and accountability. foreign direct investments, gross capital formation, government consumption, and trade openness were taken into account the model, to control their effects on economic growth. Dummy variables were included to capture the regional effects and the effects of the income level of the countries. The fixed effects and random effects techniques were applied in a balanced panel. The main data sources are the Worldwide Governance Indicators and the World Development Indicators databases.

Key Words: economic growth, governance, control of corruption, political stability, voice and accountability

2. INTRODUCTION

The global distribution of income shows a highly uneven pattern of distribution. For instance, in 2015, the per capita GDP of North America was at least 34 times higher than the per capita GDP in South Asia and Sub-Saharan Africa (The World Bank, 2016b). In addition to that, countries in some parts of the world have grown strongly over time while countries in other regions have not. The average nominal GDP in East Asia and the Pacific countries in 2015 increased by 3711 times in comparison with the figures in 1968. But in the same period, the countries in Sub-Saharan Africa grew only 868 times (The World Bank, 2016b). These figures reveal a growth difference in the different parts of the world.

Although the theoretical models including the Solow model and new growth theory provide some level of explanation for the economic growth within a particular geographic boundary, understanding of economic growth is still incomplete (Romer, 2001). In addition to that, the existing growth models fail to provide a complete explanation for the cross-country growth differences (Romer, 2001). Although human capital accumulation, physical capital accumulation and technological progress are important determinants of economic growth in the major growth models (Acemoglu, 2009), in another view Hall and Jones (1999) show the importance of social infrastructure and government policies in economic growth. The concept of governance and its importance to economic growth was raised in the early 1990s (Perkins, Radelet, & Lindauer, 2006; The World Bank, 1994).

Governance is a broad concept with great complexity to its major pillars. Kaufmann, Kraay and Mastruzzi (2010) define governance as a set of traditions and institutions that can be used to exercise the power of authority. Six basic dimensions of the governance are included political stability and absence of violence/terrorism, voice and accountability, government effectiveness, regulatory quality, control of corruption and the rule of law (Kaufmann, Kraay & Mastruzzi,

2010). These governance characteristics may influence several critical institutions that are essential for economic growth. These key institutions include well-defined property rights, unbiased contract enforcement, reduced information gap and stable macroeconomic conditions (Rodrik, & Subramanian, 2003). The governance indicators influence on these and eventually decide the country's economic growth in two ways. First, better governance creates a set of essential institutions that increases in the productivity of human and physical capital, and attract investment for developing human and physical capital. This process finally increases economic growth by following the Solow model and new growth theory. Second, following the social infrastructure theory, better governance improves the key institutions of the country and creates a favourable set of government policies for economic growth. Improved institutions and better government policies make an attractive environment for high investment in human and physical capital development, thereby achieving economic growth.

3. Research objectives

Although researchers show that governance can influence on economic growth, there is still much to uncover to ensure governance-related policies are appealing to policymakers. Most importantly, as literature reveals, the relationship between governance and economic growth has not been proved by enough evidence. For the effective policy intervention, it is important to identify the important governance factors that affect on economic growth. Therefore, the goal of this study is to measure the impact of governance on economic growth. Three objectives are set to fulfil the goal of the study:

1) To study the overall relationship between governance and economic growth

2) To investigate whether there is significant difference in economic growth rates among varying parts of the world

3) To examine whether there is a significant difference in economic growth rates between high-income countries and low-income countries.

4. LITERATURE REVIEW

4.1.Theoretical relationship between governance and economic growth

Governance is a broad and multi-faceted concept. It describes the way that state power is exercised to manage its economic and social components (The World Bank, 1994). The manner in which the state exercises its power has a link to a set of institutions that engage as keys to economic growth. According to North (1991), Grief (1994), Acemoglu and Robinson (2012), Acemoglu and Robinson (2010), North & Thomas (1973) and Rodrik and Subramanian (2003), there is a set of fundamental institutions needed for economic growth. These institutions include well-defined property rights, unbiased contract enforcements, low information gap between buyers and sellers, and stable macroeconomic conditions.

4.2.Governance and major growth theories

Political stability, the absence of terrorism and violence, proficient government policy formulation and implementation, improved regulatory mechanisms, reduced corruption and ensuring the rule of law can be recognised as high governance qualities (Kaufmann, Kraay & Mastruzzi, 2010). The provision of accomplished governance leads to improvement in the institutions mentioned above. The increase in economic growth as a result of the high quality of institutions can be directly and indirectly explained by using the Solow model, new growth theory and social infrastructure view.

The better quality institutions can contribute to the Solow model by increasing the availability of technology. It is clear that any form of bad governance, such as high political violence, terrorism and widespread corruption hurts citizens mentally and physically by decreasing their productivity. Then, it is reasonable to assume that better governance removes these physical and mental constraints and as a result, labour productivity improves. As Romer (2001) explains, the Solow model does not explain exactly the terms of technological improvement and, therefore, this rise in labour productivity is open to similar interpretation as the technological

improvement in the Solow model (Romer, 2001). Then, this technological improvement acts to increase economic growth through encouraging capital accumulation.

In another view, the improved institutions provide a conducive environment for investors. In this argument, it follows that increased investment is made in physical and human capital development. Human capital development includes the knowledge, abilities and skills that are acquired by the individual worker through the learning process (Romer, 2001) and it results in an increase in the output per worker. On the other hand, increased investments in the physical capital increases capital per worker compared with the initial condition. These approaches eventually lead economic growth through the process of capital accumulation (Romer, 2001).

New growth theory identifies the role of technology as a driving force for economic growth (Romer, 2001, Mankiw & Ball, 2011). The technological progress increases along with the rate of knowledge accumulation. In this model, research and development generates knowledge (Romer, 2001) and favourable institutions such as property rights promote investment in research and development and thereby contribute to economic growth.

In commenting on the Solow model, Hall and Jones (1999) argue that only a part of the output per worker can be explained using physical capital accumulation and the learning achievements of workers. The significant contribution to the remaining part of the cross-country differences in per-worker output carries the policy and institutional differences across countries (Hall & Jones, 1999). In addition to that, North (1991), North and Thomas (1973), Grief (1994), Acemoglu and Robinson (2008, 2010 &2012) explain the importance of institutions and government policies in economic growth in various perspectives. According to this theory, better governance creates the favourable institutions and government policies that encourage investment and production. A higher level of investment in human capital and physical capital causes economic growth. On the other hand, better institutions and government policies allocate

a country's valuable resources for production instead of diversion. Allocation of a country's resources for investment and production causes an increase in the future output (Romer, 2001).

Romer (2001) points out two pathways requiring consideration for the study of economic growth: growth over time and regional disparity. The Solow model and new growth theory can explain the growth over time. However, these neoclassical growth models have a weakness in explaining the regional disparity in the world. Although the concept of social infrastructure has a higher potential to provide a better explanation for the regional differences, there is an insufficient number of quality studies available in this area (Romer, 2001). However, as explained above, better governance can provide favourable economic conditions for technological progress, along with the human and physical capital formation that is key to economic growth.

4.3.Corruption and economic growth

Corruption means selling of the organisation's resources, exclusive information and decision-making power by a government party to a non-government party (Andvig & Meone, 1990). In the corruption action, there is a supply arising from the government party and a demand arising from the non-government party (Andvig & Meone, 1990). As Aidt (2009) argues, people have a different understanding of the impact of governance on economic growth. One group believes (Sanders) that the corruption has a negative effect on economic growth because it increases the transaction cost and the production cost. Most importantly, the corruption will decrease the consumer confidence and investor confidence and, degenerate the trust of the society. Finally, higher corruption causes a reduction in the overall institutional quality of the particular society. In contrast to Sanders, another group thinks that corruption brings an improvement in economic performance by removing bureaucratic bottlenecks such as delays in decision making regarding the issuing of licences, permits, approvals and the enforcement of contracts (Aidt, 2009).

Tanzi (1998) describes several causes for the corruption demand as follows. First, governments implement rules and regulations for administrative purposes, which include providing licences, permits and different kinds of authorisations and inspections. Bureaucrats can seek bribes by using their authority to delay decisions. Second, the officers who administer taxes have authority to make decisions on tax incentives, tax liabilities and the implementation of relevant regulations. This power allows them to engage in rent-seeking activities. Third, bureaucrats make decisions on government spending and purchasing of good and services, and on public investment projects as part of the government's activities. In these situations, they can ask for bribes from suppliers. Fourth, the government provides some goods and services (education, health, water, electricity and public housing) to the public at a subsidised price. Figure 1 describes how bureaucrats engage in rent-seeking activities when government subsidies are provided.

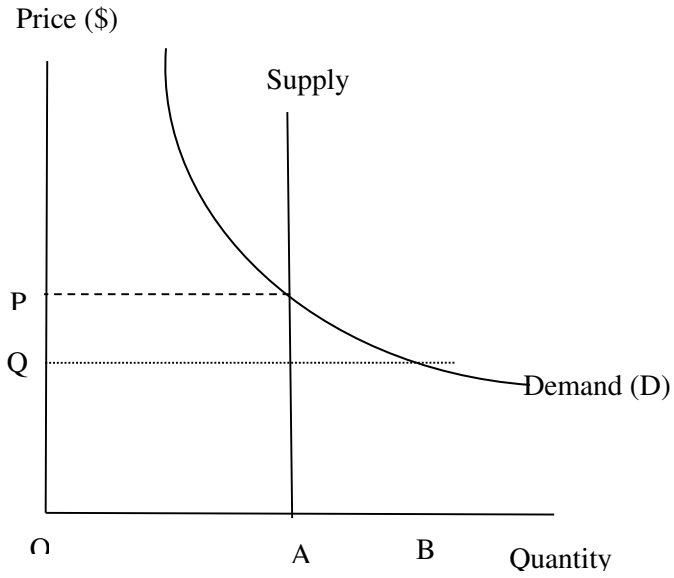

Figure 1.Supply and demand of subsidies

Source: (Tanzi, 1998, pp. 14, Figure 1)

According to Figure 1, the government has a limited number of supply of goods and services (OA). Considering the demand (D) and supply (S), the equilibrium price is P under free market conditions. The government decides the price is Q and it is less than the equilibrium price. At

price Q, the quantity demanded is equal to OB. Therefore, due to the lower price, an additional demand AB will be created. This additional demand will create an opportunity for the government officers to seek bribes.

Tanzi (1998) identified many reasons for the supply of corruption including quality of bureaucracy, public sector wages, the penalties for corruption, institutional corruption control mechanisms, transparency of rules and regulations to the public and examples set by the leadership. A huge variation exists in the quality of bureaucrats expected from country to country. Evans and Rouch (1999) found a significant positive relationship between economic growth and bureaucratic quality.

Government sector wage levels play an important role relevant to the reduction of corruption. Rijckeghem and Weder (1997) studied the relationship between public sector wages and the level of corruption and the result stressed the importance of wage increases in the government sector to reduce the corruption. Figure 2 illustrates the general relationship between corruption and government sector wages. When government sector wages are low, the level of corruption is high and when government sector wages are high, the expected corruption level is low (Tanzi, 1998, P.17. Figure 2). In some countries, the government sector is relatively large and a large government sector leads a low wage levels bound to the high level of corruption.

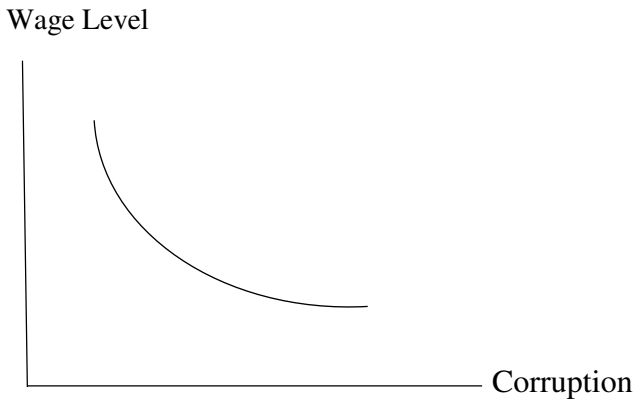

Figure 2. The general relationship between the government wage level and corruption
Source: (Tanzi, 1998, p. 17, Figure 2)

4.4.Political Stability on economic Growth

Political stability defines that the potential for maintaining a stable government without affecting from constitutional or unconstitutional changes (Alesina et al., 1992). The government or the political regime may change due to the voting power of the people within the constitutional framework of the country. In some countries, the political regime may change due to unconstitutional actions such as civil war.

In another view, Feng (1997) argues that the political stability of a country may shift due to regular government change and irregular government change. In this view, regular government change is similar to constitutional change. Irregular government change may happen due to major irregular government change (e.g. unconstitutional change) and minor irregular change (e.g. policy change) (Feng, 1997). The irregular political changes create an uncertain condition for investors and therefore economic growth decreases. As a result, many negative impacts may arise in the economy in both the short-run and the long-run. However, major government changes may positively affect economic growth if the new government can create a better environment for local and foreign investors by reducing the country's risk and offering sound

and consistent policies. The minor irregular change involves policy change. Policy changes need to be applied while maintaining political stability and without creating an investment risk (Feng, 1997). The stable political environment of the country increases the human capital and physical capital accumulation and thereby induces the growth process (Younis *et al*., 2008).

4.5.Voice and accountability on economic growth

The political system of a country may be democratic or authoritarian or combine parts of both. Under a democratic system, public participation is important in the selection process of political leaders. Voice and accountability describe the public participation in governance. This dimension of governance is directly related to democracy and transparency. Democracy in a country allows people to choose their rulers by vote. In the literature, there are three main schools of thought about how democracy affects economic growth (Sirowy & Inkeles, 1990). These are the conflict perspective, the compatibility perspective and the skeptical perspective.

The conflict perspective theorises that higher economic growth can be achieved by an authoritarian political regime because successful policy implementation for reforms is difficult under a democratic political system (Sirowy & Inkeles, 1990). This theory asserts there is a trade-off between democracy and economic growth — if a country achieves a higher level of democracy before it reaches a threshold level of economic growth it may face difficulty in achieving a higher level of economic growth (Sirowy & Inkeles, 1990). Therefore, the correct sequence is to first create economic growth and then establish a greater standard of democracy (Sirowy & Inkeles, 1990).

Most developing countries today face difficulties achieving economic growth under democratic regimes because the governments in those countries have to take short-term policy decisions to satisfy the demands of various social groups. As a result, the government's capacity will erode because it allocates scares national resources to satisfy various social groups rather than

allocating them to achieve higher growth (Sirowy & Inkeles, 1990). In comparison with the democratic regimes, the authoritarian states can achieve greater economic growth due to a better capacity to control resources and implement policies (Sirowy & Inkeles, 1990). By underpinning the arguments raised by Sirowy and Inkeles (1990), Glaeser et al., (2004) claim that authoritarian regimes help poorer countries to improve their economic growth. After achieving some extent of economic growth, in the second stage, the political institutions then need to be refined.

Compatibility perspective is the opposite of the conflict perspective and it highlights the importance of democracy and freedom in achieving economic growth. Democracy and political freedom are the prerequisites for proper contract enforcement, the safeguarding of law and order, and market expansion to achieve vigorous economic growth (Sirowy & Inkeles, 1990). The compatibility perspective stresses several weaknesses in the conflict perspective such as a tendency towards corruption and resource waste, the limited capacity of centrally controlled systems and adverse impacts on enterprise development (Sirowy & Inkeles, 1990).

The skeptical perspective focuses on how some democratic mainstays such as the political party system, political culture and resource use in industrial sectors which have an independent influence on economic growth (Feng, 1997). In reality, both conflict and compatibility views are important concepts in economic growth. Democracy contributes to increased economic growth in two ways such as encouraging major regular government changes (changes within the constitution) and discouraging unconstitutional government changes (Feng, 1997). As the literature reveals, although East Asian economies show higher economic growth, the level of democracy in some of these countries is still poor. Therefore, it is imperative for the developing countries to understand the degree of democracy and the political mechanism that best supports them to achieve economic growth.

4.6. Relationships between governance and economic growth

In the literature, various kinds of indicators stand in as proxy variables for governance. However, recent studies have predominantly used the World Governance Indicators. These indicators observe the six different dimensions of governance such as voice and accountability, political stability and absence of violence/terrorism, regulatory quality, government effectiveness, control of corruption and the rule of law. This section discusses the impacts of some of the important governance factors on economic growth.

Kaufmann and Kraay (2002) claims that the relationship between quality of governance and per capita income is positive and strong. This argument apprehends a strong positive relationship between better governance and higher per capita income and a weak, negative correlation between higher per capita income and enhanced standards of governance (Kaufmann & Kraay, 2002). Under this scenario, although higher quality governance indicators encourage a higher per capita income, the higher per capita income does not follow through with improved governance quality. Emara and Jhonsa (2014) observed significant positive effects leading from governance quality to per capita income and a positive reverse relationship similar to that found by Kaufmann and Kraay (2002).

Corruption and economic growth nexus

Several studies have looked into the relationship between corruption and economic growth. However, this relationship varies from study to study and different studies show completely different results. Pere (2015) found an insignificant relationship between corruption and economic growth. Contrary to this, Mo (2001) concludes there is a 0.72% reduction in growth rate, per 1%increase in the level of corruption. According to Aidt, Dutta and Sena (2007), the impact of corruption varies from country to country in accordance with the prevailing political regime. It can be argued that the influence of corruption is more harmful for the countries that have sound political institutions while the negative effects of corruption are reduced in the

countries with a corrupt political regime. Mo (2001) studied the impact of corruption on economic growth through different channels. According to his study, 53% of the overall negative impact of corruption on economic growth is contributed by political instability. In addition to that, the level of corruption depends highly on other institutional qualities such as culture and history (Treisman, 2000, Mo, 2001). Ata and Arvas (2011) argue that corruption has a link to the social, economic, cultural and judicial systems of a country. As mentioned in Treisman (2000), the degree of democracy in a country does not impact significantly on the level of corruption. Further to that, Mauro (1995) has revealed a significant negative relationship between corruption with both investment and economic growth.

Political stability and economic growth nexus

Political stability is an important factor relevant to the growth process, and some studies show a significant positive relationship between political stability and economic growth (Younis et al., 2008; Ramadhan et al., 2016; Tan & Abosedra, 2014; Aisen & Veiga, 2011). The political system of the country plays a key role in maintaining the political stability of the country. Both democratic regimes and the multiple party system combine to reduce political stability and thereby reduce economic growth (Younis et al., 2008). China's economic miracle can be linked to the one-party political system and high levels of political stability. On the other hand, it is reasonable to argue that low economic prosperity in India is to better levels of democracy and a multi-party political system (Younis et al., 2008). However, Pere (2005) found that political stability did not have a statistically significant effect on economic growth. Alesina et al. (1992) reveal that political instability has a negative and significant impact on economic growth.

Voice and accountability and economic growth nexus

The voice and accountability variable links with the political system of the country. The participation of people in the governance process is high in a democratic system in comparison with more authoritarian systems. Higher levels of democracy mean increased levels of voice

and accountability, which in turn allow the rise of multiple political parties. Economic reform is more difficult under multiple political parties because the reforms create a heightened political risk for the next period of office for the existing ruling party. Decisions of the political elites are based on the self-interest and uncertainty (Adam, 2000). Ruling elites may not take the necessary action to undertake the required policy reforms under this uncertainty and therefore, it may hinder economic growth. Supporting this argument, Gani (2011) finds that voice and accountability have a significant and negative affect on economic growth.

On the other hand, voice and accountability play a major role in the control of corruption and regulatory quality, and the rule of law. Mo (2001) shows that increasing corruption levels decrease the economic growth while Gani (2011) claims that, for developing nations, there is a negative and significant relationship between corruption control and economic growth. In addition to that, the regulatory quality and the rule of law show a negative but not significant association with economic growth (Gani, 2011). In balancing the empirical evidence, Salahodjaev (2015) reveals that a combination of impaired democracy and lower levels of social capital decrease economic growth. He/She further argues that democracy influences economic growth under the constraints of other social conditions such as the cognitive capacity of people in the society.

The relationship between other governance factors and economic growth

The Rule of Law is an important institution concerning economic growth because it directly links to ensuring personal security, property rights, unbiased contract enforcements and control of corruption (Haggard & Tiede, 2011). A government needs to maintain law and order, judicial independence and control of corruption to maintain the rule of law and to avoid the consequences of government failure. Rogobon and Rodrik (2004), Butkiewicz and Yanikkaya (2004) and Hoggard and Tiede (2011) all emphasise a positive relationship between the rule of law and economic growth. The operation of the rule of law in developed countries is much

more robust than in developing nations. When developing countries suffer from impaired rule of law there is an increased probability of corruption, expropriation and violence (Hoggard & Tiede 2011). Rogobon and Rodrik (2004) and Butkiewicz and Yanikkaya (2004) argue that both rule of law and democracy together play a more critical role in increasing economic growth rather than just the rule of law alone.

Government effectiveness includes the quality of government service, competent policy formulation and its ability in implementation of the desired policy (Kaufmann, Kraay and Mastruzzi, 2010). Regulatory quality is also a complementary governance indicator for government effectiveness, describing the capacity of governments to take effective policy decisions to promote private sector growth (Kaufmann, Kraay & Mastruzzi, 2010). La-Porta et al., (1999) highlight the importance of limited government intervention, a competent bureaucracy, and legitimacy in property rights and contract enforcement in the process of economic growth. As Easterly and Levine (1997) explain, there is an enormous income diversity among ethnic groups in Africa and one of the binding factors to this diversity is ineffective public policy. An unequal distribution of public goods underpinned by poor public policies may increase the inequality among different communities and different ethnic groups and thereby affect economic growth. In addition, La Porta et al. (1999) claim that better performing governments in developed nations collect a higher percentage of tax than those that perform poorly in the developing nations. The governments with a higher tax income can invest in human and physical capital formation. Burnside and Dollar (2000) mention that foreign aid is more effective if the recipient country has a sound and supportive policy environment.

5.DATA AND METHODOLOGY

5.1. Description of data

This study uses the aggregated data from the World Bank. The data relevant to governance indicators (political stability and absence of violence/terrorism, control of corruption and voice and accountability) was gathered from the World Bank governance indicators database (The World Bank, 2016a). Data relevant to real per capita GDP purchasing power parity, foreign direct investment, gross capital formation, government consumption and trade openness data were taken from the world development indicators database of the World Bank (The World Bank, 2016b). The regional classification of countries was based on the World Bank's country classification (The World Bank, 2016c). The categorisation of countries into different income groups was done based on the World Bank analytical classification data (The World Bank, 2016d). This study uses data from 145 countries for a 13 year period. There are three governance variables, four control variables and eight dummy variables in this study. The descriptive statistics of this study can be shown in Table 1.

Table 1. Descriptive statistics of governance variables and control variables.

Variance	Mean	Standard Deviation	Minimum	Maximum
lngdp	9.196	1.243	6.200	11.829
cc	0.046	1.035	-1.836	2.553
pv	-0.086	0.956	-2.812	1.665
va	0.005	0.955	-2.099	1.826
fdi	5.360	10.635	-79.797	255.423
gcapf	24.332	8.644	1.525	116.204
gcons	15.488	5.066	2.047	32.232
trad	91.692	55.199	19.118	455.277
ssa	0.234	0.424	0	1
mena	0.103	0.304	0	1
sa	0.165	0.371	0	1
la	0.048	0.214	0	1
ca	0.145	0.352	0	1
eap	0.124	0.330	0	1
hi	0.300	0.458	0	1
li	0.217	0.413	0	1

The governance variables represent the control of corruption (cc), political stability and absence of violence/terrorism (pv) and voice and accountability (va). Foreign direct investment (fdi), gross capital formation, (gcapf), government consumption (gcons) and trade openness (trad) are the control variables. Sub–Saharan Africa (ssa), the Middle East and North Africa (mena), South Asia (sa), Latin America (la), Central Asia (ca), East Asia and the Pacific (eap) are the regional dummies. The dummy variables include high-income countries (hi) and low-income countries (li).

When comparing the mean values of governance indicators, the mean value of political stability and absence of violence/terrorism indicator is lower than the control of corruption and voice and accountability. The control of corruption indicator shows a higher value than the other two indicators. The mean value is 0.046 and the standard error is 1.035. Each of variable is discussed in details in the following sections.

Table 2. Pairwise comparison for governance variables and dependent variable.

	cc	pv	va	lngdp
cc	1.0000			
pv	0.7521(0.0000)	1.0000		
va	0.7777(0.0000)	0.6607(0.0000)	1.0000	
lngdp	0.7187(0.0000)	0.6241(0.0000)	0.5196(0.0000)	1.0000

Note: Correlation coefficients are outside the brackets and the p-values are inside the brackets.

Table 2 compares the correlation between the each pair of variables relevant to the control of corruption (cc), political stability and the absence of violence/terrorism (pv), voice and accountability (va) and the log of real per capita GDP (purchasing power parity) (lngdp). In the Table 2, the values outside the brackets show the correlation coefficient between two variables, and the values inside the brackets show the p-values relevant to the relationship. The

p-values indicate that sample means are significantly different among varying governance indicators and each governance indicator with the dependent variable. Table 3 shows the the change of governance variables and the dependent variabl over the time from 2002 to 2014.

Table 3. Changes of means of the variables over time

Year	Variables			
	lngdp	**cc**	**pv**	**va**
2002	9.017	0.044	-0.070	0.002
2003	9.044	0.065	-0.090	0.005
2004	9.088	0.047	-0.095	0.032
2005	9.125	0.038	-0.083	0.018
2006	9.168	0.050	-0.080	0.010
2007	9.212	0.055	-0.081	0.007
2008	9.233	0.056	-0.093	0.000
2009	9.217	0.050	-0.115	-0.003
2010	9.246	0.048	-0.115	-0.002
2011	9.273	0.041	-0.090	-0.002
2012	9.292	0.032	-0.085	-0.008
2013	9.309	0.041	-0.079	-0.010
2014	9.324	0.029	-0.041	0.020

Governance variables

Daniel Kaufmann and Aart Kraay developed the six governance indicators by aggregating the data from different sources (Kaufmann & Kraay, 2002). These indicators caught general perceptions about governance and were based on several hundred indicators from 31 data sources (Kaufmann, Kraay & Mastruzzi, 2010). These data sources are from main four types of sources including commercial business information providers, various kind of surveys, the data from non-government organisations and public sector information. The estimate for each governance indicator lies approximately between -2.5 (poor governance quality) and +2.5 (very high governance quality). According to Kaufmann, Kraay and Mastruzzi (2010), all these indicators are composite indexes.

The world governance indicator database provides yearly data relevant to the above-mentioned governance indicators for a large number of countries for the period from 2002 to 2014

continuously. These governance indicators are voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, the rule of law and control of corruption. In this research only control of corruption (cc), political stability and absence of violence/terrorism (pv) and voice and accountability (va) indicators were selected to use as explanatory variables, due to three main reasons.

First, the general relationship of the indicators shows the government effectiveness, regulatory quality and the rule of law indicators are highly dependent on political stability and absence of violence/terrorism (pv), control of corruption (cc) and voice and accountability (va) indicators. Therefore, this research assumes that political stability and absence of violence/terrorism, control of corruption and voice and accountability are key governance indicators. Second, this research considers only the variables that have correlation coefficients of less than 80% because it avoids the multicollinearity problem. By comparing the different combinations of variables, only control of corruption (cc), political stability and absence of violence/terrorism (pv) and voivece and accountability (va) show the correlation coefficients of less than 0.8 compared with other governance indicators. Third, it is important to keep a level of parsimony in the model and, adding more variables can damage the parsimony of the model.

a.Political stability and absence of violence/terrorism

As Kaufmann, Kraay and Mastruzzi, (2010) explain this indicator measures the possibility of changes in government due to unconstitutional reasons. The unconstitutional reasons may include terrorism or politically related violence. This indicator covers unconstitutional reasons including interstate war, civil war, terrorism, protest and riots, government stability, political crises and civil unrest — things that cause a government to change (The World Bank Group, 2016a).

b.Voice and accountability

This indicator measures the government's ability to protect the country's democracy and respect citizens' rights by considering the level of citizen participation in the selection of government, the citizens' level of freedom of expression and association, and media freedom (Kaufmann, Kraay & Mastruzzi, 2010). Some of the important components of this indicator include the democracy, accountability of public officials, human rights, freedom of association and demonstration, civil liberties and media freedom. In addition, this indicator takes into account the electoral system, transparency of government, protection of the rights of minority groups, the reliability of the state's financial system, freedom of exit and entry to the country and use of military power in politics (The World Bank Group, 2016a).

c.Control of corruption

According to Kaufmann, Kraay and Mastruzzi (2010), the control of corruption indicator captures the perception relevant to the level of public power used for private interests. The corruption ranges from small scale examples to the capturing of the state power by elites. The indicator measures the behaviour of politicians and public officials in relation to corruption by considering irregular payments, transparency and accountability in the government sector and any anticorruption activities. The irregular payments may happen within various avenues such as export and import, public utilities, public contracts, tax collection and judicial decisions (The World Bank Group, 2016a).

Dependent variable

The dependent variable is the log of the real gross domestic product (GDP) based on purchasing power parity, and the unit of measurement is the constant international dollar in 2011. The purchasing power parity based GDP eliminates the changes in price levels over the period and thereby allows for a more reliable estimation.

Control variables

The control variables allow the study of the impact of governance indicators when other factors are controlled. In this study control variables include the foreign direct investment (fdi), gross capital formation (gcapf), government consumption (gcons) and trade openness (trad). The foreign direct investment (fdi) contains the net inflow of foreign direct investment as a percentage of GDP. Gross capital formation is measured as a percentage of GDP and considers the changes in fixed assets and the level of inventories. Government expenditure measures the government's final consumption expenditure on purchasing of goods and services as a percentage of GDP. Trade openness calculates the sum of imports and exports as a percentage of GDP (The World Bank, 2016b).

Regional dummies

According to Acemoglu, Johnson and Robinson (2004), cross-country differences are based on institutions, geography and culture. Diamond (1997) and Sachs (2001) stress the importance of geography on agricultural and economic systems. Based on this evidence, one of the objectives of this research is to investigate the relationship between governance indicators and economic growth in the different regions of the world. The regional dummies included represent the Sub-Saharan-Africa (ssa), Middle East and North Africa (mena), South Asia (sa), Latin America (la), Central Asia (ca), and East Asia and the Pacific (eap). Each country included in the samples is separated by the regions based on the World Bank's country classification in 2016 (The World Bank, 2016c).

Dummy variables for the level of income

According to Grief (1994) and Guiso et al. (2006) the cultural impact on the economic system varies between high-income countries and low-income countries. Therefore, the dummy variables for high-income countries (hi) and low-income countries (li) are included in order to estimate the impact of governance on economic growth due to the income level of the country.

Based on the World Bank data, all countries are divided into three groups such as low income, middle income and high-income.

5.2. Sampling

In most of the cross-country analysis, the researchers select samples based on the data availability (Ray, 2002). This study includes 145 countries based on the data availability for each variable. As shown in the tables, this sample includes the countries representing the various regions of the world and different income groups. The sample used in this study is highly representative, and it increases the precision power of the estimates. This sample was taken representing the Sub-Saharan Africa, Middle East and North Africa, South Asia, Europe and Central Asia, East Asia and the Pacific, and North America.

Table 4. Distribution of samples.

4(a) Based on the geographical region

Region	Number of countries in the sample
Central Asia	19
East Asia and Pacific	18
Latin America	24
Middle East and North Africa	15
South Asia	7
Sub-Saharan Africa	34
Other*[1]	28
Total	**145**

4(b) Based on the income levels

Income level of the countries	Number of countries in the sample
Low income	22
Middle income	50
High income	37
Low to middle income (during the period)	23
Middle to high income (during the period)	12

[1] Other* category represent the 26 European Union members, the United State and Canada

Low to high income (during the period)	1
Total	**145**

5.3. Econometric model

The econometric model is used for the balanced panel in this study and the econometric model is analysed using the pooled ordinary least square method (Pooled OLS), fixed effects (FE) method and random effects method (RE). The Pooled OLS estimation compares with the fixed effects estimation using the F test. The Breusch and Pagan Lagrangian multiplier (LM) test is used to compare the random effects model with Pooled OLS model. The fixed effects model compares with the random effects model using the Hausman test. Although the Hausman test indicates the fixed effects model is more appropriate than the RE model, the random effects model is used to explain the regional effect because the Hausman test omits all the regional dummies. Both fixed and random effects models have corrected for heteroskedasticity and serial autocorrelation before being used in the interpretation. However, As Torres-Reyna (2007) mentions, serial correlation does not create problems if the time series data is less than 20 years, as applies to this study.

The governance indicators include control of corruption (cc), political stability and absence of violence/terrorism (pv) and voice and accountability (va). Foreign direct investments (fdi), gross capital formation (gcapf), government consumption (gcons) and trade openness (trad) are the control variables. $\beta 1$ to $\beta 7$ represent the corresponding coefficients for governance indicators and the control variables. The error term is $\varepsilon_{(it)}$, i and t indicate the country and time respectively. The dependent variable (lngdp) is the log of real per capita GDP (purchasing power parity based) of the constant international dollar (2011). regional dummies for Sub-Saharan Africa (ssa), the Middle East and North Africa (mena), South Asia (sa), Latin America (la), Central Asia (ca) and East Asia and the Pacific (eap) indicate in corresponding coefficients from $\delta 1$ to $\delta 6$. $\gamma 1$ and $\gamma 2$ indicate the coefficients for high-income countries (hi) and low-income countries (li) respectively.

Pooled OLS model (Equation 1.)

$$lngdp_{it} = \propto + \beta_1 cc_{it} + \beta_2 pv_{it} + \beta_3 va_{it} + \beta_4 fdi_{it} + \beta_5 gcapf_{it} + \beta_6 gcons_{it} + \beta_7 trad_{it} + \delta_1 ssa + \delta_2 mena + \delta_3 sa + \delta_4 la + \delta_5 ca + \delta_6 eap + \gamma_1 hi + \gamma_2 li + \varepsilon_{it}$$

i=1, ……,145, t=1,……,13 $\propto$: Constant

Fixed effects model (Equation 2.)

$$lngdp_{it} = \beta_1 cc_{it} + \beta_2 pv_{it} + \beta_3 va_{it} + \beta_4 fdi_{it} + \beta_5 gcapf_{it} + \beta_6 gcons_{it} + \beta_7 trad_{it} + \delta_1 ssa + \delta_2 mena + \delta_3 sa + \delta_4 la + \delta_5 ca + \delta_6 eap + \gamma_1 hi + \gamma_2 li + \alpha_i + \varepsilon_{it}$$

α_i: Group-specific constant term

Random effects model (Equation 3.)

$$lngdp_{it} = \beta_1 cc_{it} + \beta_2 pv_{it} + \beta_3 va_{it} + \beta_4 fdi_{it} + \beta_5 gcapf_{it} + \beta_6 gcons_{it} + \beta_7 trad_{it} + \delta_1 ssa + \delta_2 mena + \delta_3 sa + \delta_4 la + \delta_5 ca + \delta_6 eap + \gamma_1 hi + \gamma_2 li + \alpha + u_i + \varepsilon_{it}$$

u_i: Group specific random term

6. RESULTS

Selection of model

The specified econometric model is estimated for pooled OLS (Equation 1.), fixed effects (Equation 2.) and random effects model (Equation 3.). Both fixed and random effects models were estimated without robust standard errors. According to the p-value, all three models are significant at the 5% level. Although any of these models can be used, it is important to identify the most appropriate model, and therefore the following mix of comparisons were conducted between models:

1. Pooled OLS against the fixed effects

2. Pooled OLS against the random effects

3. Fixed effect against the random effects.

Pooled OLS vs fixed effects

The results from F test for the fixed effects model are as follows:

F test that all u_i=0: Prob>F=0.0000 F statistics:18.70

According to above results, the p-value of the fixed effects model (p=0.000) is less than 0.05 and therefore the null hypothesis ($u_i = 0$) is rejected (Stata Corp, 2013) and we conclude that fixed effects model is more appropriate than the random effects model in this analysis.

Pooled OLS vs random effects

Breusch and Pagan Lagrangian multiplier test is used to differentiate the best model between the random effects model and the Pooled OLS model (Park, 2011; Torres-Reyna, 2007). According to the Breusch and Pagan Lagrangian multiplier test, chibar^2 is equal to 4938.48 and the p-value of chibar^2 statistics is equal to 0.000. The probability of chibar^2 statistics is less than 0.05. Then we reject the null hypothesis and draw the conclusion that the random effects model is more appropriate than the fixed effects model (Stata Corp, 2013).

Fixed effects vs random efffects

The Hausman test can differentiate the best choice between the random effects and fixed effects models. The result obtained from Hausman test is as below:

Chi^2 statistic = 315.6 , P-value of chi^2 statistics =0.0000

Because the p-value of the test is less than 0.05, the null hypothesis (H_0) of the Hausman test is rejected. As a result, the fixed effects model is more appropriate than random effects method in this study (Wooldridge, 2009).

Diagnostic test for fixed and random effects models

The diagnostic tests were conducted for multicollinearity, heteroskedasticity, serial correlation and stationary.

The Variance Inflationary Factor (VIF) was analysed in the model as in and the result of the test can be seen in Table 5. However, in this analysis, the VIF values of all variables are less than 6 and the mean VIF is 2.55. Therefore, this model does not include multicollinearity problems.

Table 5. VIF values from the multicollinearity test.

Variable	VIF
cc	5.82
va	4.62
ssa	3.67
pv	3.03
hi	2.90
la	2.39
mena	2.24
eap	2.11
li	2.06
ca	1.97
sa	1.89
gcons	1.64
trad	1.46
fdi	1.24
li	1.24
Mean VIF	**2.55**

Table 6.Test results

$Chi^{2\ test}$ test for Fixed Effect Model	Chi^2 statistics =0.0000

Breusch and Pagan Lagrangian multiplier for Random Effect model	p-value=0.0000
Wooldridge test for Autocorrelation	F statistics is equal to 452.502 and the probability of F statistics is equal to 0.000.
Levin-Lin-Chu test for the unit roots relevant to the governance and control variables	p-value of all tests were 0.000

Fixed effects and random effects models estimated with the robust standard errors

Both fixed effects and random effects models are re-estimated with robust standard errors to correct the model for heteroskedasticity and serial autocorrelation (Stata Corp, 2013;Wooldridge, 2002).

Results from both fixed effects estimation and random effects estimation are summarised in Table 7.

Table 7. The estimation resuts from random effects and fixed effects models.

(values are reported outside the brackets, saying the coefficients relevant to each variable and the robust standard errors are included inside the brackets)

Dependent variable: log of real per capita GDP (PPP)

Variables	**Fixed effects (FE)**	**Random effects (RE)**
cc	0.069 (0.033)**	0.136 (0.028)***
pv	0.043 (0.032)	0.059(0.032)*
va	-0.041(0.049)	-0.013(0.045)
fdi	-0.001(0.001)	-0.001(0.001)
gcapf	0.004(0.002)**	0.004(0.002)**
gcons	-0.003(0.004)	-0.004(0.004)
trad	-0.000(0.000)	0.000(0.000)
ssa	-	-1.839 (0.180)***
mena	-	-0.060(0.254)
sa	-	-1.595(0.177)***
la	-	-0.809(0.107)***

ca	-	-0.519(0.184)***
eap	-	-0.519(0.219)**
hi	0.180(0.024)***	0.253(0.027)***
li	-0.268(0.032)***	-0.298(0.033)***
cons	9.179(0.087)***	9.950 (0.122)***
N (obs)	1885	1885
N(groups)	145	145
R^2 (Overall)	0.83	0.73

Significant:***1% Level, **5% level, *10% level

The p-value of both random effects and fixed effects models is 0.0000. Then, at the 5% significance level, the p-values of both models is less than the critical value (p=0.05). Therefore, the overall model becomes significant at the 5% level of significance. This conclusion is valid for both fixed and random effects models and both models with robust standard errors are significant at the 5% significance level.

In fixed effects and random effects models, the overall R-Squared are 0.83 and 0.73 respectively. This means, in the fixed effect model, the explanatory variables can explain 83% of the variation in the log of real GDP per capita (PPP), and in the random effects model it is 73% percent. The within and between R^2 for the fixed effects model are 0.2 and 0.88 respectively. The random effects model is concerned, the within and between R^2 are 0.19 and 0.73 respectively.

As indicated in Table 7, the coefficients of constant show a positive sign and approximately similar values in both the fixed and random effects models. The values of the coefficients of constant and the robust standard error are 9.179 and 0.087 respectively in the fixed effects model. The magnitudes of the coefficients and the robust standard error in the random effects model report the 9.950 and 0.122 respectively. The coefficients in both fixed and random effects models are significant at the 5% level of significance.

The coefficients for control of corruption, political stability and absence of violence/terrorism and the voice and accountability variables are 0.069, 0.043 and (-0.041) respectively. However, for the random effects model, coefficients for control of corruption (cc), political stability and absence of violence/terrorism (va), and voice and accountability (va) indicators show 0.136, 0.059 and (-0.013). There is a difference between coefficients of governance indicators in fixed effects and random effects models. However, the standard errors for each governance variable in both fixed and random effects models are very similar. The robust standard errors for control and corruption (cc), political stability and absence of violence/terrorism (pv) and voice and accountability (va) variables in the fixed effects model are respectively 0.033, 0.032 and 0.049 respectively. In the random effects model, the standard errors for control of corruption (cc), political stability and absence of violence/terrorism (pv) and the voice and accountability (va) are 0.028, 0.032 and 0.045. The corruption control (cc) variable show the statistical significance at 5% significant level in both the fixed effect and the random effects model. Although political stability and absence of violence/terrorism (pv) do not become significant in the fixed effects model, it is significant at the 10% level of significance in the random effects model. The voice and accountability (va) indicator does not become significant at any of these models. The coefficients of both control of corruption (cc), and political stability and absence of violence/terrorism (pv) indicators show the positive sign, while the coefficient of voice and accountability (va) indicator shows the negative sign in both fixed and random effects models.

The coefficients of control variables are approximately similar in both fixed and random effects models. In both models, coefficients for foreign direct investments (fdi), gross capital formation (gcapf) and trade openness (trad) are approximately equal and the values for each variable are (-0.001), 0.004 and (-0.000) respectively. The coefficient of government consumption is (-0.003) in the fixed effects model and (-0.004) in the random effects model. The standard errors of both models are similar. The robust standard errors for foreign direct investments (fdi), gross capital formation (gcapf), government consumption (gcons) and trade openness (trad) follow

0.001, 0.002, 0.004 and 0.000 respectively. It is important to highlight that the only significant control variable in this model is gross capital formation (gcapf). The gross capital formation (gcapf) becomes significant at the 5% level of significance by showing the positive sign. All other control variables show a negative correlation to the log of real per capita GDP (PPP).

The fixed effects model omits the regional dummies because those variables are time invariant. However, the random effects model captures the impacts of regional effects on economic growth. Most importantly, all these coefficients show a negative sign because the economic growth in the reference group[2] is higher than in real per capita GDP (PPP) than in any other region of the study. The lowest coefficients reported are from Sub-Saharan Africa (-1.839) and South Asia (-1.595). The robust standard errors for Sub-Saharan Africa (ssa) and the South Asia (sa) are 0.180 and 0.177 respectively. Following the Sub-Saharan Africa and the South Asia, the third lowest coefficient was observed in the result for Latin America, and the magnitudes of the coefficients and standard errors are (-0.809) and 0.107 respectively. The observed values of the coefficient for both Central Asia (ca), and East Asia and the Pacific (eap) are similar and it is (-0.519) in number. However, the robust standard errors for these regions are considerably different. The robust standard error for the Central Asia (ca), and the East Asia and Pacific regions are 0.184 and 0.219 respectively. The real per capita GDP growth in the Middle East and North Africa region is less deviated from the reference group. The values for the coefficient and the robust standard errors in the Middle East and North Africa region are (-0.060) and 0.254. Except for the Middle East, all other regional dummies become significant at the 5% level of significance. The regional dummy for the Middle East and North Africa is insignificant.

When the dummy variables for the income levels are considered, the dummy variable for the high income group shows a positive sign in comparison with the reference[3] group in both

[2] Reference group of the regional dummy includes the European Union member countries, the United States and Canada.
[3] Reference group of the dummy variable for the income group is the middle-income countries.

random and fixed effect model. The value of the coefficient of the high income dummy variable is 0.180 in the fixed effects model and it is 0.253 in the random effects model. The standard errors of the coefficients of the dummies for the high income group are 0.024 in the fixed effects model and 0.027 in the random effects model. In contrast to the high income dummy, the low income dummy shows a negative sign in comparison to the middle income reference group. The values of the coefficients and robust standard error for the low income dummy in the fixed effects model are (-0.268) and 0.032 respectively. As far as the random effects model is concerned, the value of the coefficient and the robust standard error of the low-income dummy are (-0.298) and 0.033 respectively. The dummy variables for both high and low income groups become significant at the 5% significance level.

Table 8. Antilogarithms of coefficents of regional and income dummies.

Dummy variable	The converted value of the coefficient
Sub-Saharan Africa (ssa)	(-84%)
Middle East and North Africa (mena)	(-6%)
Latin America (la):	(-55%)
South Asia (sa):	(-80%)
Central Asia (ca)	(-40%)
East Asia and the Pacific (eap)	(-40%)
High Income Countries (hi)	19.7%
Low-income countries (li)	(-23.5%)

Comparision of control of corruption indicator on the regional and income differences

Control of corruption is the significant governance indicator at the 5% significance level in both fixed and random effects models. Therefore, analysis of variance (single factor) tests were conducted to compare the each pair of groups for control of corruption indicator (Black et al, 2013). The results from group wise comparison based on regions and income levels are summarised in table 9 and table 10.

Table 9. Comparision of control of corruption indicator for each pair of regions

	ssa	sa	la	ca	eap
sa	1.34 (0.0000)				
la	160.92 (0.0000)	22 (0.0000)			
ca	82 (0.0000)	16 (0.0000)	1.07 (0.299)		
eap	156 (0.0000)	52 (0.0000)	20 (0.0000)	21 (0.0000)	
Reference group	1326 (0.0000)	352 (0.0000)	361 (0.0000)	285 (0.0000)	100 (0.0000)

(Note: F-statistics are outside the brackets. The p-values are within the brackets)

Table 10. Comparision of control of corruption indicator for each pair of income group

	hi	li
li	1005 (0.0000)	
mi	1677 (0.0000)	218 (0.0000)

(Note: F-statistics are outside the brackets. The p-values are within the brackets)

Except the Central Asia-Latin America comparison, the P-value of all other all other pairs of comparison is less than 0.05. Then, at the 5% significance level, the control of corruption indicator is significantly different for each pair of groups. As far as income groups are concerned, the control of corruption indicator is significantly different for all pair of groups, at the 5% significant level.

7. Discussion

This research studies the impact of governance on economic growth using the widely accepted dataset from the years 2002 to 2014 (13 years for 145 countries). The analytical approach

follows the fixed effects and random effects models with robust standard errors, therefore these models do not suffer due to heteroskedasticity or serial autocorrelation problems. The models will not go for spurious regression because there is no serious multicollinearity among the explanatory variables and the variables become stationary. As the Hausman test suggested that the fixed effects model was more appropriate than the random effects model in this study, the results from fixed effects estimation with robust standard errors is used mainly for interpretation purposes. However, the random effects model with robust standard errors is used to explain the regional effects because fixed effects estimation omits all the regional variables. In addition to that, the random effects model with robust standard errors is also used in the discussion as required to show the important relationships. However, if it is not specifically mentioned as the random effects model, in all other places, for all other variables except the regional dummies are explained using the fixed effects model.

Impact of governance on economic growth

According to the empirical results of this study, the governance quality affects economic growth significantly. The corruption control is the most important determinant of economic growth and it can influence the economic growth more than any other growth determinants looked at in the study. As the fixed effects model of this research reveals, a one unit increase in control of corruption (cc) raises the real GDP per capita (PPP) growth on average by 6.9%, if all other variables are constant. The positive relationship between the real per capita GDP (PPP) and the control of corruption is statistically significant at the 5% significance level. The direction of the observed relationship between governance and economic growth is similar to the expected outcome. However, the political stability and absence of violence/terrorism (pv), and voice and accountability (va) indicators do not become statistically significant at the 5% level in the fixed effects model of this study.

In this study, control variables represent some of the other factors that determine economic growth, in addition to governance. When control variables are considered, only gross capital formation (gcapf) is significant at the 5% level of significance, and all other control variables are insignificant in both fixed and random effects models. The gross capital formation (gcapf) shows a positive relationship to the real per capita GDP (PPP) growth as theoretically expected. If all other variables are constant, 1% increases in the gross capital formation (gcapf) raises the economic growth on average by 0.4% at the 5% significance level in both fixed and random effects models. According to this study, other control variables, such as foreign direct investment (fdi), government consumption (gcons) and the trad (trad) show a negative relationship to the real per capita GDP growth. Therefore, it is obvious that the impact of governance on economic growth is higher than the effects of other variables such as foreign direct investments (fdi), gross capital formation (gcapf), government consumption (gcons) and trade openness (trad).

The political stability and absence of violence/terrorism (pv) show a positive relationship with the economic growth as expected. However, it is important to highlight that the political stability and absence of violence/terrorism (pv) indicator is significant at the 10% level of significance in the random effects model and the direction of the relationship is also positive. Therefore, there may be a practically significant relationship between the political stability and violence/terrorism (pv) indicator and economic growth.

The voice and accountability indicator (va) is not significant in both the fixed and random effects model. However, the result of the voice and accountability (va) indicator is negative in this research. This is an important finding of this research, and it highlights that some of the socially important factors like democracy and freedom do not affect economic growth significantly.

The study indicates the reality of the importance of corruption control in governance. Countries such as Afghanistan, Angola, Chad, Congo Democratic Republic, Congo Republic, Guinea-Bissau, Nigeria, Sudan, and Zimbabwe show a very low value in the corruption control indicator. For instance, the real per capita GDP (PPP) for 2014 is international $711 (constant 2011) in Congo Democratic Republic and it is 803 in Liberia. On the other hand, the countries that demonstrate the highest corruption control levels such as Denmark, Finland, Germany, Iceland, Luxemburg, Netherland, New Zealand, Norway, Singapore, Sweden and Switzerland have a higher real per capita GDP (PPP) that varies from international $34,263 to international $91,368. As Tanzi (1998) notes, with lower public sector wages and low-quality bureaucrats, the effectiveness of corruption control mechanisms is crucial. The higher corruption level in low-income countries may be associated with the reasons mentioned above. As Evans and Rouch (1999) explain, low bureaucratic quality in low-income countries may cause the high corruption and low economic growth.

Regional impact of governance and economic growth

As this study reveals, the real per capita GDP growth rate depends on the regional specific factors. The highest economic growth rate can be observed in the reference group, which represents the European Union member countries and the some of the North American countries. According to the random effects model, all other regional dummies are significant at the 5% significance level, except for the Middle East and North Africa region. Signs of the coefficients of all regional dummies are negative. The results indicate that the rates of real per capita GDP growth in Sub-Saharan Africa and South Asia are respectively 84% and 80% lower than the reference group. Latin America shows 55% lower growth rate in real GDP per capita than the reference group when all the other variables are constant. The real per capita GDP growth rates in Central Asia and, East Asia and the Pacific regions are on average 40% lower than the reference group.

In this sample, South Asia shows the lowest average value in political stability and the absence of violence (pv) indicator among all the regions of the world. The control of corruption indicator in South Asia shows the second lowest value, and it is only higher than the result for Sub-Saharan Africa. The voice and accountability indicator also demonstrates a lower value. When Sub-Saharan Africa is considered, it is the highest corrupted region in the world. The average value for the control of corruption indicator for the period is -0.671. The political stability and absence of violence/terrorism indicator shows the second lowest value in the sample, at -0.671 units. The political instability in Sub-Saharan Africa is high, and it is lower only in the South Asia region. It is important to highlight that the South Asia and Sub-Saharan Africa regions suffer due to higher corruption and lower political stability compared with other regions. The voice and accountability indicator of these two regions also shows a lower value. The high political instability and high corruption level may underpin the lower real per capita GDP (PPP) growth in the region.

The Central Asia classification includes a group of countries — excluding European Union members — which were categorised under Europe and Central Asia in the World Bank's country classification in 2016 (The World Bank, 2016c). The average value of control of corruption (cc), political stability and absence of violence (pv), and voice and accountability (va) indicators in Central Asia are -0.110, -0.067 and -0.071 respectively. Except for political stability and absence of violence/terrorism, both other governance indicators are lower in this region when sample means are considered.

When East Asia and the Pacific region is considered, the control of corruption and political stability and absence of violence/terrorism indicators are 0.046 and 0.299 in units, respectively. The value of the voice and accountability (va) indicator is -0.068. In both the control of corruption (cc) indicator and political stability and absence of violence/terrorism (pv) indicators, Central Asia shows negative value in both indicators while East Asia and Pacific regions also show a negative value in both indicators. The voice and accountability (va)

indicator is approximately similar in both regions. The overall governance in these two regions are also approximately similar. The real per capita GDP (PPP) in both these regions are on average 40% lower than the reference group, when all other variables are constant.

The regional dummy for Latin America indicates the real per capita GDP growth rate in Latin America is 55% per cent lower than the reference group, if all other variables keep constant. The observed growth rate for Latin America is lower than the Central Asia and East Asia regions and higher than the Sub-Saharan Africa and South Asia regions. The control of corruption indicator and political stability and absence of violence/terrorism indicators in this region are -0.031 and 0.061. However, the voice and accountability indicator is 0.360 in the Latin America result and it is much higher than both Central Asia, and East Asia and Pacific regions. The voice and accountability indicator in Latin America is second only to the value of that in the European Union member countries, the United States and Canada, which are included in the reference group. As explained by the econometric model, the higher voice and accountability leads to a lower economic growth result and Latin America may be affected due to this reason.

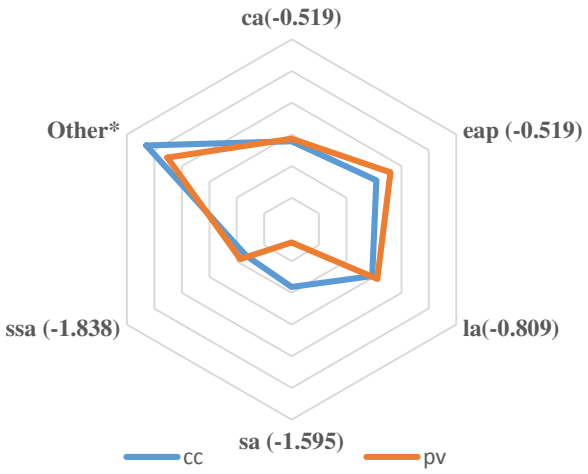

Figure 3. The relationship between governance indicators and real per capita GDP growth in different regions of the world

(In the figure 3, values mentioned in the brackets show the percentage of growth reduction in comparison with the reference[4] group.)

As above mentioned, there is a close relationship between the economic growth and the governance indicators in different regions of the world. Figure 3 illustrates the percentage reduction of real per capita GDP in each region of the world with the reference group which represents the European Union member countries and the North American countries. It clearly shows a higher percentage reduction in economic growth rate in each region is closely related to the lower mean values of control of corruption (cc) and political stability and absence of violence/terrorism (pv). For instance, there is a higher percentage reduction in growth rate for Sub-Saharan Africa and South Asia because these two regions show the lowest governance qualities relevant to all three governance indicators considered. These findings clearly show that there are regional-specific effects of governance qualities and this effect leads a regional variation in economic growth. Figure 3 shows how growth differences in different regions link with corruption control (cc) and political stability and the absence of violence/terrorism (pv) indicators.

According to table 7., the control of corruption indicator which is significant in both fixed and random effects models are considered, it is significantly different among all regions except Latin America-Central Asia comparison, at the 5% significance level. However, level of control of corruption is similar in both Latin America and Central Asia.

High income and low income counters

As the fixed effects model indicates, there is a difference in growth rates between high-income and low-income countries. As this research reveals, the high income and low income dummies are significant in both random and fixed effects models. In the fixed effect model, the real per capita GDP growth rate in high-income countries is 20% higher than in the middle-income reference group, if all other variables hold constant. On the other hand, on average, the real per

[4] The other* category in the Figure 3 represents the reference group.

capita GDP growth rate in low-income countries is 23.5% lower than the real per capita GDP growth rate in the reference group in the fixed effects model, when all other conditions are constant. Both coefficients are significant at the 5% significance level. As far as the signs of coefficients are concerned, it is positive for the high-income dummy and negative for the low-income dummy as theoretically expected. Following figure 4 illustrates the relationship between income level of countries and governance properties. According to the figure, both control and corruption and political stability and absence of violence/ terrorism indicators show a close relationship with income level of countries. The high-income countries have high level of corruption control and high level of political stability while low-income countries show a lower value in both control of corruption (cc) and political stability and absence of violence/ terrorism (pv) indicators. Each income group is significantly different in control of corruption indicator at the 5% level of significance. This means the high-income group is significantly different from rest of the countries in the sample at the 5% significance level. In addition, the low-income country group is also significantly different from both high and middle income countries at the 5% level of significance.

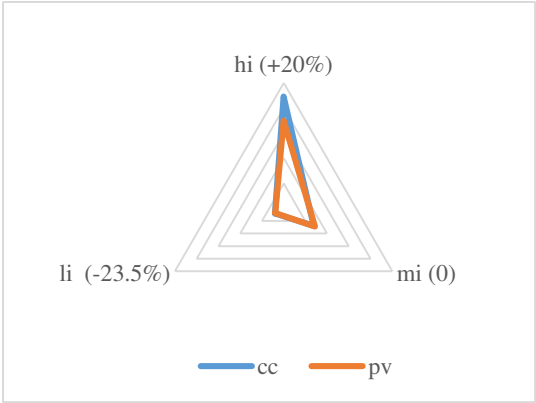

Figure 4 The relationship between governance indicators and real per capita GDP growth in different income groups of the world

The overall relationship

This research reveals that governance plays an important role as a determinant of economic growth. A one unit increment in the control of corruption indicator raises the real GDP per capita by 6.9% at 5% significance level. However, the political stability and absence of violence/terrorism (pv) indicator and the voice and accountability (va) indicators do not show a statistically significant relationship with the real per capita GDP growth in the fixed effects model. The regional specific effect on economic growth also needs to be considered when most of the geographical regions are examined. The income level of countries also has a direct relationship to the governance conditions. High-income countries have better governance qualities and higher real per capita GDP growth rates. The opposite relationship can be observed in the low-income countries. Therefore, the overall relationships can be summarised as follows in Figure 5.

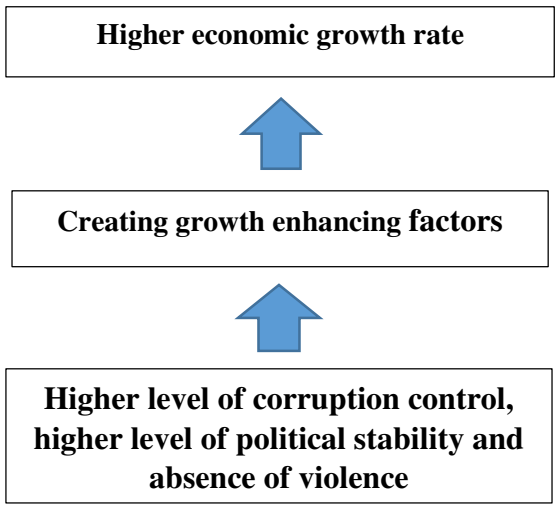

Figure 5. Overall relationship between governance and economic growth

According to the fixed effects model of this study, the control of corruption is the most important governance variable that influences economic growth. However, as random the

effects model indicates, the political stability and absence of violence (pv) indicator shows a significant relationship to the economic growth at the 10% significance level. In addition, the coefficients of both these relationships are positive. Therefore, it is practical to assume that the economic growth rate depends on both control of corruption (cc), and political stability and absence of violence/terrorism (pv) indicators.

The income level of the country and its geographical location has a direct influence on the control of corruption (cc) and the political stability and absence of violence/terrorism (pv). However, it is necessary to understand that the control of corruption, and political stability and absence of violence indicators may linked to many more social, economic and political factors.

Higher governance quality (such as lower corruption and higher political stability) increases human capital productivity and investment in technology and thereby increase the economic growth, following the Solow model and new growth theory. On the other hand, higher governance quality also improves institutional quality and the social infrastructure of the country and thereby increases economic growth, following social infrastructure theory. As an example, countries such as Switzerland, Norway and Iceland show a higher real per capita GDP, lower corruption level and higher political stability and those countries represent the high-income group. In addition, according to the World Bank classification, these countries fall into the Europe and Central Asia region. Countries such as Central African Republic, Chad and the Congo Democratic Republic, which have very low per capita GDP, show a higher level of corruption and a higher political instability. Finally, these countries represent the low-income group and share the same geographic region.

Control of corruption (cc) and political stability and the absence of violence/terrorism (pv) indicators may influence how a country is affected by both internal and external factors. These internal and external factors may increase or decrease the economic growth of a country by influencing the control of corruption (cc) and political stability and absence of

violence/terrorism (pv) indicators. For example, ethnic conflicts are internal factors because they arise in a country or in a particular geographic boundary. This internal cocnflict may decrease the political stability of the country and its economic growth may decline. Countries such as Iraq and Libya provide examples for the importance of political stability to the economic growth of a country. If the new government of a country takes rigid action to control corruption, it may increase the country's economic growth.

In addition to the internal factors, many external factors may influence the economic growth of a country. Interstate wars can jeopardise the political stability of countries within a short period of time. The resultant political instability may reduce the economic growth of a country and of the whole region. As far as the control of corruption is concerned, if international organisations or the international community influences the countries that have highly corrupted governments, they may cause an increase in the economic growth of the country or the region. Therefore, it is necessary to keep both political stability and control of corruption indicators in a balance to achieve a sustainable and long-run economic growth.

In our sample, 23 countries moved from the low-income category to the middle-income category between 2002 and 2014. During this period, economies of another 12 countries transited from middle-income group to the high-income group. The examples of the countries that transferred from the low income economies to the middle income economies include Indonesia, Mongolia, Vietnam and Georgia. All of these countries improved both real per capita GDP (PPP) and the governance qualities during the period. As Kaufman, Kraay and Mastruzzi (2010) point out, economic growth does not improve the governance qualities much, so we can assume these countries increased their real per capita GDP by improving their governance qualities. According to our data, when Georgia is considered, the country has improved the real per capita GDP in international dollars (constant 2011) from 3663 to 8749 between 2002 and 2014. In this period, the corruption control index of the country improved from -1.139 to 0.742. The political stability and absence of violence/terrorism indicator grew from -1.361 to -

0.233. In Indonesia, the real per capita GDP increased by international dollars (constant 2011) by 3912 between 2002 and 2014. This shows a 64% growth in comparison with 2002. During the period, corruption control (cc) and political stability and absence of violence/terrorism (pv) indicators improved by 0.557 and 1.252. These figures highlight the importance of the control of corruption and political stability and the absence of violence in reaching higher economic growth.

8. CONCLUSION

This research uncovers some of the most critical areas relevant to the empirical relationship between the governance and economic growth. Most countries make policies to deal with foreign direct investments, gross capital formation, government expenditure and international trade with the objective of achieving a higher economic growth. However, this research suggests that the impact of governance on economic growth may be greater than the effects of the other determinants. That means the influence on critical governance factors increases the economic growth at a higher rate than its influence on other growth determinants, such as foreign direct investment, gross capital formation, government expenditure and international trade.

Corruption control is the most important determinant of economic growth in the model. The control of corruption shows a significant positive relationship to economic growth at the 5% significance level, and it shows the highest contribution in the magnitude, among all other variables. By increasing one unit in the control of corruption indicator, the real per capita GDP (PPP) level increases on average by 6.9% at the 5% significance level, if all other variables are constant.

Economic growth is affected by regional specific characteristics. All other regions except the Middle East and North Africa, show a significantly lower real per capita GDP growth (PPP) in

comparison with the reference group. Further, the Middle East and North Africa exhibit insignificance and lower economic growth in comparison with the reference group. When South Asia and Sub-Saharan-Africa are studied, the economic growth of these two areas is lower than all the other regions. The economic growth in South Asia and Sub-Saharan Africa are respectively 80% and 84% lower in comparison to the reference group. While Latin America shows 55% lower growth in real per capita GDP than reference group, the growth reduction for both Central and East Asia and Pacific regions approximately 40%. Most importantly, the control of corruption indicator shows a close link with real per capita GDP growth in each region.

The study found that, economic growth rate of high-income countries is significantly higher than the low-income countries. On average, high-income countries show 20% higher economic growth rates in comparison to the middle-income reference group. When the relationship between low-income and the middle-income countries is considered, the economic growth in low-income countries is 23.5% lower than in the middle-income reference group.

As this research reveals, control of corruption increases economic growth. However, the political stability and absence of violence/terrorism indicator becomes significant at the 10% significance level in the random effects model, and the sign of the coefficient is positive. In addition, when the geographical regions and the income level of the countries are studied, the growth patterns show a close relationship between political stability and absence of violence indicators. Therefore, there may be a practical positive relationship between political stability and absence of violence indicators and economic growth. In practical terms, political stability and absence of violence/terrorism indicators need to be increased or managed effectively to get the benefits of the control of corruption. Therefore, both corruption control and political stability and absence of violence/terrorism are also the most important pillars of economic growth. If, in a country or a particular geographical region, one of these indicators (control of corruption and absence of violence) deteriorates, it may cause a decrease in the economic

growth in the country or the region. Therefore, the right mix of political stability and control of corruption is necessary to maximise the economic growth. Further, this research finds that the voice and accountability indicator is not significant in either the fixed or random effects models.

In conclusion, governance has a direct impact on economic growth. The control of corruption is a critical determinant of economic growth. It is important to manage both the control of corruption indicator, and the political stability and the absence of violence/terrorism indicator effectively to increase the economic growth. The regional specific characters and the income level of the country show a close relationship with the governance quality. Corruption control is the critical determinant of economic growth and a one unit increase in the corruption control causes on average a 6.9% increase in real per capita GDP at the 5 level of significance, if all other variables are constant. The proper mix of corruption control and political stability will have a positive effect on human and physical capital accumulation, improve the quality of institutions and other social infrastructure, and thereby increase economic growth. Therefore, countries need to improve both political stability and control of corruption to increase the economic growth.

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LIST OF COUNTRIES IN THE STUDY

Sub-Saharan Africa	**The Middle East and North Africa**	**South Asia**
Angola, Benin, Botswana, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Cote d'lvoire, Equatorial Guinea, Gabon, Ghana, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nambia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Uganda, West Bank and Gaza, Zimbabwe	Algeria, Bahrain, Egypt Arab Republic, Iran Islamic Republic, Israel, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates,	Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka,
Europe and Central Asia	**East Asia and the Pacific**	**Latin America**
Albania, Armenia, , Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Iceland, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Kazakhstan, Kyrgyz Republic, Lao PDR, Latvia, Lithuania, Luxembourg, Macedonia, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Suriname, Switzerland, Turkey, Ukraine, United Kingdom, Uzbekistan,	Australia, Brunei Darussalam, Cambodia, China, , Hong Kong, Indonesia, Japan, Korea Republic, Macao, Malaysia, Mongolia, New Zealand, Philippines, Singapore, Thailand, Vanuatu, Vietnam,	Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jameica, Mexico, Nicaragua, Panama, Paraguay, Peru, St Lucia, St Vincent, Uruguay

Note: In addition to the United States and Canada from North America were included