



Munich Personal RePEc Archive

Institutions and Economic Growth: Does Income Level Matter?

Aziz, Nusrate and Ahmad, Ahmad H.

Algoma University, Ontario, Canada;, Loughborough University,
Leicestershire, United Kingdom

6 January 2018

Online at <https://mpra.ub.uni-muenchen.de/83684/>

MPRA Paper No. 83684, posted 11 Jan 2018 06:29 UTC

Institutions and Economic Growth: Does Income Level Matter?

Nusrate Aziz¹ and Ahmad H Ahmad²

Abstract

This paper investigates whether a country's level of income matters to the effectiveness of institutions in fostering economic growth. The institutional variables are represented by democracy, corruption levels, and armed conflicts. The countries in the data-set are divided into high-, middle- and low-income countries based on the World Bank criteria. The overall results indicate that institutional variables have offsetting effects on economic growth. The performance of these variables appears to have been influenced by the countries' level of income. Labour, capital and human capital are found to be positive and significant variables for economic growth, irrespective of whether the countries are in high-, middle- and low-income groups. On the contrary, corruption affects GDP negatively in high- and middle-income groups, but positive, although insignificant in low-income countries. Democracy has a mixed effect on economic growth and largely negative in high- and low-income countries, but positive in middle-income group. Armed conflicts do not appear to have any statistically significant effect on high and middle-income countries' economic growth. However, it has a significant negative effect on low-income countries' economic growth.

Keywords: Institutions, income level, economic growth, panel study

JEL Code: C23, O43, O47

¹ Algoma University, Ontario, Canada, E-mail: Nusrate.Aziz@algomau.ca

² Loughborough University, UK

1. Introduction

Identifying sources of economic growth and the factors that could hinder it has been at the forefront of academic research with relevant policy implication. Initial work in the area is based on the neo-classical theory, which can be regarded as supply-oriented (Federici and Marconi, 2002). However, these models did not explicitly recognise the role of domestic policies, including trade policies to growth. The work of Kaldor (1970) introduced the role of international trade, particularly foreign-demand in fostering and sustaining economic growth to the literature. This sub-literature became known as the demand-oriented theory. The new growth theory also known as the endogenous growth models that largely based on the work of Romer (1986) and Lucas (1988) recognised the determinant role played by skills augmented efficiency, completion and capital flows to economic growth. Coe and Helpman (1995), Arrow (1962) Uzawa (1965) and Solow (1969) have all contributed towards the development of the theory.

Recent Literature (see among others Berg, *et al.*, 2012; Hausmann *et al.*, 2006; Easterly *et al.*, 2006) has identified important role played by institutional factors to growth, which have been largely overlooked by both the neo-classical and the endogenous growth theories. Empirical literature has also confirm importance of such variables to a countries growth, which include political variables like democracy, government stability, economic freedom, violence, frequent armed conflicts and level of corruption. A survey of this literature has been provided by Brunneti (1997). However, what is not clear is whether level of income of a country is a factor in the importance of these sunspots variables.

This paper has two objectives. First, it aims at bringing in further empirical evidence concerning the role of these variables in economic growth with a particular emphasis on the role of ‘polity’ score, existence of armed conflicts, and level of corruption, using both cross-sectional and panel data for 126 and 106 countries, respectively. Secondly, the paper investigates whether the effects of these variables vary according to the income level of a country. To this end, the countries in the sample are grouped into low-, middle- and high-income countries, using the World Bank classification scheme.

This study therefore examines two sets of variables – the traditional and institutional variables - in a growth model. Literature suggests that although there is a consensus about the positive effect of traditional variables such as labour and capital, on economic growth, however, the

influence of institutional variables are controversial. Existing studies apply either democracy or corruption or armed conflict in the growth regression. This is the first study (to the best of our knowledge) which applies these variables in the growth regression. This study will also assist in reducing the controversy about the ambiguous effect of institutional variables on economic growth.

The rest of the paper is organised as follows. Section 2 provides a brief review of the relevant literature on the importance of corruption, polity and conflict on economic growth. Section 3 discusses the theoretical framework and presents the empirical model used for the analysis as well as the data-set. Section 4 presents the empirical results while Section 5 concludes.

2. Brief Overview of the Relevant Literature

The modern-day world has come off a long way from the organic view of the state in which the existence of the citizens and their activities would exclusively mean for the welfare of the ‘state’ rather than the citizens themselves. The role of the government has thus shifted from maintenance of law and order, and governance to enhancing the standards of living of the citizens. This is, probably more true in democratic societies where leadership is conferred with mandates by the citizens than in other political systems. The perceived new role of the government apparently makes it to be performance-oriented. The achievement of these governments is contingent upon the presence or absence of certain parameters. The set of parameters include, among other things, governance, political violence, political volatility, corruption, and armed conflicts. In emphasising the role of the institutional variables, the contemporary growth literature brings to the forefront the *institutional* view on economic growth. The role of institutions in economic development was first identified by Lewis (1955). Later literature considers institutions as potential sources of differences in cross-country differences in growth (see, for example, North and Thomas (1973); Acemoglu *et al.* (2005); IMF (2005)). Rodrik (2005) develops a four-cluster taxonomy of institutions that is vital to the study of economic growth. The taxonomy includes (a) market-creating institution that ensures the security of the property rights and enforcement of contracts; (b) marketing-regulating institution responsible for command and control; (c) market-stabilizing institution chocking out fiscal and monetary policies; and (d) market-legitimising institutions that refer to the political regime that oversees the operation of the market. Thus, a clear synergy between economic institutions as embedded in the neoclassical theory, political institutions, and political regimes is now discernible.

The literature on economic institution-growth nexus is still evolving. The literature in this area largely draws from the development of economic institutions in many European colonies in the past 500 years. These included the provision for private property, introduction and/or maintenance of extractive institutions, migration of the Europeans to sparsely populated regions, introduction of legal rights and the quality thereof in protecting the investors, among other issues. Empirical evidence, though not free from controversy, is indicative of a positive impact of economic institutions on economic growth. Acemoglu, Johnson and Robinson (2001, 2002) find positive effects of the development of private property and the introduction of extractive institutions in previously poor regions. Acemoglu (2001) finds that settlements of Europeans, as proxied by mortality rates 100 years ago, have no effect on per capita GDP today. However, mortality rates are likely to have contributed to the development of institutions that may affect growth. La Porta *et al.* (1997, 1998) show that the degree of investor protection as spelled out in the legal systems has implications for the development of equity and stock markets. Better investor protection leads to greater debt and equity markets and also to better labour-market conditions which in turn may contribute to growth (Botero *et al.*, 2004; Mahoney, 2001). Deger, Lam and Sen (2011) find positive relationship between growth and economic institutions.

The theoretical underpinnings of the role of institutional variables³ to economic growth have been brought to light by Cass and Shell (1981, 1983). Cass and Shell (1983) argue that while *institutions* do not matter in the static Arrow-Debru economy with complete markets, it may matter in overlapping-generations models under certain conditions. Further, in the presence of *institutions*, equilibrium allocations are Pareto optimal in a ‘weaker’ sense’, “which is appropriate to dynamic analysis”. Bruneti (1997) has an extensive survey of the empirical literature concerning the effects of the sunspot variables on economic growth. The survey reviewed five categories of papers respectively concentrating on democracy, political volatility, government stability, political violence, and subjective political measures. Measures of political volatility and subjective political indicators have been found to have significant effects of economic growth followed by government stability and political violence. Other literature examines and re-examined the impact of traditional determinants such as economic endowment, labour force, physical capital and human capital of economic growth. There is hardly any debate about the direct and positive impact of these variables on economic growth.

³ They are also alternatively known as “animal spirits” or “market psychology”.

The focus of this study is therefore not the traditional determinants rather institutional factors of economic growth.

Democracy appears to have mixed results, and in most cases being unsuccessful in explaining economic growth. Fidrmuc (2003) suggests that democracy strengthens economic liberalization and effectively contributes towards growth. De Hann and Sturm (2003) find that democracy leads to greater economic freedom, which is an important ingredient in fostering economic growth of developing countries. Tavares and Wacziarg (2001) find that the net effect of democracy on growth is moderately negative. Barro (1996) and Helliwell (1994) also indicate an insignificant effect of democracy on the economic growth. Chan (2002), Dornbusch and Edwards (1991), Kohli (2004), and Leftwich (2005) document that democratic government finds it difficult to initiate painful economic reforms, which may have adversely affect the welfare of the people, even in the short-run. Deger, Lam and Sen (2011) find that political institutions including democracy do not have any conclusive effects on economic growth. A separate line of research on the association between democracy and economic growth conjectures that democracies and autocracies achieve, on average, equal economic growth, though democracies are less volatile (Doucouliago and Ulubasoglu, 2006; Mulligan, Giland Sala-i-Martin, 2004). Polity (a measure of democracy), in this study, is therefore included as one of the *institutional* determinants of economic growth to re-examine the impact of it on economic growth. Similarly corruption has been found to have adverse effects on the economic growth (Gyimah-Brempong, 2002; Keefer and Knack, 1997; Knack and Keefer, 1995; Li *et al.*, 2000; Mauro, 1995; Mo, 2001; Sachs and Warner, 1997). Ades and Di (1997), Mauro (1995), and Meon and Sekkat (2005) find that the association between corruption and economic growth to be constantly negative and more dominant in countries with allegedly high levels of red tape, weak legal system and extensive government inefficiencies. Mauro (1995) also states that corruption decreases the quantity of private investments, which ultimately adversely affects the growth. Tanzi and Davoodi (1997), Ehrlich and Lui (1999), Sarte (2000), Aidt *et al* (2007), Blackburna and Forgues-Puccio (2010), and Park (2012) also document negative effect of corruption on economic growth. Unlike democracy, the negative impact of corruption on economic growth is less controversial. This study investigates the effect of corruption using both cross-sectional and panel data which is missing in existing studies. A large number of studies have investigated the empirical relationship between conflict (which is our third *institutional* variable for economic growth) and growth. Barro and Lee (1994) examine the factors affecting economic growth from 1965 to 1985 in a large cross-section of countries and

find insignificant relationship between war and economic growth. Murdoch and Sandler (2002) find that civil war has an inverse relationship with short-term economic growth but does not impact long-term economic growth. Koubi (2005) finds that war severity and duration seems to contribute positively to *subsequent* economic growth, although war may have a negative and contemporary effect on economic growth in the short-run due to devastation of productive resources. Daria (2009) finds no direct association between war and economic growth. It can be concluded that there is little consensus about any specific effect of armed conflict on economic growth. Overall, it seems that although armed conflict negatively effects economic growth in the short-run, the long-run implication of armed conflict is ambiguous.

3.1 The Theoretical Framework, the Empirical Model and the Data

The theoretical framework is based on a two-factor Cobb-Douglas production function that encompasses two basic factors of production, labour and capital, which positively affect economic growth with probably different size of contribution, represented by α and β respectively. There are also institutional and infrastructural factors, which can be very influential determining factors to output growth. These factors can be denoted by A , represents the initial endowments of a country and therefore, capturing the differences in productivity across countries. Besides, the literature also suggests a ‘state capacity’ variable in the growth equation, which also can be captured by A . Several papers have found that human capital is also an important determinant of economic growth (see, for example, Mankiw, Romer and Weil, 1992; Mankiw, Phelps and Romer, 1995). Putting all these together provides *traditional* variables of the initial endowment (A), labour (L), physical capital (K) and human capital (H). As representatives of the *traditional* variables, the present study includes level of non-corruption, existence of armed conflicts, and level of democracy into the model. Accordingly, the model can be represented as:

$$Y = AL^\alpha K^\beta H^{1-\alpha-\beta} E^\delta ; \quad \alpha > 0, \quad \beta > 0, \quad \delta \leq 0. \quad (1)$$

This indicates that labour, physical capital and human capital positively contribute to production while the combination of the *institutional* variables as outlined here may have an offsetting effect, positive effect or insignificant influence on economic growth. The model specified in equation (1) can be re-written in logs as:

$$\ln Y_{it} = \mu_i + \ln(A)_i + \alpha \ln L_{it} + \beta \ln K_{it} + (1 - \alpha - \beta) \ln H_{it} + \delta \ln E_{it} + \varepsilon_{it} \quad (2)$$

where, Y is output of country i at time t ; μ is the country-specific effect; A is initial endowment of the country i ; E is the vector of *institutional* variables as defined above and ε is an error term.

Based on equation (2) above, the empirical model is given as follows:

$$\ln Y_{i,t} = \mu_i + \beta_1 \ln Y_{i,t-1} + \beta_2 \ln LF_{i,t} + \beta_3 \ln K_{i,t} + \beta_4 \ln HK_{i,t} + \beta_5 \ln P_{i,t} + \beta_6 \ln NPI_{i,t} + \beta_7 C_{DUM} + \varepsilon_{i,t} \quad (3)$$

where $\beta_1 > 0$; $\beta_2 > 0$; $\beta_3 > 0$; $\beta_4 > 0$; $\beta_5 \leq 0$; $\beta_6 < 0$; $\beta_7 \leq 0$. Y_{it} denotes PPP-adjusted GDP (constant 2005 international \$) for each country i over the period from 2000 to 2009⁴. L represents labour force, K is gross fixed capital formation as percentage of GDP, HK is the country's human capital and proxied by the percentage of population completed secondary education aged 25 and over. P is the polity score, NPI is non-corruption perception index, C_Dum is the armed conflict dummy, which takes the value of 1 if there is an incidence of conflict and 0 otherwise while ε is an error term. The cross-sectional model uses the mean values for the covered period (2000-2009) of all the variables. All the variables except armed conflict dummy are the average (2000-2009) of their respective values over cross-section. *Non-corruption perception index* (NPI) data are available from 1995 for few countries, but it is available for most countries from 2000. Since NPI is one of the most important variables for this study, and it is only available for the sample countries from 2000 onwards, therefore, our analysis is limited to ten years, 2000 – 2009 due to limitation of data.

The economic growth equation was estimated using both cross-sectional and panel data. Cross-sectional data is used for 126 countries, while balanced panel data are obtained for 106 countries. Time series data cover from 2000 to 2009 period. Some countries whose variables, such as GDP, labour force, capital, corruption and armed conflict are available, but are excluded from this study as they do not have human capital and polity variables. Extending the time series may require dropping out many countries. It is worth noting that the number of countries included in the panel analysis is smaller than that of the cross-sectional study. This is because countries without all variables have been excluded in the panel analysis. Data on PPP-adjusted GDP and PPP-adjusted GDP per capita, labour force, and gross fixed capital formation (% GDP) variables are sourced from the 'World Bank Development Indicators'

⁴ An alternative model used PPP-adjusted GDP (constant 2005 international \$) per capita.

(WDI). Human capital variables are sourced from Barro and Lee Database (2010). Democracy level (polity), non-corruptions and armed conflicts are compiled from the Centre for Systemic Peace and the Centre for Global Policy, George Mason University (April 30, 2010); Uppsala Conflict Data Program (1 August 2011); and Corruption Perceptions Index (various issues) of the Transparency International.

Both the cross-sectional regression and the panel study techniques are used for estimation. We have tested the sensitivity of data and empirical model by using sub-group analysis. Full sample, high-income, middle-income and low-income countries data are applied in both cross-sectional as well as panel study. Additionally, non-oil sub-sample is used in the cross-section analysis. We apply PPP-adjusted GDP and PPP-adjusted GDP per capita in alternative regressions. The panel study applied OLS as well as fixed effects models in full-sample and sub-samples.

3.2 The Variables

i) Polity

The original 'polity' variable from the dataset consists of scores which take values between -10 (strongly autocratic) and +10 (strongly democratic). However, these were converted into a range that runs from 0 to 20 in order to facilitate the conversion of the variables into their natural logs required for the analysis. The modified 'polity' variable, labelled 'polity2' is used. The advantage of using 'polity2' is that it has standardized the original scores and yielded positive figures that are required for log conversion.

<Figure 1>

Figure 1 plots the average polity distribution for 126 countries in the world.⁵ The world average is 14. There is very low polity score for the socialist countries (such as China) and kingdoms (such as Saudi Arabia, Kuwait, UAE, Qatar, and Bahrain) despite the fact that they have been growing faster than many democratic countries. Bhutan (-10), Qatar (-10) and Saudi Arabia (-10), Turkmenistan (-9), Uzbekistan (-9), Swaziland (-9), UAE (-8), China (-7), Vietnam (-7),

⁵ Some names are omitted from the figure to avoid clumsiness in appearance.

Laos (-7) carry very low polity score. However, average growth of Bhutan (8.5%), Qatar (12.5%), Saudi Arabia (3.4%), Turkmenistan (14.2%), Uzbekistan (6.5%), Swaziland (3.1%), UAE (5.8%), China (10.3%), Vietnam (7.3%), Laos (6.8%) indicate that less polity score does not negatively affect economic growth. In reality, the average growth rate of these countries (7.8%) was way higher than world average growth rate (4.5%). Perhaps, the stability of economy, not necessarily the level of polity, plays significant role in economic growth. Nonetheless, we have excluded countries with polity score of 0 as conversion into the logarithm generates no value.

ii) Corruption

Corruption is, generally, perceived as detrimental to growth. This is supported by empirical findings of, among others, Mauro (1995), Brnetti and Weder (1998) and Mo (2001) who reported negative effects of corruption on growth as it discourages investment. However, Bardham (1997) Beck and Mahar (1986) and Lien (1986) counter argue that corruption, particularly, bribery could be beneficial to growth as it can “grease the wheels” of an inefficient bureaucracy. Development of businesses that were aided by corruption are cited as examples to buttress the point⁶. Corruption Perceptions Index, CPI as defined by the *Transparency International (TI)*⁷ is “poll of polls” that show the average scores which are the reflection of opinions by international businesses people and financial journalists for all the countries in the world. Countries are ranked according to the perceptions of corruption level in the public sector. Thus it is an indicator of corruption level at as perceived by businesses and how it affects their commercial activities. The higher the score of *NPI*, the lower the level of perceived corruption by businesses for a country. The corruption indicator is denoted by *Non-corruption Perception Index (NPI)*. Consequently, if corruption deters economic growth, we expect a positive sign for the coefficient of *NPI* variable. The *NPI* scores for full sample are plotted against GDP and GDP per capita in Figure 2a and 2b, respectively.

<Figure 2>

The world average of non-corruption score is found to be approximately 4, which is below half of the total score. Scandinavian countries are the top scorers as least corrupt countries while

⁶ This is consistent with argument of Leff (1964), Huntington (1968) and Leys (1965), which was later come to be known as “grease the wheels” hypothesis.

⁷The Berlin-based anti-corruption non-governmental organisation, TI, defines corruption as “the abasement of entrusted power for private gain”.

South Asia and Africa have the lowest scores as the most corrupt countries. The trend line gives an indication of positive relationship between non-corruption and GDP.

iii) Armed Conflict

The UCDP/PRIO Armed Conflict Dataset Codebook defines the term ‘conflict’ has been defined as: “a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths”. Average annual numbers of battle deaths due to both internal and external conflicts are collected and a dummy variable is constructed for the armed conflicts. A value of 1 for the dummy denotes the presence of armed conflicts and a value of 0 denotes otherwise. It may be mentioned that after the end of the ‘cold war era’ (1947 to 1991) both internal and external armed conflicts had fallen dramatically. We find 39 countries (either internally or externally involved with armed conflicts) out of the 126 selected countries were involved in armed conflicts at least once between 2000 and 2009. Among them Algeria, Burundi, Colombia, Democratic Republic of Congo, India, Israel, Nepal, Pakistan, the Philippines, Russia, Sri Lanka, Thailand, Turkey, Uganda and USA were heavily involved in conflicts. A distinctive effect of internal to external conflict is beyond the scope of this study. A third country which was not directly involved in combat, however, indirectly played a role (supported) combating countries in their internal or external conflict is not considered in this study. Any further study may find these distinctions interesting.

<Figure 3>

Figures 3a and 3b represent GDP and GDP per capita and armed conflicts. It is apparent from the figure that GDP per capita is more sensitive to conflict than GDP. It is, therefore, higher for a country which is not engaged in armed conflict and vice versa. The triangle shape shows the GDP of non-conflicting while star shape shows GDP of conflicting countries. Very few countries (except some developed countries such as USA, UK, Russia, Israel, who can be considered as world leader), which maintain high GDP per capita are involved in armed conflict. The UK and the US were the main players in the war against Iraq⁸ (30 countries were

⁸ Countries which were involved in the Iraq invasion are: Albania, Australia, Azerbaijan, Bulgaria, Czech Republic, Denmark, Dominican Republic, El Salvador, Estonia, Georgia, Honduras, Italy, Kazakhstan, Latvia, Lithuania, Macedonia, Moldova, Mongolia, Netherlands, Nicaragua, Norway, Philippines, Poland, Portugal, South Korea, Romania, Slovakia, Spain, Tonga, Ukraine, United Kingdom, United States of America.

involved in military invasion under the American-led coalition) and (Taleban) Afghanistan⁹ (47 countries were involved) who spent a significant amount of money for war. Although many countries were physically involved in these wars, however, the war expenditure for many countries was very insignificant amount. Subsequently, these two external armed conflicts are typically different to others. Also, including all these countries into the analysis as those engaged in armed conflict between 2003 and 2008 (which covers almost our entire sample period), could lead to some misleading results. The nature of these wars is typically different to other internal and external conflicts. Types of expenditure are also different. Many involved countries in these wars have not faced any battle deaths except Iraqis, the British and the American. Differentiating the conflicts into internal and external is beyond the scope of this paper, but it may be an interesting future extension¹⁰.

4. Discussion of the Empirical Results

Table 1 presents the descriptive statistics, which indicates that the world average of growth rate is 4.5 percent with a large discrepancy between countries, which is as high as 15 percent and as low as approximately half a percent. Average polity score is about 14 out of 20 in the world. China's average polity score was 3, while its average GDP growth rate was about 10 percent during the same period. Qatar's average polity score was 0 (zero), while the country's average GDP growth rate was 13.5 percent in the last decade. On the contrary, Portugal's average polity was 20 while the country's average GDP growth rate was less than 1 percent. A similar feature (in terms of polity and economic growth) is observed in many other countries. The average NPI score for the world as a whole is about 4 out of 10, with the highest NPI score of 9.52 for Finland is perceived as the least corrupt country in the world. Denmark (9.46), New Zealand (9.45), Singapore (9.28), Sweden (9.24) and Iceland (9.22) are the other perceived less corrupt countries. Those with the lowest scores of 1.7 point are Afghanistan and Bangladesh, perceived as the most corrupt countries in the world.¹¹ Chad (1.73), Sudan (1.89), Democratic Republic

⁹ Countries which were involved in war against Taleban (in Afghanistan) are: Albania, Armenia, Australia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lithuania, Luxembourg, Macedonia (Former Yugoslav Republic of), Malaysia, Mongolia, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Turkey, Ukraine, United Arab Emirate, United Kingdom, United States of America.

¹⁰ A third country, which is not directly involved in combat, but indirectly play a supportive role is excluded in the analysis.

¹¹ Somalia and Myanmar have lower NPI scores than Afghanistan and Bangladesh. Somalia, Myanmar and Afghanistan however are not included in our panel. Afghanistan and Bangladesh were included in our cross-section.

of Congo (1.94) are perceived as the next most corrupt countries, for the sample period. Ethiopia is the worse armed-conflict-hit country in the sample period, which was followed by Afghanistan, Pakistan, Sri Lanka, Sudan and India. The least hit country was Azerbaijan which was followed by Peru, China, Iran and Tajikistan.

<Table 1>

The democracy indicator, the polity, as expected, has the highest mean in the high-income countries and followed by the middle-income countries. The low-income countries group has the least average of polity. However, these are averages and can obscure some individual countries' positions. For example, there are a number of countries that are classified as high-income countries, but are under autocratic governments. These countries include Qatar, Bahrain and the United Arab Emirates. This is evident in the difference between the minimum and the maximum. The minimum is 1, which is highly autocratic while the maximum is 20, that is, highly democratic. The scenario is similar for middle- and low-income countries, albeit, to a lesser degree in the latter.

This study applies both cross-section and panel techniques. Multicollinearity is not a vital issue for cross-section. However, since, panel data includes both time-series and cross-section, multicollinearity could be a problem. Correlation between the variables in panel is tested to examine any potential multicollinearity problem. Table 2 presents the correlation matrix and it indicates that the degree of correlation between the independent variables in the empirical model and shows that the correlation is not significantly high. Therefore, multicollinearity is not likely to be a problem.

The model specified in equation (3) is estimated and the results are reported in Tables 3, 5 and 6. Table 3 presents the results obtained from the cross-sectional estimation by applying mean values (2000-2009) of variables, while Tables 5 and 6 report panel study results by applying the pooled OLS and the fixed effects estimators, respectively.

4.1 Mean Cross-Section:

Real GDP (PPP) per capital and real GDP (PPP) are used as dependent variables in alternative estimations. A full-sample (which includes collectively high, medium and low income countries, and does not differentiate between oil producing and non-oil producing countries)

and sub-samples based on different income level and oil production status are used which give us an opportunity to examine the sensitivity of the results. All variables are in real term and in logarithm form except armed conflict (which is a binary dummy). Qatar and Saudi Arabia are excluded from sample because polity score for them is zero which cannot be converted into logarithm. Total sample size in the cross-section and panel are 126 and 106 countries, respectively. The reported results from the cross-section show that, in general, the *traditional* variables, which are labour, capital and human capital foster GDP growth. However, the *institutional* determinants of growth that include the polity and the corruption variables are found to be negative and significant. A negative sign of the coefficient of the polity variable indicates that the greater the degree of democracy, the lower will be the GDP growth.

<Table 3>

Corruption is found to be a key player in economic growth. It is worth mentioning that high score of *NPI* indicates suggest less perceived corruption level. A positive sign of *NPI* (Non-corruption Perception Index) therefore indicates that more non-corruption leads to more GDP growth; hence, more corruption leads to less economic growth. Corruption variable is found to be significant in full-sample as well as in each sub-sample, except the low-income countries. The size of the *NPI* coefficient is also very high compare to other variables. In fact, the positive effect of *traditional* variables is fully neutralised by the negative effect of corruption variable alone. Consequently, what remains in GDP growth is actually only the autonomous growth. Specifically, in full-sample model (for example), the significant *traditional* variables jointly contribute 0.562 to the real GDP per capita and 1.52 to real GDP; however, these contributions have been neutralised by corruption alone (1.77 and 1.685, respectively). The coefficient of corruption is found statistically greater than one in both GDP per capita and GDP models. This finding is consistent with the literature that suggests corruption is “sand in the wheels”. That is corruption constitute an obstacle to growth (Mauro, 1995; Brutiatti and Weder, 1998; and Mo, 2001).

Although the estimated result from cross-section on full sample regression shows that armed conflict has a negative and significant effect at 10% significance level on GDP per capita growth, however, it does not appear to have any significant effect on GDP growth. This may be because armed conflict was not a significant phenomenon in the 2000s. The major conflicts which took place in the 2000s were some kind of unusual conflict such as group attacks on a particular country (e.g., Iraq, Afghanistan). Iraq is not included in our analysis due to non-

reliability of data. Although, Afghanistan, USA and UK are included into our sample, armed conflict has been a common phenomenon for these countries over a long-time. Moreover, in a 126 dataset, may be these three countries could not play any significant role to alter the overall results. The R-square and F-statistic values and number of observations are also presented in Table 3 which indicates overall fitness of the empirical models.

4.2 Panel Study

Unit root tests are carried out on the variables in order to determine their level of integration. Panel unit root tests of Levin-Lin-Chu were used and the results are reported in Table 4. The results indicate that all the variables are stationary, $I(0)$ on level. Consequently, model in equation (3) is estimated in panel using the pooled OLS and the fixed effects estimators. Estimated results are given in Table 5 and Table 6, respectively.

<Table 5>

<Table 6>

The results from the pooled OLS show that overall, all *traditional* variables - first lag of GDP, labour, capital and human capital are positive and significant contributors to GDP growth in both empirical models (real GDP per capita and real GDP). *Sunspot* variable, corruption plays a negative and significant role in economic growth. In full-sample, the size of coefficient of NPI is the highest among all variables in both models (GDP per capita and GDP). This is consistent with the results reported from cross-section approach.

The polity variable is found to be negative and significant in high- and low-income countries¹². Overall, the effect of polity on growth is insignificant. It also found insignificant in middle income countries. This is not surprising as Bhutan (-10), Qatar (-10), Saudi Arabia (-10), Turkmenistan (-9), Uzbekistan (-9), Swaziland (-9), UAE (-8), China (-7), Vietnam (-7), Laos (-7) have very low polity scores. However, their average growth for the sample period is generally high; Bhutan (8.5%), Qatar (12.5%), Saudi Arabia (3.4%), Turkmenistan (14.2%), Uzbekistan (6.5%), Swaziland (3.1%), UAE (5.8%), China (10.3%), Vietnam (7.3%), Laos (6.8%) indicate that polity score does not positively affect economic growth. In reality, the

¹² There are 32 countries in the high-income group and 17 countries in low-income group and middle-income countries group consists of 57 countries.

average growth rate of these countries for the sample period is 7.8%, which is a way higher than the world growth rate average of 4.5%.

The results also indicate that armed conflict has a negative impact on GDP growth in low income countries. It is insignificant in the full-sample estimation as well as in the sub-sample of middle-income countries. The results are similar for high-income countries estimates that used GDP per capita as a dependent variable. Unexpectedly, conflict is found to have positive effect to GDP for the high-income countries. However, before we make a comment on this issue, we need to double check the effect of conflict on high income countries economic growth.

Results from the fixed effects as reported in Table 6, which indicates that lag of GDP, labour, capital and human capital are positive and significant determinants of economic growth. The first lag of GDP can be termed as initial endowment for current year's GDP growth. Human capital (HK) is found negative and significant for low income countries. We, then, have tested the effect of its (HK) lags on economic growth. The study finds that a one-year lag of human capital has an insignificant effect (-.018(.015)) on economic growth, however, two-year lag has appeared to be positive and significant (0.023***(.011)) in our growth regression. This indicates that if low income countries invest in human capital, it becomes an investment (cost) for current year, however, this investment starts giving returns from year two.

Institutional determinants such as corruption are found to be negative and significant in full-sample and in most of the sub-samples. Overall, polity and armed conflicts are found to be insignificant variables in the fixed effects models. Armed conflict is not found positive in high income countries data when we have applied the fixed effects estimator (see, Table 6). Number of observations in cross-section and panel are 126 and 1057 respectively.

4.3 Important Differences across the Income Groups

Labour force is significant at all conventional levels for the model that uses the real GDP for all the groups. However, it has the lowest coefficient for the low-income countries. The coefficient for the labour force in the non-oil producing countries is the highest as reported in Table 3. This may be a reflection of non-existence of 'resource curse' as suggested by the literature on the natural resources abundance that such resources tend to have negative effect on other sectors of the countries' economies. This is particularly, on their labour productivity.

Similar pattern of results has been reported in Table 5 based on pooled OLS. The only difference is that the model that uses the real GDP per capita reports higher value of coefficient than the one that uses the real GDP. Capital is significant at any conventional level for all the groups, except the middle-income countries where it is insignificant. Results for the former are consistent with general findings of the literature on growth. However, insignificance of capital to middle-income countries could be attributed to trade union activities, which may undermine productivity of capital. Human capital is insignificant in the high-income group, but is highly significant and positive in both middle- and low-income countries. The role of democracy to economic performance appears to be negative and significant to high- and low-income countries, but positive and insignificant in the middle-income countries. The former is consistent with the literature (see, for example, Chan (2002), Dornbusch and Edwards (1991), Kohli (2004), Leftwich (2005) among others) that argues that democratic countries find it difficult to implement painful economic programmes that are beneficial to economic growth. Sometimes, even if these programmes are necessary. This is more evident in the current experience, particularly, of the Euro-Zone countries in implementing reforms after the sovereign debt crisis. This is in contrast to what was later known as the “Chilean miracles”, which referred to economic results obtained as a consequent of reforms imposed by the former dictator, Pinochet. Secondly, most of the best performing economies in the world are non-democratic ones. For example, in its 2015 annual report, the World Economic Forum declares Qatar, an autocratic country, as the most efficient economy in the world and followed by Singapore. The results for the middle-income group suggest that for democracy to be beneficial to economic growth, a country must achieve a certain threshold of income that is sufficient enough to strengthen democratic institutions, but not too strong to hinder overall economic performance.

It is also noteworthy that the results reported in Table 5 indicate that the role of corruption to economic growth differs across the groups. It is found to hamper growth in high- and middle-income group countries. However, its role in low-income countries is insignificant. The former is consistent with literature on corruption that suggests that it is ‘sand in the wheel’ while the latter is in consonant with those who argue that corruption could act as ‘grease in the wheel of the economy as it can promote productive activities. It is argued that without corruption such businesses would not have developed. But what the results indicate that level of national income important in these different roles of corruption.

5. Conclusion

This paper investigates the effects of the *institutional* variables on economic growth. It is motivated by an augmented Cobb-Douglas production function. We use ten years (2000-2009) mean values of variables and construct cross-section dataset for 126 countries. Subsequently, we estimate growth model by using both full-sample and sub-samples data. The countries are classified into high-, middle- and low-income using the World Bank criteria. The study used panel of 106 countries with 1060 observations. Similar to cross-sectional study, we use both full-sample and sub-samples to estimate economic growth models using Pooled OLS and the fixed effects approach.

The results from both cross-section and panel data analysis indicate that *traditional* variables, which are first lag of GDP (only in panel), labour, physical capital and human capital are found to be significant determinants of economic growth. These variables foster economic growth. On the contrary, corruption plays a significant negative role in fostering economic growth. The size effect of corruption is the maximum among all the *traditional* and *institutional* variables. It can be documented that most of the contributions of the *traditional* variables to economic growth are neutralised by corruption alone. The coefficient of polity (democracy) variable in most of the cases is insignificant which indicates that polity cannot influence economic growth. However, in few cases we found that polity plays a negative role in economic growth. One generally does not expect a negative effect of polity. However, this result is in line with the existing empirical literature (see, Bruneti, 1997). Armed conflicts do not appear to have any statistically significant effect on economic growth except in low-income countries.

The results also demonstrate that influence of some certain *institutional* variables vary according to the income level of the countries. For example, corruption is found to have significant negative effects in high- and middle-income countries. However, it is found to be positive, although insignificant in low-income countries. This difference, therefore, sheds light on the argument that corruption could be favourable to growth. The results show that corruption could only have positive impact in poor countries with weak institutions where absence of corruption could be a barrier to investments that businesses may find not profitable. Similarly, democracy is found to be negative in high- and low-income countries, but positive in middle-income countries. This shows that for democracy to be beneficial to growth, income level of the country should be between low and high thresholds. The critical question that is a future research is to determine what these thresholds are.

In conclusion, our estimated results (in general) indicate that lag income, labour, physical capital and human capital are positive and statistically significant determinants of economic growth. However, *institutional* variables, particularly, corruption has a significant negative effect on economic growth. Others have ambiguous effect on economic growth. Armed conflict and polity are either statistically insignificant determinants or negative determinants of economic growth. The empirical results of this study are consistent with theoretical forecasting of the paper as well as with existing literature.

References

Acemoglu, D., Johnson, S. and Robinson, J. A., (2005) Institutions as a Fundamental Cause of Long-run Growth, *Handbook of Economic Growth*, Volume IA.

Acemoglu, D., Johnson, S., and Robinson, J.A., (2001) The Colonial Origins of Comparative Development: An Empirical Investigation, *American Economic Review*, 91: 1369-1401.

Aghion, Philippe & Howitt, Peter, (1992) A Model of Growth through Creative Destruction, *Econometrica*, 60(2): 323-351.

Arrow, Kenneth (1962) The Economic Implications of Learning by Doing, *The Review of Economic Studies*, 29 (3): 155–173.

Botero Juan, Simeon Djankov, Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Schleifer, (2004) The Regulation of Labour, *The Quarterly Journal of Economics*, 119(4).

Brunetti, Aymo (1997) Political Variables in Cross-country Growth Analysis, *Journal of Economic Surveys*, 11(2): 163-190.

Brunetti. A. and Weder. B. (1998). Investment and institutional uncertainty: A comparative study of different uncertainty measures. *Wclrwirtschaftliches Archiv* 134: 513-533

Cass, David and Shell, Karl (1983) Do Sunspots Matter Center Analytic Res. Econ. Soc. Sci. (CARESS) Working Paper no. 81-09R, Philadelphia: Univ. Pennsylvania, May 1981.

Cass, David and Shell, Karl (1983) Do Sunspots Matter? *Journal of Political Economy*, 91(2): 193-227.

Coe, D., and E. Helpman, (1995) International R&D Spillovers, *European Economic Review*, 39: 859–887.

Deger, S., Lam, C. and Sen, S. (2011) Institutions and Economic Growth – Revisiting the Empirical Evidence from A Development Perspective, Paper prepared for the Annual Meeting of the Public Choice Society, Miami, Florida, March 2012.

- Denison, E. F. (1980) "The Contribution of Capital to Economic Growth", *The American Economic Review*, 70(2): 220-224.
- Federici and Marconi (2002) On Exports and Economic Growth: the Case of Italy, *Journal of International Trade and Economic Development*, 11(3): 323-340.
- Grossman G.M. and Helpman, E (1991) Quality Ladders in the Theory of Growth, *Review of Economic Studies*, 58: 43-61.
- Kaldor, N. (1970) The Case for Regional Policies, *Scottish Journal of Political Economy*, 17: 337-348.
- Koubi, Vally (2005), War and Economic Performance, *Journal of Peace Research*, 42(1):67–82.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1997) Legal determinants of external finance, *Journal of Finance*, 52: 1131-1150.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1998) Law and Finance. *Journal of Political Economy*, 106: 1113-1155.
- Lucas, Robert E. (1988) On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22: 3-42.
- Mankiw, N.G., Phelps, E.S. and Romer, P.M. (1995), The Growth of Nations, *Brookings Papers on Economic Activity*, Vol. 1995, No. 1: 275-326.
- Mankiw, N.G., Romer, D. and Weil, D.N. (1992), A Contribution to the Empirics of Economic Growth, *The Quarterly Journal of Economics*, 107(2): 407-437.
- North, Douglass C., and Robert P. Thomas, (1973) *The Rise of the Western World: A New Economic History*, Cambridge: Cambridge University Press.
- Pesaran, M.H., Shin, Y., Smith, R.P. (1999) Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, 94, 621-634.
- Romer, Paul M. (1986) Increasing Returns and Long-Run Growth, *Journal of Political Economy*, 94 (5): 1002-1037.
- Romer, Paul M. (1993), Idea gaps and object gaps in economic development, *Journal of Monetary Economics*, 32(3): 543-573.
- Solow, Robert M. (1969) *Growth Theory: an Exposition*, Oxford University Press, New York.
- The World Economic Forum (2015) *Global Competitiveness Report*, WEF available: <http://reports.weforum.org/global-competitiveness-report-2014-2015/>.

Figure 1a
Polity and Real GDP (PPP)

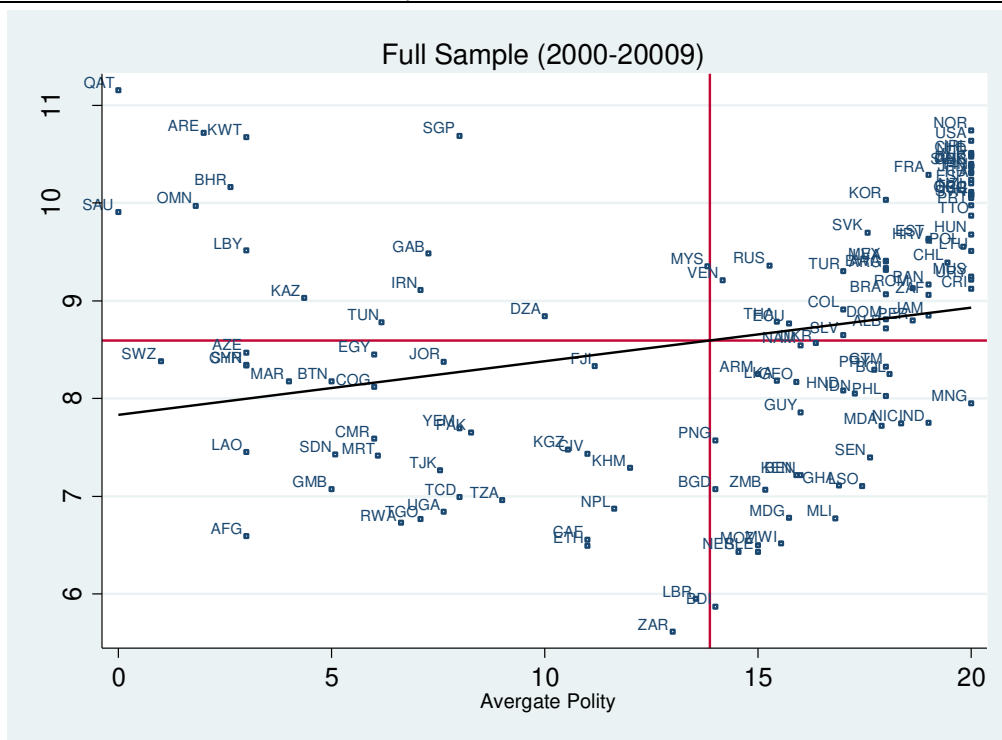
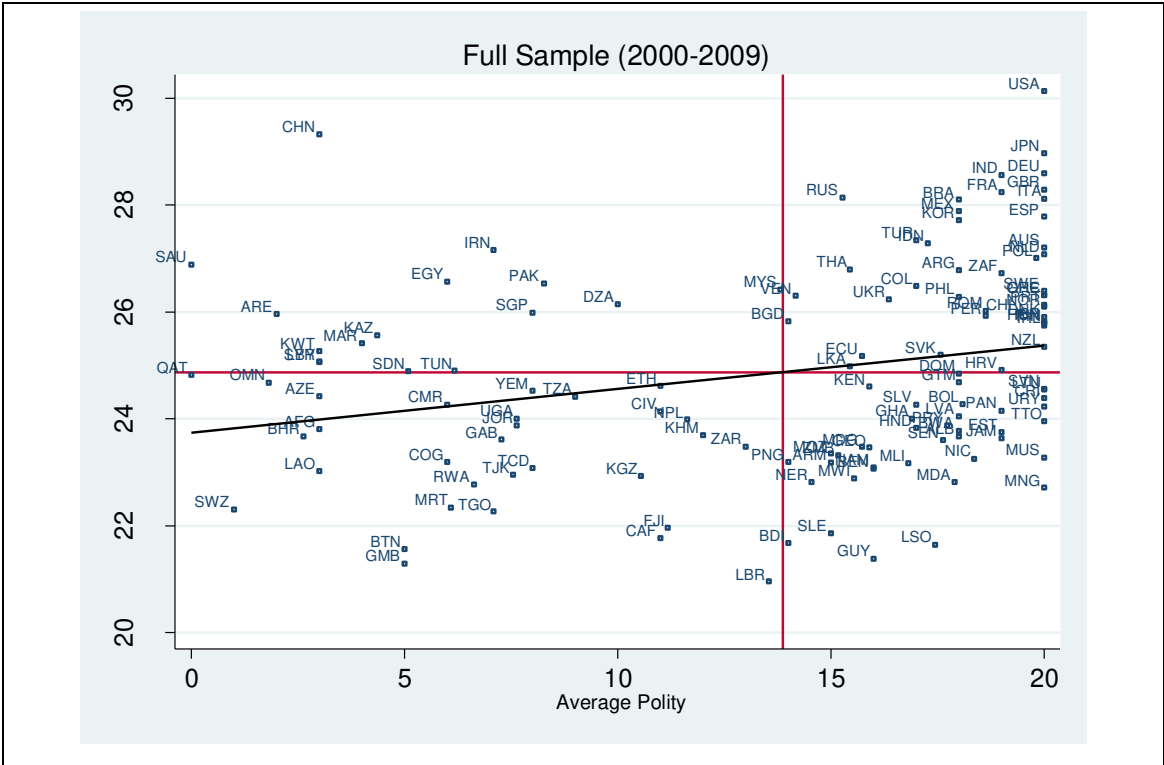


Figure 2b
Polity and Real GDP per Capita



The vertical axis shows both logarithm of real GDP (PPP) per capita and logarithm of real GDP (PPP) against average Polity for full sample. The mean lines of GDP and polity are also shown to indicate which country is above the mean and which country is below it. Country codes are used following World Bank coding for countries. We calculated 10 years' average value (2000-2009) for GDP and polity score of each country. We draw the trend line which shows an upward trend in case of real GDP (PPP) as well as real GDP (PPP) per capita.

Figure 2a
Non-corruption Indicator and Real GDP (PPP)

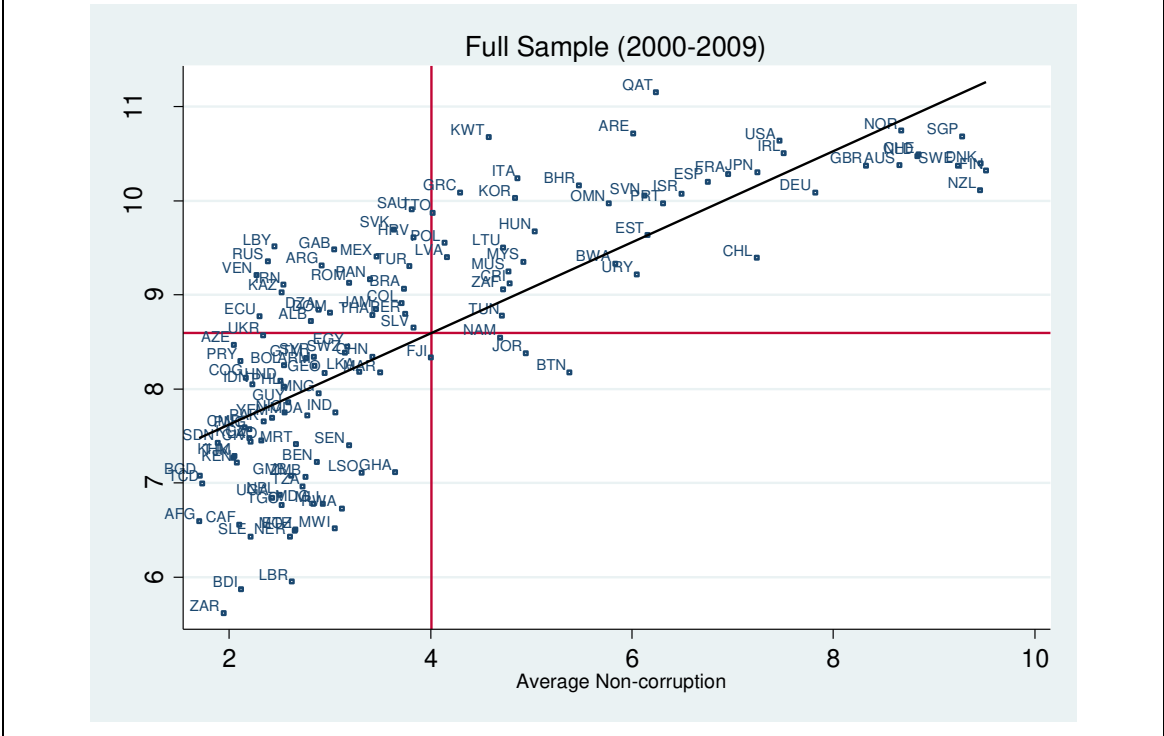


Figure 2b
Non-corruption Indicator and Real GDP (PPP) Per Capita



Figure 3:
Real GDP per capita of Countries Engaged in Conflicts

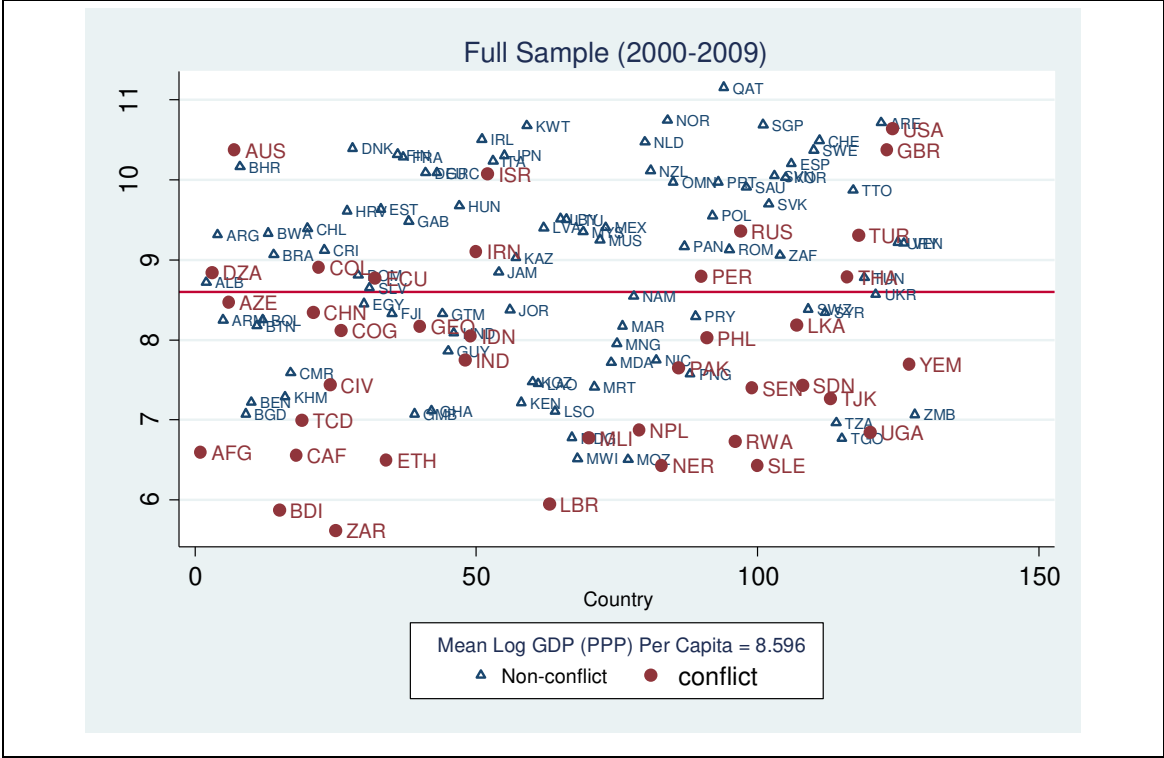


Figure 3b

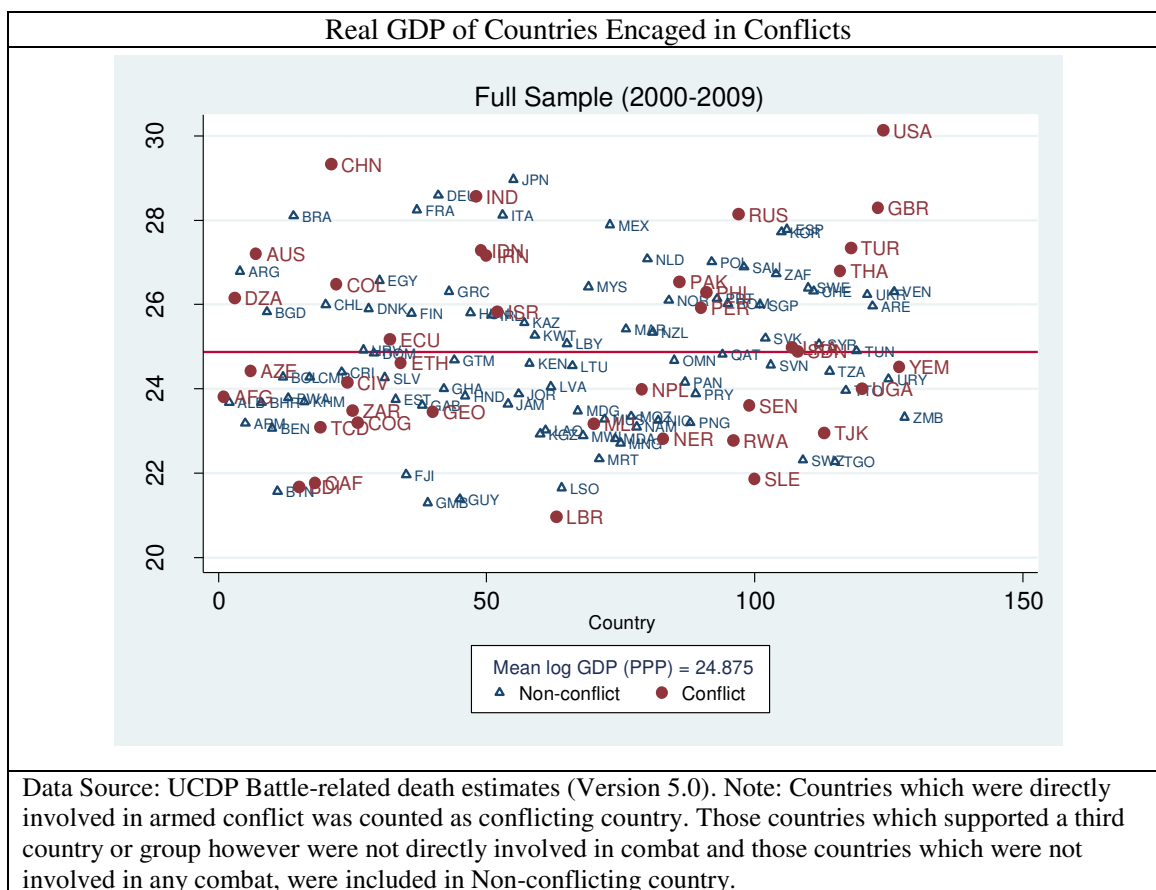


Table 1
Descriptive Statistics (2000-2009) – Cross-sectional Data

Sample	Mean	S.D.	Min	Max
Full-sample (N =126)				
GDP (PPP) Per Capita	10727.04	11866.61	275.24	46432.2
GDP (PPP) (million)	418000	1310000	1270	12300000
Growth Rate	4.41	2.26	.58	14.91
Labour Force (million)	21.60	78.70	0.25	758
Capital	21.62	5.40	8.86	51.87
Human Capital	21.68	15.70	0.67	74.10
Polity	14.10	5.89	1	20
Corruption	3.99	2.07	1.70	9.52
Conflict (Battle Death)	308.34	994.54	0	8202
High income countries (N=38)				

GDP (PPP) Per Capita	26563.36	10325.79	10181.49	46432.2
GDP (PPP) (million)	919000	2140000	19400	12300000
Growth Rate	3.24	1.74	0.58	7.01
Labour Force (million)	15.60	29.60	0.38	154
Capital	21.55	3.73	12.29	29.05
Human Capital	31.48	12.35	11.17	57.53
Polity	17.29	5.77	1	20
Corruption	6.53	2.0	2.38	9.52
Conflict (Battle Death)	294.25	1377.35	0	8202
Middle income countries (N =60)				
GDP (PPP) Per Capita	5965.87	3588.98	1234.84	15999.29
GDP (PPP) (million)	315000	837000	1930	5770000
Growth Rate	4.59	2.24	0.71	14.91
Labour Force(million)	31.60	111.00	0.30	758.00
Capital	21.79	4.72	10.42	39.48
Human Capital	23.55	15.39	0.67	74.10
Polity	13.69	5.69	1	20
Corruption	3.17	0.92	2.04	5.84
Conflict (Battle Death)	194.70	604.03	0	3298.36
Least Developed Countries (N=30)				
GDP(PPP) Per Capita	1245.8	928.28	275.24	4729.59
GDP (PPP) (million)	21200	31900	1270	168000
Growth Rate	5.48	2.29	1.12	10.66
Labour Force (million)	8.77	12.80	0.25	64.40
Capital	21.36	7.97	8.86	51.86
Human Capital	6.16	4.53	0.97	17.50
Polity	11.09	4.57	3	17.64
Corruption	2.59	0.69	1.70	5.38
Conflict (BD)	552.53	1069.05	0	4650

Note: Human capital is proxied by labour force with secondary education (% of population aged 25 and over); Polity is polity score; corruption is non-corruption score and conflict is the number of battle death. We have used World Bank (2009) information which has classified countries as per their Gross National Income Per capita (in dollar value). There are countries which moved from one group to another group due to the change in their income level. We have used average (2000-2009) income level. Hence, for example, there are some countries which are

shown in the middle income group; however, the average income level of those countries is higher than the lowest income level in high income group.

Table 2
Correlation Matrix (Panel Data)

	ln(YPC)	ln(Y)	ln(LF)	ln(K)	ln(HK)	ln(P)	ln(NPI)
ln(YPC)	1.00						
ln(Y)	0.66	1.00					
ln(LF)	0.05	0.78	1.00				
ln(K)	0.25	0.18	0.03	1.00			
ln(HK)	0.61	0.32	-0.09	0.21	1.00		
ln(P)	0.29	0.23	0.07	-0.02	0.23	1.00	
ln(NPI)	0.80	0.46	-0.04	0.18	0.42	0.30	1.00

Table 3
Cross-sectional regressions using mean values (2000-09) of variables

Variables	GDP (PPP) per capita					GDP (PPP)				
	Full-Sample	High- Income	Middle- Income	Low- Income	Non-Oil	Full-Sample	High- Income	Middle- Income	Low- Income	Non-Oil
C	3.486*** (.959)	6.930*** (1.270)	5.881*** (1.295)	5.659*** (1.374)	3.518*** (1.031)	4.88*** (.960)	8.460*** (1.186)	7.862*** (1.284)	6.542*** (1.603)	4.907*** (1.063)
lnL	.116** (.044)	.073* (.042)	.056 (.054)	.078 (.079)	.100** (.048)	1.103*** (.044)	1.076*** (.039)	1.043*** (.054)	.879*** (.092)	1.088*** (.050)
lnK	.112 (.248)	.393 (.347)	.062 (.360)	.923*** (.268)	.129 (.255)	.067 (.248)	.115 (.324)	.184 (.357)	1.139*** (.313)	.065 (.263)
lnHK	.446*** (.068)	.017 (.121)	.144 (.091)	.074 (.098)	.415*** (.070)	.417*** (.068)	.023 (.112)	.100 (.090)	.099 (.114)	.385*** (.072)
lnP	-.170* (.098)	-.307*** (.092)	-.036 (.116)	-.195 (.167)	-.078 (.108)	-.194* (.098)	-.252*** (.085)	-.113 (.116)	-.173 (.194)	-.125 (.111)
lnNPI	1.770*** (.158)	.877*** (.164)	1.145*** (.291)	.0001 (.450)	1.650*** (.239)	1.685*** (.158)	.778*** (.153)	1.285*** (.289)	.185 (.525)	1.678*** (.247)
Conflict	-.289* (.152)	.105 (.199)	-.159 (.188)	-.053 (.169)	-.254 (.163)	-.245 (.153)	.039 (.185)	-.131 (.187)	.172 (.198)	-.209 (.168)
Adj. R ²	0.74	0.56	0.32	0.51	0.63	0.88	0.97	0.89	0.85	0.86
F ^{STAT}	58.99***	6.17***	4.14***	6.07***	27.09***	154.35***	175.12***	85.47***	29.39***	91.90***
Countries	126	36	60	30	93	126	36	60	30	93

Note: ***p<0.01; **p<0.05 and *p<0.10; standard errors are in parentheses.

Table 4
Unit root tests (Levin-Lin-Chu test)

Series	Level		1 st Difference	
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
ln(YPC)	-5.54**	-3.36**	-5.14**	-7.22**
ln(Y)	-3.97**	-5.15**	-5.33**	-6.51**
ln(LF)	0.95	-28.08**	-17.78**	-23.76**
ln(K)	-8.06**	-8.01**	-14.87**	-20.84**
ln(HK)	-2.36**	-4.75**	-13.35**	-23.35**
ln(P)	-14.00**	-11.82**	-11.29**	-16.75**
ln(NPI)	-14.30**	-20.95**	-25.15**	-26.52**

**p<0.01; *p<0.05. Null hypothesis: unit root

Table 5
Regression Results (Pooled OLS)

Variable	GDP (PPP) Per Capita				GDP (PPP)			
	Full-Sample	High-Income	Middle-Income	Low-Income	Full-Sample	High-Income	Middle-Income	Low - Income
C	.619*** (.214)	1.887** * (.373)	.655*** (.258)	1.523** * (.354)	1.819** * (.273)	6.147** * (.426)	4.403** * (.395)	4.741** * (.539)
lnY.L1	.605*** (.016)	.645*** (.033)	.812*** (.022)	.758*** (.036)	.367*** (.016)	.118*** (.020)	.336*** (.022)	.332*** (.038)
lnL	.039*** (.009)	.042*** (.008)	.018** (.008)	.028 (.018)	.721*** (.019)	.988*** (.023)	.733*** (.025)	.667*** (.041)
lnK	.216*** (.048)	.186*** (.063)	.042 (.052)	.269*** (.046)	.223*** (.059)	.212*** (.083)	.166 (.182)	.290*** (.073)
lnHK	.197*** (.015)	.028 (.020)	.058*** (.018)	.040** (.015)	.270*** (.018)	.087*** (.026)	.110*** (.026)	.061** (.024)
lnP	.019 (.023)	- .146*** (.027)	.017 (.020)	-.088** (.039)	.004 (.028)	-.256*** (.033)	.016 (.031)	- .190*** (.061)
lnNPI	.740*** (.041)	.425*** (.043)	.268*** (.053)	-.022 (.069)	1.058** * (.045)	.808*** (.044)	.763*** (.079)	-.055 (.108)

Conflict	-.043 (.029)	.047 (.058)	-.067 (.086)	- .134*** (.039)	-.017 (.035)	.277*** (.076)	-.008 (.048)	- .276*** (.060)
Adj. R ²	0.89	0.83	0.79	0.82	0.93	0.97	0.91	0.92
F ^{STAT}	1197.95 ***	224.27* **	306.02* **	111.00* **	1989.34 ***	1701.34 ***	1001.56 ***	291.03* **
Observation	1058	317	568	169	1058	317	568	169
Countries	106	32	57	17	106	32	57	17

Note: ***p<0.01; **p<0.05 and *p<0.10; standard errors are in parentheses.

Table 6
Regression Results (Fixed Effects)

Variable	GDP (PPP) Per Capita				GDP (PPP)			
	Full-Sample	High-Income	Middle-Income	Low-Income	Full-Sample	High-Income	Middle-Income	Low-Income
C	-.197 (.667)	7.387*** (1.498)	-4.584*** (.915)	-10.378*** (1.655)	4.705*** (.658)	12.237*** (1.368)	1.548*** (.955)	5.695*** (.730)
lnY.L1	.036*** (.005)	.075*** (.023)	.047*** (.010)	.123*** (.025)	.015*** (.003)	.006 (.007)	.010** (.004)	.050*** (.017)
lnL	.458*** (.046)	.013 (.069)	.714*** (.063)	1.054*** (.116)	1.197*** (.045)	.809*** (.063)	1.386*** (.065)	2.029*** (.111)
lnK	.197*** (.018)	.300*** (.054)	.313*** (.024)	.038 (.028)	.194*** (.017)	.285*** (.050)	.318*** (.024)	.088*** (.033)
lnHK	.265*** (.034)	.373*** (.080)	.196*** (.041)	-.138* (.074) ^a	.246*** (.034)	.331*** (.072)	.198*** (.042)	-.159 (.072)
lnP	-.020 (.019)	-.405 (.369)	-.052** (.025)	.011 (.023)	-.021 (.019)	-.429 (.336)	-.064** (.025)	-.008 (.034)
lnNPI	.073*** (.025)	.403*** (.077)	.050 (.034)	.098* (.050)	.072*** (.024)	.353*** (.071)	.049 (.036)	.069* (.037)
Conflict	-.044 (.036)	-.040 (.091)	-.047 (.034)	-.015 (.020)	-.026 (.035)	-.036 (.082)	-.035 (.036)	-.002 (.020)
Overall R ²	0.15	0.30	0.12	0.12	0.71	0.93	0.86	0.81

F ^{STAT}	99.61***	18.29***	106.40***	28.80***	272.29***	48.88***	196.32***	111.40***
Observation	1057	317	568	168 ^a	1057	317	568	169
Countries	106	32	57	17	106	32	57	17

Note: ***p<0.01; **p<0.05 and *p<0.10; standard errors are in parentheses. ^aThis is the effect of current human capital on current economic growth. However, one-year lag shows an insignificant effect (-.018(.015)) and two-year lag has appeared to be positive and significant (0.023*** (0.011)) in our growth regression.

APPENDIX

A1. Countries in Cross-section

Afghanistan	Greece	Oman
Albania	Guatemala	Pakistan
Algeria	Guyana	Panama
Argentina	Honduras	Papua New Guinea
Armenia	Hungary	Paraguay
Azerbaijan	India	Peru
Australia	Indonesia	Philippines
Bahrain	Iran	Poland
Bangladesh	Ireland	Portugal
Benin	Israel	Romania
Bhutan	Italy	Rwanda
Bolivia	Jamaica	Russia
Botswana	Japan	Senegal
Brazil	Jordan	Sierra Leone
Burundi	Kazakhstan	Singapore
Cambodia	Kenya	Slovak Republic
Cameroon	Kuwait	Slovenia
Central African Republic	Kyrgyz Republic	South Africa
Chad	Laos	South Korea
Chile	Latvia	Spain
China	Liberia	Sri Lanka
Colombia	Lesotho	Sudan
Costa Rica	Libya	Swaziland
Cote d'Ivoire	Lithuania	Sweden
DR Congo (Zaire)	Madagascar	Switzerland
Congo	Malawi	Syria
Croatia	Malaysia	Tajikistan
Denmark	Mali	Tanzania
Dominican Republic	Mauritania	Togo
Egypt	Mauritius	Thailand
El Salvador	Mexico	Trinidad and Tobago
Ecuador	Moldova	Turkey
Estonia	Mongolia	Tunisia

Ethiopia	Morocco	Uganda
Fiji	Mozambique	Ukraine
Finland	Namibia	UAE
France	Nepal	UK
Gabon	Netherlands	USA
Gambia	New Zealand	Uruguay
Georgia	Nicaragua	Venezuela
Germany	Niger	Yemen
Ghana	Norway	Zambia

Total: 126 countries

A2 Countries in Panel

Albania	Guyana	Paraguay
Algeria	Honduras	Peru
Argentina	Hungary	Philippines
Armenia	India	Poland
Australia	Indonesia	Portugal
Bangladesh	Ireland	Romania
Benin	Israel	Russia
Bolivia	Italy	Rwanda
Botswana	Japan	Senegal
Brazil	Jordan	Sierra Leone
Burundi	Kazakhstan	Singapore
Cambodia	Kenya	Slovenia
Cameroon	Kyrgyz Republic	South Africa
Central African Republic	Laos	South Korea
Chile	Latvia	Spain
China	Lesotho	Sri Lanka
Colombia	Lithuania	Sudan
Costa Rica	Malawi	Swaziland
Cote d'Ivoire	Malaysia	Sweden

DR Congo (Zaire)	Mauritania	Switzerland
Congo	Mauritius	Syria
Croatia	Mexico	Tajikistan
Denmark	Moldova	Tanzania
Dominican Republic	Mongolia	Thailand
Egypt	Morocco	Turkey
El Salvador	Mozambique	Tunisia
Ecuador	Namibia	Uganda
Estonia	Nepal	Ukraine
Finland	Netherlands	United Arab Emirate
France	New Zealand	United Kingdom
Gabon	Nicaragua	Uruguay
Gambia	Niger	United States of America
Germany	Norway	Venezuela
Ghana	Pakistan	Zambia
Greece	Panama	
Guatemala	Papua New Guinea	

Total: 106 Countries