

Evidence on the role of institutions in economic growth: A panel data study of developing countries

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Keywords

Gross Domestic Product (GDP), International Development Association (IDA), Generalized Method of Moments (GMM), International Bank Reconstruction and Development (IBRD), World Development Indicator (WDI), International Country Risk Guide (ICRG).

Abstract

The paper examines the role of various types of institutions on economic growth through capital formation and technological progress. The Solow residual is taken as a proxy of technological progress. The study uses panel data from twenty-one developing countries from the International Development Association. The sample period extends from 1990 to 2013. The institutions are categorized as economic, financial, political, and social institutions. The Solow growth model is the basic reference point of this study. The GMM panel estimation technique is applied due to the problem of endogeneity. The relationship between GDP per labor and institutions is explored through technology and stock of capital per labor. The results of this study show a significantly positive relationship between economic growth and economic, political, social, and financial institutions. Moreover, based on empirical results this study concludes that to achieve economic growth in developing countries, the government should strengthen its institutions and control the corruption, ethnic tension, injustice, terrorism, and intolerance in the society. The governments of developing countries should strengthen the financial and economic institutions to enhance growth via increasing investment in the country.

Introduction

Institutions play an important role in influencing the macroeconomic performance of the country. The development, functioning, and formation of institutions vary from country to country. This institutional variation causes variation in the economic growth of the countries by marking some countries rich and others poor. Moreover, it is seen that developing countries with weak institutions fail to promote property rights and productive investment. Furthermore, the reason for low investment in developing countries is manipulation and uncertainty in the judiciary, bribery, tax evasion, corruption, presence of inefficient institutions and the lack of property rights. The critics are of the view that institutions influence economic growth through transaction cost, incentive structure and property rights (North and Thomas 1973). In addition, variables like justice, law enforcement and tax administration are among the other variables of institutions that affect economic growth. The elite class has unlimited political and economic power and only they can benefit from the productive opportunities and quality of education.

Literature Review

Vinayagathan (2013) studied the impact of inflation on economic growth by taking the balanced panel data. The study employed dynamic panel estimation and a fixed effect model. It was found that inflation and economic growth are significantly and negatively related. The study found a non-linear relationship between economic growth and inflation. Moreover, inflation harms economic growth when it is more than 5.43%.

Javed et.al, (2013) empirically analyzed the impact of government expenditure and inflation on economic growth by taking the time series data. The study suggests that reduction in taxes and misallocation of resources will improve economic growth. The study of Arjomand, Emami and Salimi (2016) found that inflation and labor productivity have a positive effect on economic growth. Budget deficit increases inflation, liquidity and government debt to state banks. This study suggests that the government can sell its bonds to meet its budget deficit. Goher et. al, (2012) empirically analyzed the impact of budget deficit on economic growth. The study found that budget deficit is negatively related to economic growth. The study suggests that the country should use its underutilized resources. Moreover, the government should reduce the excessive printing of paper money. Furthermore, the government should impose indirect and direct taxes to generate the revenue.

Adak (2015) studied the impact of innovation and technological progress on economic growth. The study found that technology and economic growth are positively related to each other. While the error correction results show negative long-run relationship. The study suggests that introduction of new machines; equipment's and technology tools will increase the output, which leads to the increase in economic growth. Ciftci, Ispir, Yetkiner (2015) analyze theoretically and empirically the impact of financial development on economic growth. The study found that the stock market and credit market development have positive long-run effect on economic growth. This study suggests that financial funds should be used for productive purposes rather than unproductive. The government policies should be structured in such a way that it boosts the credit market. Moreover, there should be legal and institutional improvement to strengthen the investor and creditor rights.

Abu-Bader and Abu-Qarn (2008) examines the impact of financial development on economic growth. This study suggests that limiting the government participation in financial system and improving the investment in human resource will improve the economic growth. Teng et.al, (2006) studied the impact of financial development on economic growth. This study found that long-run relationship exists between financial development and economic growth. This study suggests that China should improve its financial system with liberalized interest rate and sound financial intermediation. Hondroyannis, Lolos and Papapetrou (2005) discuss the empirical impact of banking and stock market on economic. The study found that both the banking and stock market have long-run relationship with economic growth. This study suggests that financial intermediaries should offer funds to highly productive and less established firms.

Guidotti (1995) studied the empirical impact of financial institution on economic growth. This study suggests that well-functional financial structure leads to the better economic growth. The study further suggests that improvement of domestic financial market will boost the investment and saving rate. Paik et.al, (2017) wrote about the impact of ethnic tension on economic growth. This study suggests that the government should provide equal rights and public goods to the minorities. Moreover, the minorities should be given full privileges to participate in the politics. Arin et.al, (2017) studied the impact of ethnic fractionalization on economic growth. The study was found that ethnic tension and economic growth has negative relationship. This study suggests that the government should control the ethnic heterogeneity and rent-seeking behavior of the different ethnic groups, which will help in increasing the economic growth.

Leandro et.al, (2016) wrote a paper on the impact of cultural diversity on economic growth. Cultural diversity is represented by polarization and fractionalization index. The study found that both the polarization and fractionalization have positive and significant relationship with economic growth. This study suggests that diverse range of customs, ethics, societal norms and new ideas can foster technology innovation.

Ager and Bruckner (2013) studied the impact of cultural diversity on economic growth. The study found that polarization is negatively related to economic growth. This study suggests that immigration increases the polarization and negatively affects the economic growth. The study further suggests that the developed countries should tighten its immigration policies to boost economic growth. Radu (2015) empirically analyzed the impact of political stability on economic growth. The study suggests that the government should increase the education level, welfare of its residents, reduce poverty and assure job creation.

Li and Liu (2005) examined the impact of foreign direct investment on economic growth. The study found that problem of endogeneity does not exist between foreign direct investment and economic growth. study suggests that government should promote foreign direct investment and human capital, in order to improve the economic growth.

Agostino, Dunne and Pieroni (2016) empirically analyzed the impact of corruption and government. The study concluded that corruption reduces the collection of taxes. Moreover, the corrupt politicians collect bribes from spending on major project like civil engineering developments and purchase of weapons. Economic growth can be enhanced by controlling the corruption and reducing the military expenditure. Asadullah (2014) investigated the impact of military expenditure in the presence of external and internal threats on economic growth. It was found that military expenditure is negatively related to economic growth. The study suggests that military spending should be reduced to encourage economic growth.

Ugwuegbe et.al, (2013) empirically analyzed the impact of capital formation on economic growth. The data was gathered from state bank of Nigeria. This study suggests that the government should emphasis on capital accumulation, which will increase the economic growth of Nigeria. Xiaoqing (2005) investigated the impact of investment on physical and health capital on economic growth. This study suggests that investment in physical and human capital leads to the economic growth. Beck and Murphy (1994) studied the impact of physical capital, human capital on economic growth. They found the positive relationship between physical capital and economic growth. Nejat and Sanli (1999) discussed the impact of physical and human capital on economic growth and found the positive relationship between physical capital and economic growth. The study concluded that investing in both physical and human capital together is more fruitful for economic growth as compared to investing separately.

Beck and Murphy (1994) did analysis on the impact of physical capital, human capital and economic growth. They found the positive and significant relationship between physical capital and economic growth.

Research Objectives

The objective of this study is to explore the relationship between institutions and economic growth empirically and theoretically for developing countries. There are many studies which have analyzed the impact of institutions on economic growth. Some studies have divided the institutions into explicit categories, but none of them have taken political, economic, social, and financial institutions all together and there is no single study that has focused on IDA countries. Hence, it may be a useful contribution to test the effect of different types of institutions upon economic growth in IDA countries.

Objectives of the study are specified as follows:

- To quantify the effect of political institutions upon economic growth in developing countries.
- To quantify the effect of financial institutions upon economic growth in developing countries.
- To quantify the effect of economic institutions upon economic growth in developing countries.
- To quantify the effect of social institutions on economic growth in developing countries.

Hypothesis

The following hypothesis is considered for testing based on econometric inference.

- Political institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Economic institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Financial institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.
- Social institutions significantly affect GDP per labor through stock of capital and technological progress in the selected IDA countries.

Research Methodology

This section consists of detailed discussion of a theoretical framework constructed on the basis of the Solow growth model.

Theoretical Framework

Following the neo-classical production structure, the aggregate production function is given as:

$$Y = A \cdot f(K, L) \quad (1)$$

Where Y, A, K and L represents the output, technology, capital and labor respectively. Technology is appearing in this function multiplicatively. Assuming constant return to scale, the intensive form of this production function becomes more insightful.

Dividing the entire equation by labor 'L' we get,

$$\left(\frac{Y}{L}\right) = A \cdot f\left(\frac{K}{L}\right) \quad (2)$$

It implies that output per worker depends only on capital stock per worker (capital stock labor ratio), give the state of technology. Further, assuming Cobb-Douglas production function, we get the equation 7 below

$$\left(\frac{Y}{L}\right) = A \cdot \left(\frac{K}{L}\right)^\beta \quad (7)$$

Taking log of the equation 7, we get equation 8 below:

$$\ln\left(\frac{Y}{L}\right) = \ln A + \beta \ln\left(\frac{K}{L}\right) \quad (8)$$

When $\ln Y/L$ is regressed upon $\ln(K/L)$, we get a constant α and residual μ . The sum of constant α and μ is used to represent technology (A). It is to be noted that $\frac{dY}{dA} = 1$, if we differentiated the equation 8 w.r.t $\frac{dY}{dA}$. In chain rule we will incorporate the $\frac{dY}{dA} = 1$ value.

$$A = \alpha + \mu \quad (9)$$

Econometric model of equation (8) production function is:

$$\ln\left(\frac{Y}{L}\right) = \alpha + \beta \ln\left(\frac{K}{L}\right) + \mu \quad (10)$$

Rather than looking at the impact of institutions on economic growth directly this study looks at how do the institutions affect capital stock per labor and technology. Then by using the chain rule, the impact of institutions on economic growth is determined. For this purpose, the following two functions are estimated

$$A = f(E. Ins, F. Ins, P. Ins, S. Ins) \quad (11)$$

$$\left(\frac{K}{L}\right) = f(E. Ins, F. Ins, P. Ins, S. Ins) \quad (12)$$

Using the chain rule, the impact of institutions on economic growth is calculated as follows:

$$\frac{dY}{dI_i} = \left(\frac{dY}{dK} \cdot \frac{dK}{dI_i}\right) + \left(\frac{dY}{dA} \cdot \frac{dA}{dI_i}\right) \quad (13)$$

Where I_i denotes each of the four institutions under consideration in this study.

Description of Variables

The international country risk guide consists of 22 variables, divided into three categories i.e. economic, financial and political variables. Each of these 22 components are assigned a numerical value which is its risk points where higher points indicate low risk and low points indicate high risk. The ICRG has combined social variables with the political variables. The social variables are separated in this paper and separate index of social institutions is constructed. The international country risk guide (created by the editor of international report in 1980) was made to forecast political, economic, social and financial risks. It provides data for 27 countries on annual basis and 140 countries on monthly basis. The ICRG data

is used by banks, investors, multinational importers, corporations, foreign exchange, exporters, shipping concerns, traders and etc.

Overview of Data

Variable	Notation	Description	Sources
GDP per worker	<i>GDP/L</i>	Total output of the country divided by total number of labor US \$ (2010)	World Development Indicator (ID (WDI-2016)
Capital per worker	<i>K/L</i>	Stock of Capital US\$ with base year (2010) divided by total labor force	Penn World table 9.0
Economic Institution	<i>EINS</i>	<ol style="list-style-type: none"> 1. GDP per Head. 2. Real GDP Growth. 3. Annual Inflation Rate. 4. Budget Balance as a Percentage of GDP. 5. Current Account as a Percentage. 	International Country Risk Guide (ICRG)
Financial Institutions	<i>FINS</i>	<ol style="list-style-type: none"> 1. Foreign Debt as a Percentage of GDP. 2. Foreign Debt Services as a Percentage of Exports of goods and services. 3. Current Account as a Percentage of Exports of Goods and Services. 4. Net International Liquidity as Month of Import. 5. Exchange Rate Stability. 	International Country Risk Guide (ICRG)
Political Institutions	<i>PINS</i>	<ol style="list-style-type: none"> 1. Government Stability. 2. Investment Profile. 3. Internal Conflict. 4. External Conflict. 5. Corruption. 6. Military in Politics 7. Law and order. 8. Democratic Accountability 9. Bureaucracy Quality 	International Country Risk Guide (ICRG)
Social Institutions	<i>SINS</i>	<ol style="list-style-type: none"> 1. Ethnic Tension 2. Religious Tension 3. Socioeconomic variable 	International Country Risk Guide (ICRG)

Principal Component Analysis

Principal component analysis is a statistical technique used to identify a few uncorrelated variables, called principal components, from a large data set. Thus, it helps in eliminating the problem of multicollinearity among the variables. This technique is mostly used to identify strong patterns and emphasize the variation in the data set. It is a commonly used tool for analyzing exploratory data in

industries, social science, and market research. Minimal time and effort are used in reducing confusing and complex data sets to a useful and simplified information set.

Endogeneity Problem and its Solution

The problem of simultaneity or bi-directional causality is defined as the correlation between the independent variable and the error term of the model. The independent variable, which is correlated with the error term, is called the endogenous variable. In the presence of endogeneity, the OLS estimators will be biased and inconsistent. An instrumental variable approach is used to address the problem of endogeneity. In instrumental variable approach, variables are introduced in such a way that it nullifies the relationship between the endogenous variable and error term. In the measures used in this paper, bi-directional causality exists among economic growth, capital stock per labor and political institution: capital stock per labor, economic and social institution: technology and financial institution.

Generalized Method of Moments (GMM)

In ordinary least square method, we assume that there is no relationship between explanatory variable and the error term. If there is a relationship between explanatory variable and error term, it means there is a problem of endogeneity. In that case OLS estimator will be biased and inconsistent. Hasen (1982) developed the GMM technique in order to cope up with the problem of endogeneity.

Results and Discussion

Marginal Effects	
Variable	
$\frac{\partial y}{\partial S}$	0.001989
$\frac{\partial y}{\partial P}$	0.023135
$\frac{\partial y}{\partial E}$	0.035022
$\frac{\partial y}{\partial F}$	0.069355

Table 1.1 Marginal effects of institutions on GDP per labor are as follow:

Source: Author's Estimation

The above table shows the indirect and positive relationship between GDP per labor, social institution, economic institution, political institution, and financial institution. Chand et al. (2012) wrote about the impact of social institutions on economic growth and found that presence of corruption in these institutions will reduce economic growth of the country. Eicher et al. (2009) also found that political institutions and economic growth have a positive relationship. Glaser et al. (2004) who empirically analyzed the impact of economic institutions on economic growth. They found that developing countries grow at a faster rate under dictatorship as dictators follow command economics which encourages investment through secure property rights, unhindered trade activities, and easy access to credit. King and Levin (1993) studied the impact of financial development on economic growth and found that a well-structured and efficient financial institution increases the investment of the country.

Summary

The purpose of this study was to capture the impact of political, economic, social and financial institutions on economic growth. The theoretical framework was constructed on the basis of Solow growth model. The panel data of 21 developing countries were used from 1990 to 2013. Methodology of

the paper revolves around the panel causality test that detected the bi-directional causality among different variables. Due to the problem of endogeneity, a generalized method of moments was used. The relationship between GDP per labor and institutions were captured through capital and technology by using the Solow residuals.

Three different models were estimated to calculate the marginal effect. The International Country Risk guide, Penn world table 9.0 and world development indicator (WDI) were the sources used. Furthermore, GMM was applied using the dependent variables: Solow residuals, log GDP per labor and factor productivity for the estimation of marginal effects. The highest marginal effect can be seen in the financial and economic institutions. In developing countries, the elite class has unlimited power and only few people can benefit from the quality of education and the weak structure of the society was due to fragile bureaucracy.

The improvement in the information services regarding commercial banks and risk diversification will help in increase in economic growth of the country. There should be legal and institutional improvement to strengthen the investor and creditor. Moreover, the government should avoid involvement in commercial institution decisions. The financial intermediaries should offer funds to highly productive and less established firms. Furthermore, the study suggests that improvement of domestic financial market will boost the investment and saving rate.

Policy Recommendation

The paper recommends that in order to achieve economic growth in developing countries the government of these countries should strengthen its institutions. There should be investment in technology, human and physical capital. The government should control the ethnic and religious tensions, corruption, injustice and intolerance in the society. The government should be politically stable, in order to promote foreign direct investment. Moreover, if the financial institutions are stable the country will have more investment, which will lead to the increase in economic growth. The investment in infrastructure promotes use of modern technologies, which will increase the productive activities.

Economic institutions play a significant role in increasing the economic growth of the country. It was found in the previous studies that increase in investment, reduction in trade barriers, reduction in taxes and miss allocation of resources will improve the economic growth. Hence, the government should impose indirect and direct taxes to generate the revenue, introduce new machinery, equipment and technology tools which will increase the output.

According to the empirical results of this study, financial institutions contribute more in economic growth as compared to other institutions. Therefore, it is suggested that improvement in the information services regarding commercial banks and risk diversification will help in stable economic growth. The government policies should be structured in such a way that it boosts the credit market. Moreover, there should be legal and institutional improvement to strengthen the investor and creditor rights. Furthermore, the financial intermediaries should offer funds to highly productive and less established firms. The government expenditure and trade play a major role in the amplification of economic growth. The well-operational financial structure leads to better economic growth.

A social institution is also one of the main pillars of institutions and it plays a key role in the development of society. It was seen in the different studies that the government should provide equal rights and public goods to the minorities; the minorities should be given full privileges to participate in politics. The government should control the ethnic heterogeneity and rent-seeking behavior of the different ethnic groups, which will help in increasing economic growth. Moreover, education increases the knowledge and skill of labor, which leads to an increase in labor productivity and finally economic growth. Furthermore, primary education should also be given equal importance, as primary education prepares for higher education.

The government should make policies for the production of goods and services on domestic level, in order to manage both external and government level debt. The sectorial imbalance should be avoided because it damages industrial and agriculture production. The foreign direct investment and economic growth have significantly positive relationship in many studies. So, the governments should promote foreign direct investment and human capital. It is seen that the corrupt politicians collect bribes from

spending on major project like civil engineering developments and purchase of weapons. Economic growth can be enhanced by controlling the corruption. The financial institutions and decision makers should set their goals keeping in mind the political instability, while making the policy. Moreover, the government should avoid giving rent seeking opportunities to bureaucrats, and instead involve the bureaucrats in investment activities. Furthermore, the government should enlarge the economy and increase competitiveness

The countries should emphasize capital accumulation, which will increase economic growth. Many studies concluded that investing in both physical and human capital together is more fruitful for economic growth as compared to investing separately. As mentioned in OECD (2007) the contribution of capital and investment in software lead to an increase in economic growth. Moreover, the investment in imported machinery increases economic growth since it possesses the latest technology and is cost and time efficient.

Limitation and Future Research

In this paper, the GMM estimation technique is used to find the impact of political institutions, financial institutions, economic institution, social institution and physical capital (control variable) on economic growth. This study includes the group of twenty-one developing countries taken from the International Development Association (IDA). This study can further be extended using the ASIAN and SAARC countries. Moreover, the econometric model and theoretical framework should be established to further highlight economic growth. Due to less availability of data, 21 IDA countries are included in the analysis of the research. The data of other countries can also be used to do more comprehensive research in this area.

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