A Panel Data Approach of Determining Factors of Economic Growth for Different Income Groups of Countries

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Abstract

Objectives: The main objectives of the study include, to identify whether there is any direct impact of labor, capital/investment, technological advancement and institutional quality on economic growth; understanding the marginal effect of capital and technological advancement for different levels of institutional quality; determining how these relationships vary on the group of countries based on their income groups – poorer to richer.

Method: Panel data for the period 2006–2020 and 40 countries was considered for the analysis. In order to examine the relationships for all the countries, fixed effect OLS was applied. In addition, to identify the nature of the relationships for the countries based on their income group, quantile fixed effect regression was conducted. To control the time effect, the variable, year, was considered as dummy variable.

Findings: The study finds that the rate participation of the labor force negatively impacts economic growth whereas institutional quality, capital formation, and advancement of technology positively impact economic growth. The study also finds that the relationship between economic growth and labor, capital, R&D and institutional quality vary across the income group of countries. In case of the 10th quantile, that is the lowest income group countries, none of the independent variables have been found to be impacting the dependent variable, economic growth. This statement has been found true for the two subsequent upper groups of countries – that is for 25^{th} and 50^{th} quantile – as well. However, in the case of 75^{th} and 90^{th} quantile, institutional quality has been found to impact economic growth positively. The positive impact, however, has been found decreasing with increasing of income group of countries. On the other hand, the findings of the study implies that the impact of capital on economic growth will likely to be significant with gradual improvement in the quality of institutions and it has been the case for all the income group countries. In addition, the study finds, the impact of advancement of technology on economic growth gradually decrease with the improvement of institutional quality. Other than this lowest income group of countries, for all other income group countries, the impact of technological advancement tends to have a positive impact with the gradual improvement of the quality of institutions of an economy.

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1. Introduction

1.1 Background of the study

Economic growth is, or at least has been, considered as one of the key components for achieving economic development. It implies an increase in the total output of an economy. Gross Domestic Product (GDP) has been the most popular tool that is used for measuring the economic growth of an economy. Since the inception of measuring economic growth, the policymaking of countries across the world has been circling around on how to enhance it. Over the course of time, the pursuit of enhancement of economic growth shifted from nominal economic growth to real economic growth, which more justifies the enhancement of economic output by controlling the effect of inflation. As with the enhancement of economic growth getting substantial priority in policymaking, an enormous ground has been created for researchers in explaining the enhancement or even diminution of economic growth by identifying the factors that have an impact on it.

The progress towards explaining the underlying factors of economic growth has been remarkable. Over the years, several groundbreaking studies have been able to identify causal relationships between economic growth and most other likely factors. A few economic growth theories based on these groundbreaking studies emerged and came with evidential reasoning on the behavior of economic growth. The attempt to explain economic growth started with the concept of mercantilism theory, which stated that a nation's economic growth could be enhanced through the accumulation of gold and running a trade surplus (Allen, 1991). Subsequently, the father of classical economics, Adam Smith, argued that growth in population, capital, labor division (technological advancement), and the economy's institutional structure (competitive-free traded market economy) are the key elements influencing the engine of economic growth (Smith, 1776). While for long classical growth theory believed to be impeccable, the neoclassical growth theory appeared with the argument that enhancing capital or labour causes diminishing returns; hence, enhancement of capital has only a momentary and limited influence on increasing economic growth (Solow & Swan, 1956). This theory also introduced technological progress as a key factor of economic growth. Another neoclassical growth model was introduced by Harrod (1939), and Domer (1946) claimed that a function of the savings rate influences growth rate. On the other hand, the latest most celebrated work on economic growth was introduced by Romer (1994), also known as endogenous growth theory, claimed that the most key factor of economic growth is the

productivity of both capital and labour. Unlike solow's growth model, this theory argued that increasing capital does not necessarily cause diminishing returns; rather, it depends on the type of capital investment. Even after the progression of knowledge towards the behavior of economic growth of a country, the thirst for knowledge regarding the explanation of economic growth remains pertinent today due to several reasons. First, these theories have their own limitations. Second, these economic growth theories are struggling to fit in a present world of economy, where the economic agents and factors of production of an economy are getting complex, thanks to the advancement of technology. With the availability of a broad range of data and development of advanced econometric methods, there is a wider scope available today to see economic growth through the lens of the well-established economic theories and understand their capacity in explaining the economic growth for different income groups of countries.

1.2 Rationale of the Study

This study seeks to examine the factors of economic growth hinged on the latest economic growth theory of Mankiw, Romer, and Weil (1992). While the factors of production, including labor and capital and technology, are considered the key determinants of economic growth (Solow, 1956; and Swan, 1956), the magnitude of their impact largely depends on the quality of institutions. Much as a number of studies had attempted to pursue (as shown in the literature review section) the relationship between economic growth and labor, capital, technology, and institutional quality; there is an absence of examination of this relationship considering a large number of countries, controlling the time effect, based on their income group status, and the nature of the marginal impact. The question still remains pertinent whether the relationship is truly significant, whether there is any income status base dimension, and how their marginal effect behaves in the case of the relationship. The study hence attempts to fill this research gap by examining the nexus between economic growth and labor, capital, technology, and institutional quality through the lens of the economic growth theory of Romer (1994) critically. The study's findings will facilitate the understanding of the determinants of economic growth and how the behavior of economic growth varies across the different groups of countries.

1.3 Research objectives

Against the identified research questions in the discussion of the previous section, the following research objectives could be extracted:

1. To assess the relationship between economic growth and participation of labor, size of capital, technology, and institutional quality.
2. To identify whether there is any income country group dimension in case of the relationship between economic growth and participation of labor, size of capital, technology, and institutional quality.
3. To examine the interaction effect of the capital and institutional quality, and technology on economic growth and its income group-based dimension.
4. To evaluate the marginal effect of the capital and institutional quality, and technology on economic growth and its income group-based dimension.
5. To test the extent of commensurateness of the economic growth theory with the findings of the study.

1.4 Method, contribution, and limitation of the study

Method: The study uses panel data for the period 2006–2020 and 40 countries for the analysis. In order to examine the relationships for all the countries, fixed effect OLS was applied. In addition, to identify the nature of the relationships for the countries based on their income group, quantile fixed effect regression was conducted. To control the time effect, the variable, year, was considered as dummy variable.

Contribution: The study is expected to complement the findings of the other studies that had been conducted in the area of economic growth. In addition, findings of the study would be helpful for conducting new studies particularly in the area of gaps of this study. Finally, the study might also help in better understanding the nature of the economic growth for different income group of countries.

Limitation: Similar to many other researches, the major limitation of this study was unavailability of data. It is well known that the higher the size of observation, the higher the variation among the data which thereby lead to reducing the biases of the study. Due to limited data availability, the result of the analysis might not be entirely representative. Another limitation of the study is the quality of data used for the analysis. Data available for all the countries particularly for developing countries might not be truly indicative of the real

economic scenario and their quality of institutions. For example, there have been questions regarding recent unemployment rate and GDP growth rate measured by Government of Bangladesh. Any discrepancy in data, therefore, might lead to some ambiguous findings.

2. Literature review

Identification of determinants of economic growth remains a vast area of research work. Numerous studies have been undertaken in this regard. However, in reviewing of literature, those dealt with the relationship between economic growth and labor, capital, technology, and institutional quality have been prioritized. Both the ones that examined the relationships for single country and multiple countries have been reviewed. In addition, some of the key theories in regard to economic growth have also been reviewed.

Impact of institutional quality on economic growth

Eicher et al. (2007) attempted to build an aggregate index of institutional quality in OECD countries to assess the relevance of institutions only for those countries. The purpose of the study was to examine whether a set of institutions can be isolated from OECD country groups that directly or indirectly contribute to economic growth. However, the impact of institutions on economic growth in OECD countries has not been systematically explored due to limitations on their Institutions Climate Index. However, they showed that The Index can be used to analyze and understand the differential economic performance of OECD countries.

Acemoglu & Robinson (2008) tried to find the primary determinant which causes differences in prosperity across the countries. They found that differences in institutions cause differences in any country's economic growth. They argued that by reforming their institutions, a country could quickly move onto more successful paths of economic development.

Valeriani & Peluso (2011) examined the impact of institutional quality on economic growth over sixty years for different stages of country groups. On the analysis part, two econometric models (pooled regression model and fixed effect model) and three institutional indicators (civil liberties, several veto players, and quality of government) have been used. This study tried to investigate among different country groups. However, they conclude that the institutional quality does impact economic growth positively, but the effect of institutions differs among the country groups. For example, improved civil liberties seem to perform a more significant impact on economic growth in developing countries, but on the other hand, the number of veto players seems more critical for developed countries

Mobarak and Karshenasan (2012) explored the relationship between natural resources, institutional quality, and economic growth. Analyzing panel data from 1996-2007 for oil-exporting countries found that institutional quality positively impacts economic growth. This paper considers four indicators as institutional quality: voice and accountability, control of corruption, the rule of law, and government effectiveness. However, resource abundance is negatively related to economic growth and decreases institutional quality. They concluded by stating that there is an indirect consequence of natural resources on economic growth, which goes through the institutional quality and create a positive impact. Therefore, the negative impacts of resource abundance could also be reduced through better quality of institutions.

Nawaz et al. (2014) tried to develop a theoretical model that would better incorporate with the institutions' role to explain economic growth as previous models hardly incorporate much of the role of institutions towards economic growth. In developing the model, they considered data from 35 Asian countries from 1996 to 2012. They also tried to conduct an empirical analysis to quantify the impact of institutional variables on economic growth. It was found that institutions are more effective in developed Asian countries than developing Asian countries. They argued that different countries required a different set of institutions to achieve long-term economic growth.

Masiyiwa (2016) examined whether any significant relationship exists between income per capita and institutional quality in Zimbabwe. Approaching the Generalized Method of Moments (GMM), it was found that institutional quality has a higher impact on growth in Zimbabwe. However, it also added that if the quality of institutions is not taken into account, the policy measures for economic growth may not have a significant impact. In other words, it would crowd out the economic growth policy initiatives.

Ozpolat et al. (2016) studied the effect of institutional effectiveness on economic growth for three different country groups from 2002 to 2015. GMM method has been used. This study considered GDP as a Dependent variable, and the independent variables are institutional variables (the rule of law, fight against corruption, voice, and accountability). This paper tried to find the questions about whether or not there is a positive relationship between the rule of law and economic growth in high-income, middle-income, and low-income countries. And they find out that the efficiency of institutional structure is not a reason but a result of growth.
Radulović (2020) inspected the impact of institutional quality on the economic growth of South-East Europe by applying the panel autoregressive distributed lag (ARDL) approach. It

was found that a long-run relationship exists between institutional quality and economic growth in the case of EU countries.

Impact of labor on economic growth

Kargi (2014) discussed the relationship between population and economic growth. And found population has a positive relation with economic growth. However, despite having a direct relation with population and economic growth, the author found a paradox with the concept of labor force participation rate to explain the advancing population. Because it reveals a few concepts such as "jobless growth" and "unskilled growth". So author concluded by saying labor participation rate have much effective contribution to economic growth.

Impact of capital on economic growth

Ongo & Vukenkeng (2014) tried to examine the effect of gross capital formation on economic growth. He considered a CEMAC sub-region (Central African Economic and Monetary Community). Data has been used from World Bank Development Indicators, and the Generalized Least Square estimation technique has been used for the estimation purpose. The endogenous growth model inspires the study. This study suggested that gross fixed capital has a significant positive impact on economic growth.

Impact of technological change on economic growth

Clarke (2001) explored the relationship between Institutions and R&D expenditure. This study considered data between 1983 and 1994, and it was the (unbalanced) panel. However, fixed country and time effects are included in all regressions and found a strong positive relationship between Institutions and R&D expenditure. The better the institutions, the greater the R&D expenditure.

Zhao (2018) described how technology had been integrated into the study of economic growth; in his research, he explained from the Solow model and emphasized Romer's endogenous growth theory to explain economic growth better.

Impact of institutional quality, labor, capital, technological change on economic growth

An empirical analysis of the 11 countries in the MENA region found that investment and economic growth have a significant relationship with institutional variables by Zouhaier (2012). Moreover, the relationship is positive between political institutions and investment, whereas negative is between political instability and investment. The paper concluded by

stating a positive influence of political institutions on economic growth and investment, but corruption negatively influences the mentioned factors.

Prochazkaa & Cermakovaa (2014) aimed to investigate the impacts of economic growth using a few institutional variables. In their study, two types of factors have been discussed to explain economic growth, one is hard growth factors which are capital, labor & technologies, and another is a soft growth factor which is institutions. And this study only considered two factors as institutions: one is trade freedom, and another is investment freedom. Moreover, this study used the IEF index for its analysis. However, this study did not confirm a theory about the positive correlation between trade openness and economic growth, but they showed a positive correlation between R&D expenditure and economic growth.

Pietak (2015) divided the economic models into endogenous and exogenous groups. In his study, he concluded with a concern that the results from the models are not always be supported by the empirical data for the global economy; for example, he mentioned the "scale effect" of Romer's model, which was not confirmed by the standards of individual countries.

Yildirim & Gokalp (2015) tried to analyze the relationship between institutions and macro-economic performance in developing countries from 2000-2001. This study stated that human capital mainly consists of unskilled and untrained workers in developing countries, causing the informal economy's emergence. Also, freedom and regulations are restricted on credit, and labor markets remain insufficient and left behind for technological innovation. As a result, this study investigated the institutional structure of developing countries and concluded that the institutions of these countries have generally lacked sufficient effectiveness.

Hayat (2019) explored the direct relationship of institutional quality with economic growth and its indirect connection with foreign direct investments (FDIs). He provided evidence that the coordination of FDI inflows and the quality of the institutions can create more vigorous economic growth for an economy. However, the influence varied based on the country belongs to which income group. For low- and middle-income countries, the growth of FDI played a more remarkable role, as better institutional quality enhanced the FDI-led economic growth. On the other hand, FDI slowed down the economic growth rate for high-income countries.

On modern institutions

Concerning Institutions, Douglass North (1981,1990) has done a lot of the groundwork in institutional performance. According to North, institutions are human-made restrictions that form human activity. Essentially, in North's system, executive authority is restricted, which increases institutional quality. The severity of such limits has been shaped by the features of applying them, which may be formal rules or informal restrictions. The premise is that limiting executive authority reduces a country; de jure ability to place itself above the rules. And this means that the legislation covers individuals, traders, and other economic environment challengers in their business enterprises and developments in human and physical resources, as well as new technology ventures.

Lloyd & Lee (2018) studied the post-2000 works of literature of institutions as a factor determining cross-country differences in growth rates. Also, it has tried to explain how institutional economics has evolved. They have constructed a few models with institutional variables that show the importance of pursuing causality and endogenized the institutional variables themselves. There is no doubt that institutions are an essential determinant of long-run growth. However, whether they are the primary determinant of cross-country differences in growth or why the growth rates have accelerated in some economies and decelerated in others, and why they have accelerated then decelerated when institutions are supposedly stable over time. This question is still unclear since Institutions change over time and vary over space.

Salamova (2020) described how institutions continuously evolve to a new direction of economic thought. The contemporary theory of institutions has been divided into formal institutions such as 'constitutions' and non-formal institutions such as 'telephone right.'

Tran et al. (2021) made a very recent study considering 48 countries in Asia between 2005 to 2018. They formed a multiple regression model using the quantile regression method on panel data to analyze the impact of institutional variables on economic growth. In their analysis, they used the World Bank CPIA index. This study found that there is an institutional threshold for economic growth. Therefore, to keep the economic growth positive, it is essential to calculate the threshold point because if any institutional indicators exceed that threshold, that causes a negative effect on economic growth.

Observation from the literature review

It can be observed from the conducted literature review is that the existing literature regarding impact of institutional quality, labour, capital, and technological progress on economic growth and have been mostly limited to data of a fewer countries. Also, very few studies investigated the nature of these relationships based on the different income group of countries. Moreover, none of the studies were found that dealt with marginal effect of institutional quality on economic growth and also conducted the analysis controlling the time effect. In terms of the finding, several studies found positive relationship with institutional quality, capital and technological progress and economic growth. However, some of the studies have not found any significant relationship between these variables.

3. Theoretical Framework

3.1 A discussion on existing growth theories

With time, the economy has become more complex, and new growth theories have been developed. In the 15th century, Mercantilism was considered the earliest economic theory. Mercantilism believed the accumulation of wealth was the primary source of economic growth; by that time, they used precious metals, gold, and precious coins as liquid materials. At that time, they focused on developing their domestic market by creating trade restrictions to provide credit facilities for low-interest loans to the country. For that reason, they restricted gold export but encouraged exporting other goods so that they could have credit inflow in their economy (Osipian, 2007). But those ideas faded away with the intervention of physiocrats in the second half of the 18th century. They focused more on agriculture, and they believed the wealth of a nation only could be derived from "land agriculture" or "land development" (Sharipov & Ilkhom, 2015). They only considered agricultural workers as skilled labor, but industrial or non-agricultural workers don't add value to the economy (Marx, 2000).

The book "The Wealth of Nations" (1776) by Adam Smith is considered as the beginning of classical growth theory. He first brought the idea to us that not gold, but trade is the true force to increase the wealth of a nation. By employing trade, both parties can profit, and the economy can improve. Smith discouraged state interference in a market, and he believed actual competition could push an economy upward. According to this theory, the population is increasing, but resources are limited, so a temporary increase in GDP per capita will lead to a rise in population since resources are limited, so economic growth will become slow. So that, with the help of the

advancement of technology, the economy will shift upward. But this theory completely ignores the role of technological progress for economic growth in their model.

Later, John Maynard Keynes, in the 1930s, came up with a concept based on macroeconomic values such as national income, consumption, savings, and investments are the main forces of growth. From there, Keynesian theories appeared. He focused more on government's role in an economy. He suggested the government should intervene in a macroeconomic role such as a fiscal and monetary policy to stimulate the economy. The investment was considered as the main factor of economic growth, and an increase in aggregate demand can balance the economic growth. But in reality, aggregate demand does not necessarily equal the economy's productive capacity. In the 1950s-1960s, The Neoclassical Growth Theory explained growth with only three economic forces: labor, capital, and technology.

The Solow model is the most popular and simplest model of Neoclassical growth theories. This theory postulates that short-term economic equilibrium is a result of varying amounts of labor and capital, which plays an important role in the production process and technological changes have a major influence on growth (Sharipov & Ilkhom, 2015), but the Solow model was not completely endogenous; it failed to answer why countries have different technologies and also failed to explain the long-run economic growth. Lately, in the 1980s-1990s, endogenous Growth Theories came. This theory states that economic growth is the result of all internal forces. The concept of this model contrasts with the Neoclassical growth model, which explained growth with exogenous factors. This model also supports the role of government policies that can increase growth, but most importantly, this model emphasizes the role of R&D and knowledge for technological progress. Romer described "ideas" or "knowledge" from a different perspective than ordinary goods, but these ideas or knowledge can be produced with the internal factors of labor and capital just like other ordinary goods (Zhao, 2018). Romer identifies two main properties for Ideas. First, it is nonrival, such as used by one person's ideas will not become non-useable like other products; other people can use it. Second, ideas are partially excludable; the person who has a patent for a particular idea can receive the full monopolistic benefit by excluding others from its benefits.

Endogenous growth theory with modern institutions

This study follows Romer's model of endogenous growth theory. First, the theory argued that technological change is not just an exogenous byproduct; later, it sought those institutions, including government policies, institutional property law, and investment in R&D, help to foster an endogenous model that fuel-up economic growth for any nation. In addition, this theory

emphasized the government's role, for example, subsidies to correct the market failure and spur economic growth by promoting science and technological innovation.

Regarding explaining modern institutions, Salamova (2020) described how institutions are continuously evolving to a new direction of economic thought. The contemporary theory of institutions has been divided into formal institutions such as 'constitutions' and non-formal institutions such as 'telephone right'. We have been blessed with technological advancement in this modern time, and with this advancement of technology, economies are increasingly becoming complex. For example, cryptocurrency could become an essential factor for economic growth which did not exist in the past.

According to Tebaldi & Elmslie (2013), Solow, Romer, Jones, and many others had a major prediction, which is the steady-state growth rate of output per capita is equal to the rate of technological Progression, and the institutions have a growth effect on income because institutional quality affects an economy's rate of Technological innovation, which is the engine of economic growth.

3.2 Model Specification

This section of the study endeavours to build a statistical model based on the Romer's model of endogenous growth theory to realize the research objectives. The aims of model specification are to identify which independent variables should be included in or excluded from the model equation. In order to specify the model for the study should be based on the theoretical considerations of Romer's model of endogenous growth theory, following steps have been adopted.

According to the model, the functional form of economic growth can be written as:

$$Y = F(K, L, A, IQ) \text{ .....(i)}$$

Y represents economic growth, K represents capital, L represents labor, A represents technological change, and IQ represents institutional quality. For empirical investigation, variables against this function have been inputted based on the literature.

Economic growth is measured as the annual percent change of gross domestic product (GDP). Although data for GDP is available for most of the countries of the world, solely considering size of GDP might deviate the analysis from its goal. For example, population growth also increases labour force and, therefore, increases the economic growth. As a result, higher

economic growth may not mean the higher standard of living. On the other hand, more GDP per capita mostly indicate of a more efficient economy. Hence, the study considers GDP per capita in place of economic growth following the study of Nguyen (2018).

In order to gauge the size of the factor capital, the variable 'gross fixed capital formation' has been considered as was by Valeriani (2011). Gross capital formation, also known as gross domestic investment, consists of the additions to the fixed assets that include plants, machineries, construction of roads, equipment purchases etc.

The rate of participation of labor has been considered for measuring the factor, labor force – also used by Nguyen (2018).

Given that there are no readymade variables available for measuring the progress of technology of an economy, different proxy variables are used by different authors to substitute the variable with a similar one. In case of this study, the variable R&D expenditure has been used for measuring technological change– as used by Jensen & Webster (2009).

Similar to technological change, there is no direct variables available to measure the quality of institutions of an economy. However, a number of indexes on quality of institutions has been prepared by different studies. For this particular study, an institutional quality index (IQI) based on methodology of Nifo & Vecchione (2013) has been considered[1].

Hence, by substituting all these variables in equation (i):

$$GDP\ per\ capita = F\ (Gross\ Capital\ Formation,\ Labor\ Force\ Participation\ Rate,\ R\&D\ expenditure,\ Institutional\ Quality)\ .....(ii)$$

Considering the cobb-Douglas production function in equation (ii):

$$GDP\ per\ capita = (Gross\ Capital\ Formation)^{\beta 1}\ (Participation\ of\ Labor\ Force)^{\beta 2}\ (R\&D\ expenditure)^{\beta 3}\ (Institutional\ Quality)^{\beta 4}\ \ldots\ldots\ldots\ldots\ (iii)$$

Taking Ln on each side of equation (iii):

$$(Ln\ GDP\ per\ capita) = \beta_1(Ln\ Gross\ Capital\ Formation) + \beta_2(Ln\ Participation\ of$$

[1] Please see the detail methodology of the index in the subsequent section

Labor Force) + β_3(Ln R&D expenditure) + β_4(Ln Institutional Quality) .....(iv)

Based on this equation (iv), the estimating model for the study has been constructed in next section.

4. Data and Methods

4.1 Data

In conducting the study, data from a number of secondary sources were collected for 40 countries and period 2006 – 2020 was considered (Table 1). The variables considered for the studies are as follows:

Table 1: An overview of the variables considered for the study

Indicator	Considered variables	Number of countries	Period	Data Source	Based on
Economic growth	Real GDP per capita	40	2006-2020	WDI[2]	Nguyen (2018)
Quality of institutional	IQI Index	40	2006-2020	WGI[3]	Nifo & Vecchione (2013)
Capital	Real Gross Fixed Capital Formation	40	2006-2020	WDI[4]	Valeriani (2011)
Labour	Rate of labour force participation (18-60)	40	2006-2020	WDI[5]	Nguyen (2018)
Technological Change	R&D Expenditure	40	2006-2020	WDI[6]	Jensen & Webster (2009)

Source: Author's compilation.

Economic Growth: As mentioned earlier, economic growth is measured using Gross Domestic Product (GDP). However, GPD per capita has been considered for this study. GDP is usually measured both in nominal and real terms. The only difference between nominal and

[2] World Development Indicators
[3] World Governance Indicators
[4] World Development Indicators
[5] World Development Indicators
[6] World Development Indicators

real GDP is that the real GDP is inflation adjusted while the nominal is not. For this reason, real GDP depicts a truer scenario of the economic growth of a country than nominal GDP. Hence, in considering economic growth, real GDP per capita in US$ has been considered for this study. It is to be noted that the GDP is decomposed into the population and economic elements that is per capita output. The per capita output is obtained by dividing the real GDP's size by the size of the population.

Institutional Quality: Measure of institutional quality can vary based on its definition. No single variable that measures institutional quality for country-level was found in secondary sources. *World Governance Indicator (WGI)* has six aggregated indicators - including government effectiveness (GE), control of corruption (CC), regulatory quality (RQ), political stability (PS), rule of law (RL), and voice and accountability (VA)- related to institutional quality. In measuring the quality of the institution of a country, some earlier studies used [such as Knack & Keefer (1995) and Al-Marhubi (2005)], the average of these six indicators. However, according to the findings of Haggard & Tiede (2011), as cited in Bergh et al. (2014) that a cluster of developing countries combined higher levels of corruption with relatively well functional property rights while the second cluster of countries performs worse in these institutional dimensions and is highly violent. Therefore, instead of taking the general average, a customized index variable, indicative of the institutional quality of a country, was formed following the methodology of the Institutional Quality Index (IQI) prepared by Nifo & Vecchione (2013). The customized institutional quality index comprises five variables, including Voice and Accountability, Government Effectiveness, Regulatory Quality, Rule of law, and Corruption. Data of these five variables were collected - for selected 40 countries, taking ten countries from each income group (Annex I) and periods 2006-2020 - from the *World Governance Indicator (WGI)*. Values of all these variables range between -2.5 to +2.5, which have been normalized, that is transformed to the range of 0 to 1. The normalized values of each of the five indicators were then averaged by applying specific weight as identified by Nifo & Vecchione (2013). The higher value of the calculated index, therefore, indicates better institutional quality, while the lower value indicates the opposite.

Gross Fixed Capital Formation: The variable Gross Fixed Capital Formation can be indicative of investment. It refers to the purchase of engendered assets (including second-hand assets), together with the production of such assets by producers for their self-use, minus

disposals (OECD, 2021). Similar to GDP, the data is available both in nominal and real terms. For the purpose of the study, the real Gross Fixed Capital Formation is used.

Labor force participation rate: For this study, the participation of the labor force (aged between 18-60) has been considered. The data is obtained for the time period of 2006-2020 for selected 40 countries, taking 10 countries from each income group (Annex I).

R&D Expenditure: In this study, research and development expenditure (% of GDP) has been considered as Technology. The research and development expenditure of a country can represent how well the country is adopting new technologies (Jensen & Webster, 2009).

Rationale behind the selection of 40 countries

In total data of 40 countries, 10 from each of the income group countries as per World bank definitions – lower income, lower middle income, upper middle income, and high income– has been considered for the study. In selecting 10 countries from each of the group, the data availability was given the most priority. That is, countries from each income group, that had the least missing values for all the variables was considered for the study. The rationale behind taking 10 countries from each of the country group is to ensure the similar level of representation of all the countries in the data – from poorer to the richer.

4.2 Method

The study is conducted mainly based on regression analysis with the use of statistical software STATA. In this study, using panel data, fixed effect regression is estimated. The rationale of using panel data is that it offers a higher number of observations compared to time series data and provides more accurate inferences of model parameters thereby [(Hsiao, 1985); (Baltagi, 2008) and (Wooldridge, 2010)]. On the other hand, the rationale of using fixed-effects model is that it eradicates any omitted variable bias by calculating changes within groups across time, mainly by including dummy variables for the missing or unknown characteristics. As the study intends to control the effect of time (for any abnormal event) and missing values, fixed effect was applied for the regression.

In order to obtain the estimated regression model for the analysis based on the theoretical form, considering equation (iv) as panel form and putting the variables against the targeted indicators, it can be obtained:

$Ln (Y)_{it} = (\beta_1 Ln K)_{it} + (\beta_2 Ln L)_{it} + (\beta_3 Ln A)_{it} + (\beta_4 Ln IQ)_{it}$ …………………………….. (v)

Where,

Y = Real GDP per capita

K = Real Gross Capital Formation

L = Labor Force Participation Rate (18-60)

A = R&D expenditure (%) of GDP

IQ = Institutional Quality Index

In order to assess the marginal impact, the inclusion of the interaction term is required. After including the interaction term, the equation stands at:

$$Ln (Y)_{it} = (\beta_1 Ln K)_{it} + (\beta_2 Ln L)_{it} + (\beta_3 Ln A)_{it} + (\beta_4 Ln IQ)_{it} + \beta_5 (Ln IQ \times Ln K)_{it} + \beta_6 (Ln IQ \times A)_{it} \quad \text{……………………..} \quad (vi)$$

Given that, the variables, L, A are already at per centage, the ln transformation for these variables can be lifted. Hence, the final regression equation stands as:

$$\boldsymbol{Ln (Y)_{it} = \beta_1 (LnK)_{it} + \beta_2 (L)_{it} + \beta_3 (A)_{it} + \beta_4 (IQ)_{it} + \beta_5 (IQ \times Ln K)_{it} + \beta_6 (IQ \times A)_{it}} \text{……..} \textbf{\textit{(vii)}}$$

When all other variables are kept constant, marginal effects evaluate the influence of a single unit change in independent variable on the dependent variable. It depicts average effect of changes. Moreover, as one of the objectives of the study is to assess the marginal impact of capital and technology on different levels of institutional quality, the following derivation is applied on equation (vii) to obtain the marginal effect:

$$\partial(LnY)/\partial(LnK) = \beta_1 + \beta_5 \times IQI \quad \text{……………………………………….} \quad (viii)$$

$$\partial(LnY)/\partial(A) = \beta_1 + \beta_6 \times IQI \quad \text{…………………………………………….} \quad (ix)$$

Aligning with the study's first objective, the OLS fixed effect regression analysis is conducted considering economic growth (i.e. GDP per capita) as dependent variable and gross capital formation and institutional quality, R&D expenditure, and labor force participation as predictive variables. Logarithmic transformation is applied in GDP per capita, fixed capital

formation, to curb their higher skewness and find the elasticity coefficients. On the other hand, intending to be in line with the objective of the study, two interaction terms multiplying capital and institutional quality and multiplying R&D and institutional quality, are also used as a predictive variable. In the fixed-effect model, the variable year was used as a dummy variable in an effort to ensure that no year-centric bias (such as depression, natural crisis, oil shock, etc.) affects the analysis.

On the other hand, in order to identify the income group-based dimension of the estimated model, in addition to Ordinary Least Square (OLS), quantile regression is approached. Applying quantile regression in the model allows to identify the relationship of the entire conditional distribution of the dependent variable (Uribe & Guillen, 2020), which is real GDP per capita. The dependent variable that is per capita income, has been categorized into five quantiles (10th, 25th, 50th, 75th, 90th) from lower to a higher value. Therefore, the higher quantiles represent higher income group countries and vice versa for lower quantiles.

5. Result and Discussion

The overview of summary statistics of all the variables used in this study would assist in getting a quick insight regarding the characteristics of the variables. It would also help identify any potential anomalies or significant missing values that might influence the result of the analysis. The summary table (Table 2) shows that the average output per capita is US$ 13,421and number of observations is 600. The average size of gross fixed capital formation has been found as US$2481401.36. The number of observations for this variable is 557. On the other hand, the average labor force participation rate is 67.83%. There are 560 observations. It is to be noted that the number of observations for the variable R&D expenditure is significantly low (424). However, the average R&D expenditure of the data set has been found as 1.04%. Finally, value of the institutional quality of the dataset ranges between 0 to .98. The average value for the institutional quality index is 0.55.

Table 2: Summary statistics of the variables

Variables	Min	Mean	Max	N
GDP per capita in USD	270.69	13421.02	60836.77	600
Gross fixed capital formation in USD (mil)	118.37	248401.36	4656286.47	557
Labor Force Participation Rate (%)	41.47	67.83	90.34	560
R&D Expenditure (% of GDP)	0.01	1.04	3.40	424
Institutional Quality Index (0-1)	0.22	0.55	0.98	600

Source: Author's calculation

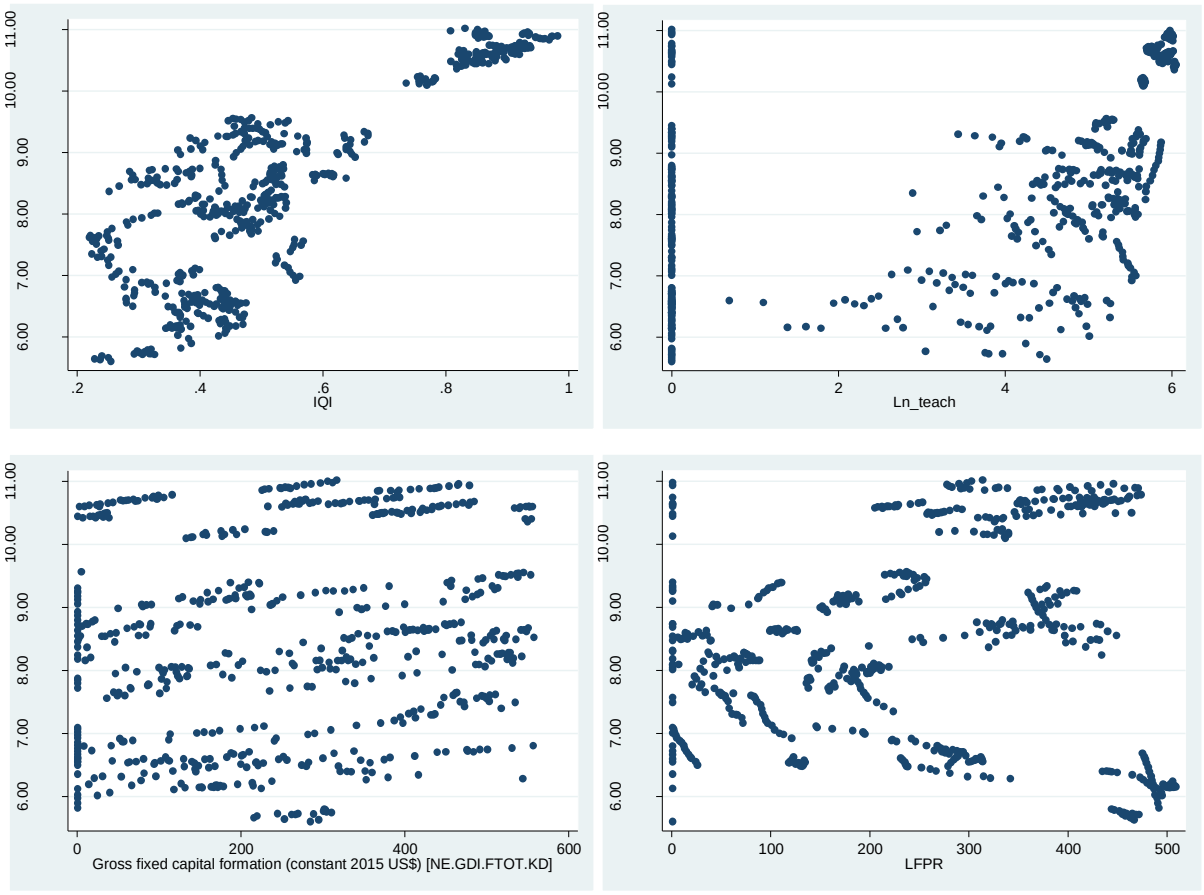
On the other hand, the summary of the variables based on the five quantiles shows that the countries with lower quantiles that is lower income group countries have lower average gross capital formation as compared to the higher ones (Table 3). However, in terms of labor force participation rate, the lowest income group countries (of 10th quantile) is at higher position compared to subsequent income group countries (of 25th and 50th quantile). Among all, two most interesting reflection that can be observed from Table 2 is that the average quality of institutions and technological progress (R&D expenditure) is in increase with the increase in the country's income groups (10th to 90th).

Table 3: Summary statistics of the variables (quantiles wise)

	10th Quantile			25th Quantile			50th Quantile			75th Quantile			90th Quantile		
Variables	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**	**Mean**	**Min**	**Max**
GDP per capita in USD	469.4	270.6	830.57	1580.6	830.5	3250.4	3828.4	3229.6	6222.28	12731.7	6222.2	35765.3	36100.0	35765.3	60836.7
Gross fixed capital formation in USD (mil)	3211.9	118.3	45546.7	65501.9	1068.4	818740.2	37244.6	2303.8	123490.5	226140.5	15060.6	4656286.4	608914.8	51618.2	4248643.2
Labor Force Participation Rate (%)	56.0	44.7	90.3	44.7	41.4	71.8	45.7	43.6	79.0	52.4	48.4	78.0	56.5	66.5	80.9
R&D Expenditure (% of GDP)	0.06	0.01	0.61	0.20	0.10	0.95	0.36	0.10	1.78	0.77	0.12	3.40	1.60	1.54	3.28
Institutional Quality Index (0-1)	0.31	0.23	0.47	0.32	0.22	0.57	0.37	0.25	0.64	0.49	0.34	0.87	0.72	0.81	0.98

Before going for conducting the regression, depicting scatterplots would give an indication regarding the relationship between the independent and dependent variables. The scatters plot between the economic growth (GDP per capita) and capital, labor, technological progress, and institutional quality depicts that there might be a linear relationship between them except for capital (Figure 1). However, the relationship between economic growth and institutional quality, and also between economic growth and technology appeared to be stronger and positive in the scatter plot.

Figure 1: Scatter diagrams between the dependent variable and independent variables



Source: Author's illustration

In order to confirm the trend of these scatter plots, that is to understand the general linear relationship between the aforementioned dependent and independent variables, an OLS regression has been conducted. The output result of the conducted regression is provided in Table 4. From the result, it can be observed that the value of R-square (R^2) is 0.76. This implies the independent variables of the conducted regression can explain almost 76% of economic growth. Given that economic growth can be influenced by a vast number of factors, 76% R square indicates a good fit for the model. In addition, the output result also shows that the F value of the model is significant. The coefficient value for labor of the model point towards

that the labor force participation rate has a negative impact on economic growth. On the other hand, the coefficient values of technological progress (R&D expenditure), capital, and intuitional quality show that these variables have a positive impact on economic growth. The standardized values of the regression model show that the institutional quality has the highest impact (positive) on economic growth as compared to the remaining independent variables (Table 4).

Table 4: OLS Regression output

Predictive Variables	Coefficient (β)	S. E	P Value	Standardized (β)
L	-.0012418*	.0002189	0.000	-0.00027
IQ	7.437648*	.4323112	0.000	1.64281
Ln K	0.0016548*	.000526	0.002	0.00037
R&D	0.228118*	.039048	0.000	0.05039
Ln K × IQ	-.0024468*	.0009205	0.008	-0.00054
R&D× IQ	-.2123186*	.0705856	0.003	-0.00027
R square = 0.76				
F = 319.60 (P value = 0.000)				

Source: Author's calculation

Note: * are significant at the 0.05 level

It would be interesting to explore whether the same relationship holds true, all along with the income distribution, from poor to rich countries. Therefore, along with the OLS, fixed effect quantile regression has been applied, controlling the effects of time.

Table 5:Quantile Regression Output

Variables	Quantile 10th (N = 507)			Quantile 25th (N =544)			Quantile 50th (N=555)			Quantile 75th (N =557)			Quantile 90th (N =578)		
	β	*S. E*	*P*	*β*	*S. E*	*P*	*β*	*S. E*	*P*	*β*	*S. E*	*P*	*β*	*S. E*	*P*
Ln K	0.0001248	0.00	*0.774*	0.0001227	0.00	0.725	0.0001198	0.00	*0.607*	0.0001152	0.00	*0.157*	0.00001136	0.00	*0.295*
L	-0.0002261	0.00	*0.873*	-0.0002292	0.00	0.841	-0.0002335	0.00	*0.762*	-0.0002402	0.00	*0.376*	-0.0002426	0.00	*0.502*
R&D	0.006	0.07	*0.943*	0.000	0.06	0.996	-0.008	0.04	*0.839*	-0.021	0.01	*0.120*	-0.026	0.01	*0.147*
IQ	1.005	2.25	*0.656*	0.994	1.79	0.579	0.978	1.18	*0.408*	0.951*	0.40	***0.018***	0.942*	0.53	***0.039***
Ln Capital × IQ	-0.008	0.11	*0.945*	0.004	0.08	0.968	0.019	0.05	*0.751*	0.044*	0.02	***0.028***	0.053*	0.02	***0.043***
R&D× IQ	0.000	0.00	*0.950*	0.000	0.00	0.934	0.000	0.00	*0.903*	0.000	0.00	*0.799*	0.000	0.00	*0.841*

Source: Author's calculation

Note: * are significant at the 0.05 level

The conducted quantile regression result (Table 5) shows that the relationship between economic growth and labor, capital, R&D and institutional quality vary across the income group of countries. It can be observed that the result obtained from the OLS regression contrast with the result of quantile regression for most of the income groups countries. Although it was expected, and as found in earlier literature, that at least one of the independent variables would have some impact on economic growth, the result of this study shows for most of the quantiles, it has not been the case. The conducted OLS regression also showed that all these independent variables significantly impact economic growth. However, the conducted quantile result contrasts with that as well.

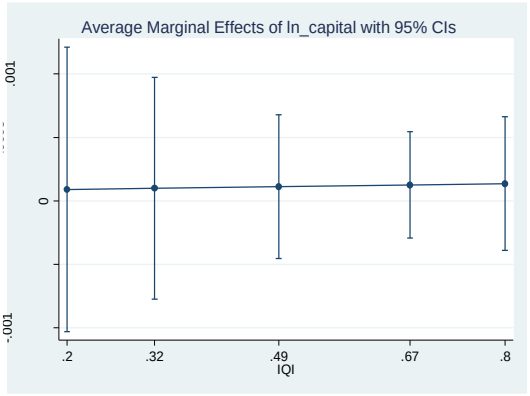
In case of the 10th quantile, that is the lowest income group countries, none of the independent variables have been found to be impacting the dependent variable, economic growth. This

statement has been found true for the three upper groups of countries – that is for 25th, 50th– as well. The independent variable capital has been observed to have an decreasing positive coefficient values across lower quantile to higher quantiles. However, none of these coefficients has been found to be significant. The coefficients of the independent variable, labor, negative and decreasing across lower quantile to higher quantiles. Similar to capital, none of these coefficients are found to be significant. In case of the independent variable technological progress, the coefficients are found to be positive for 10th and 25th quantiles and negative for 50th, 75th and 90th quantile. Yet again, none of these coefficients are found to be significant. The institutional quality has a positive coefficients decreasing across lower to higher quantiles. However, except for 75th and 90th, none of these coefficients are found to be significant. On the other hand, the interaction term, for capital and institutional quality found to have positive and significant coefficient for the 75th and 90th quantile. These results likely to contrast with the statement of the economic growth theory of Romer which stated that augmentation of an economy's human capital result in economic growth by means of the development of new forms of technology and efficient and effective means of production.

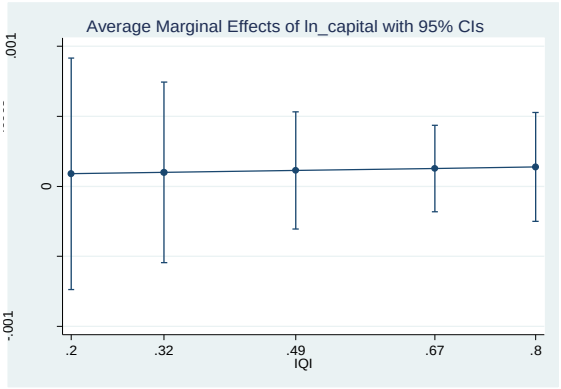
As per the objective, in order to understand the marginal effect on economic growth, marginal plots have been prepared for all the quantiles.

Figure 2: Marginal effects of capital for all the quantiles

(Average marginal effects for 10th quantile)

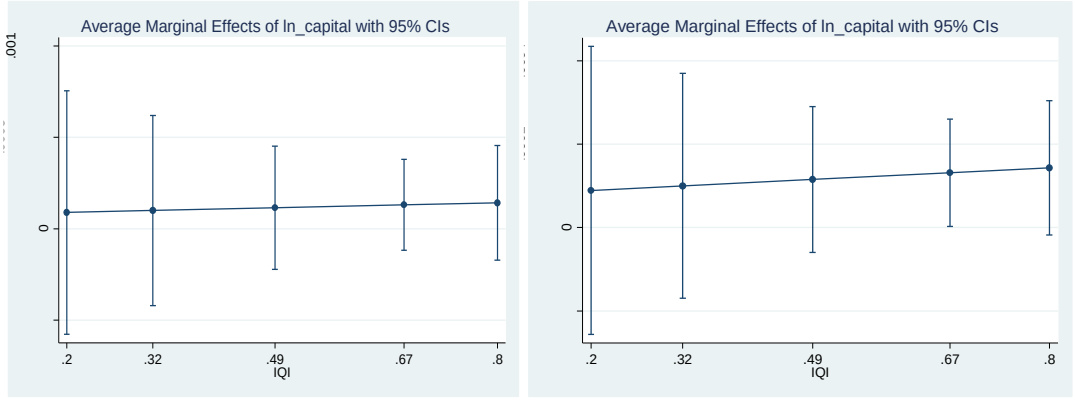


(Average marginal effects for 25th quantile)

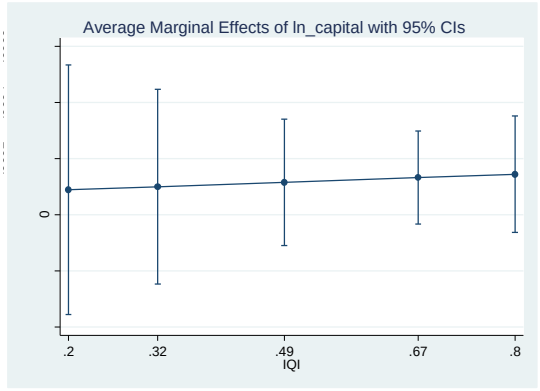


(Average marginal effects for 50th quantile)

(Average marginal effects for 75th quantile)



(Average marginal effects for 90th quantile)

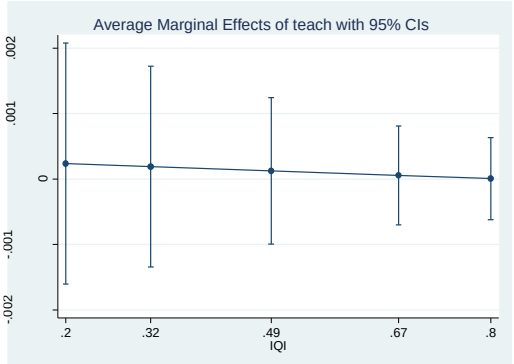


Source: Author's illustration

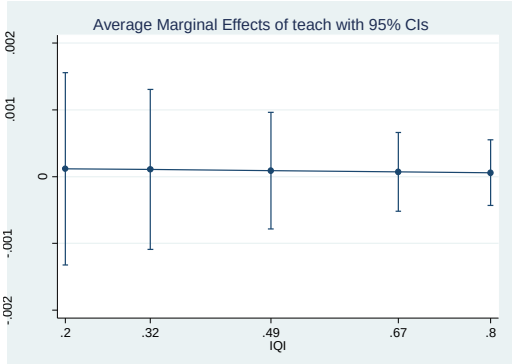
The figure 2 depicts that for the all the income group of countries (for all the quantiles), with the increase the institutional quality, there has been an increase in the impact of capital on economic growth. In other words, in can be apprehended that, the impact of capital on economic growth will likely to be significant with gradual improvement in the quality of institutions and it has been the case for all the income group countries.

Figure 3: Marginal effects of Technological advancement for all the quantiles

(Average marginal effects for 10th quantile)

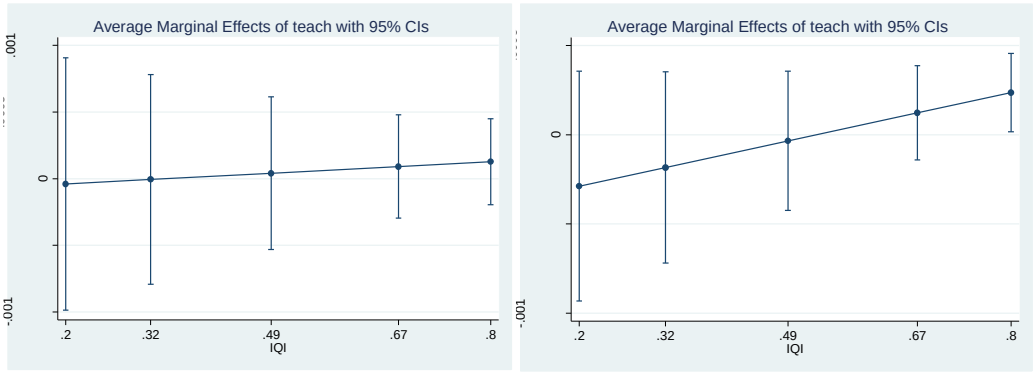


(Average marginal effects for 25th quantile)

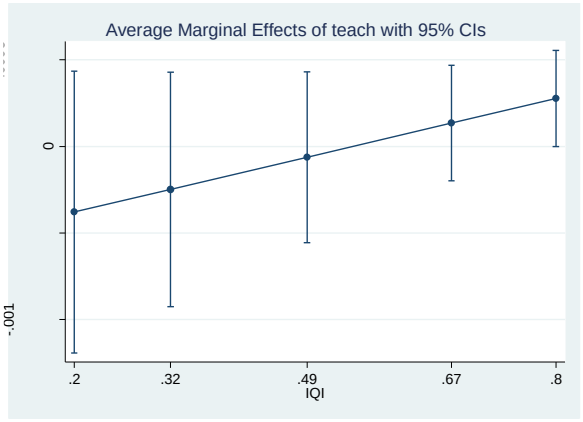


(Average marginal effects for 50th quantile)

(Average marginal effects for 75th quantile



(Average marginal effects for 90th quantile)



Source: Author's illustration

On the other hand, figure 3 depicts that, for the lowest income group of countries, the impact of advancement of technology on economic growth gradually decrease with the improvement of institutional quality. This is perhaps due to the fact that lowest income group of countries tend to have labor intensive economies and also subject to higher corruption. Other than this lowest income group of countries, for all other income group countries, the impact of technological advancement tends to have a positive impact with the gradual improvement of the quality of institutions of an economy.

6. Conclusion

Factors that affect economic growth have been one of the most discussed issues in the field of economics. A number of existing theories on economic growth suggest some of the key phenomena behind the economic growth of a country. Institutional quality holds significant implications in many of these economic theories. The conditional convergence theory, which is an extension of Solow growth model states that economic growth of poor and rich countries tend to converge on the same point over the years as the poor countries' economies grow at a

higher rate than the richer ones. However, the convergence would depend on many homogenous factors between poor and rich countries including the same institutional quality.

The findings of the study contradict with the findings of most of the literature that examines the relationship between economic growth, and labor, capital, institutional quality, and technological advancement. The study finds that although there indicates of significant influence of labor, capital, institutional quality, and technological advancement on economic growth for overall countries, the relationship between economic growth and labor, capital, technological advancement and institutional quality vary across the income group of countries. In case of the 10th quantile, that is the lowest income group countries, none of the independent variables have been found to be impacting the dependent variable, economic growth. This statement has been found true for the two subsequent upper groups of countries – that is for 25th and 50th quantile – as well. However, in the case of 75th and 90th quantile, institutional quality has been found to impact economic growth positively. The study also finds that, the impact of capital on economic growth will likely to be significant with gradual improvement in the quality of institutions and it has been the case for all the income group countries. In addition, the study finds, the impact of advancement of technology on economic growth gradually decrease with the improvement of institutional quality. This is perhaps due to the fact that lowest income group of countries tend to have labor intensive economies and also subject to higher corruption. Other than this lowest income group of countries, for all other income group countries, the impact of technological advancement tends to have a positive impact with the gradual improvement of the quality of institutions of an economy. However, further research on these findings could unveil underlying causes behind this nature of relationship found in this study.

References

Acemoglu, D., Johnson, S., & Robinson, J. (2005). Institutions as a Fundamental Cause of Long-Run Growth.

Ahmed, K., Bhattacharya, M., Shaikh, Z., Ramzan, M., & Ozturk, I. (2017). Emission intensive growth and trade in the era of the Association of Southeast Asian Nations (ASEAN) integration:An empirical investigation from ASEAN-8. Journal of Cleaner Production, 530-540.

Alonso, J. A., & Garcimartín, C. (2013). The Determinants of Institutional Quality. More On The Debate. Journal of International Development.

Al-Marhubi, F. A. (2005). Openness and governance: Evidence across countries. Oxford Development Studies.

Baltagi, B. (2008). Econometric Analysis of Panel data. Theoretical Economics Letters.

Barro, R. J. (1999). Determinants of Economic Growth: Implications of the Global Evidence For Chile. Cuadernos de Economía.

Bergh, A., Mirkina, I., & Nilsson, T. (2014). Globalization and Institutional Quality—A Panel Data Analysis. Oxford Development Studies.

C.Vianna, A. (2018). Institutions: Key variable for economic development in Latin America. Journal of Economics and Business, 42-58.

Clarke, & Beck, T. (2001). New Tools in Comparative Political Economy: The Database of Political Institutions. The World Bank Economic Review.

Easterly, W. (2013). The Role of Growth Slowdowns and Forecast Errors in Public Debt Crises. University of Chicago Press.

Eicher, T. S., & Leukert, A. (2007). Institutions and Economic Performance: Endogeneity and Parameter Heterogeneity. SSRN.

Gani, A. (2007). Governance and foreign direct investment links: evidence from panel data estimations. Applied Economics Letters.

Ha, W., Yi, J., & Zhang, J. (2016). Brain drain, brain gain, and economic growth in China. China Economic Review, 322-337.

Haggard, S., & Tiede, L. (2011). The Rule of Law and Economic Growth: Where are We? Econpapers.

Hayat, A. (2019). Foreign direct investments, institutional quality, and economic growth. The Journal of International Trade & Economic Development.

Hsiao, C. (1985). Benefits and limitations of panel data. Econometric Reviews.

Kaldaru, H., & Parts, E. (2014). Social and institutional factors of economic development: evidence from Europe. Social and institutional factors of economic development: evidence from Europe.

Kargi, B. (2004). Labor force participation rate and economic growth: observations for Turkey. Universal Journal of Management and Social Sciences. *Vol. 4, No.4*

Knack, S., & Keefer, P. (1995). Institutions And Economic Performance: Cross-Country Tests Using Alternative Institutional Measures. Economics & Politics.

Li, Q., & Resnick, A. (2003). Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries. Cambridge University Press.

Lloyd, P., & Lee, C. (2018). A review of the recent literature on the institutional economics analysis of the long-run performance of nations. Journal of Economic Surveys, *32*(1), 1-22.

March, J., & Olsen, J. (2014). The New Institutionalism: Organizational Factors in Political Life. Published online by Cambridge University Press.

Marija, R. (2020). The impact of institutional quality on economic growth: A comparative analysis of the EU and non-EU countries of Southeast Europe. Economic Annals , 163-181.

McDermott, J. (1999). Mercantilism and Modern Growth. Journal of Economic Growth , 55-80.

Mobarak, A., & Karshenasan, A. (2012). The Impact of Institutional Quality on Relation between. Iranian Economic Review.

Nawaz, S., Iqbal, N., & Khan, M. A. (2014). The Impact of Institutional Quality on Economic Growth: Panel Evidence. The Pakistan Development Review, 15-31.

N, G. M., Romer, D., & Well, D. (1992). A Contribution to the Empirics of Economic Growth. The Quarterly Journal of Economics,.

Nguyen, K. T., HO, C., & Pham, N. (2021). Economic Growth, Financial Development, and Trade Openness of Leading Countries in ASEAN. Economic Growth, Financial Development, and Trade Openness of Leading Countries in ASEAN.

Nifo, A., & Vecchione, G. (2014). Do Institutions Play a Role in Skilled Migration? The Case of Italy. Econpaper.

North, D. C. (1990). Institutions, Institutional Change and Economic Performance. Cambridge University Press.

Ongo, E. N., & Vukenkeng, A. (2014). Does gross capital formation matter for economic growth in the CEMAC sub-region? EuroEconomica.

Osipian, A. (2008). Human Capital: Economic Growth Nexus in the Former Soviet Bloc. Comparative International Education Society.

Özpolat, A., & Guven, G. (2016). Does Rule of Law Affect Economic Growth Positively? Research in World Economy.

Piętak, Ł. (2014). Review of theories and models of economic growth. Comparative Economic Research.

Procházka, P., & Čermáková, K. (2015). Influence of Selected Institutional Factors on the Economic Growth: Case Open Markets. Procedia Economics and Finance.

Salamova, A (2020) Basic theories of modern institutionalism. State. Politics. Society

Sharipov, I. (2015). Contemporary Economic Growth Models and Theories: A Literature Review. EconPapers.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. The MIT Press.

Tebaldi, B & Elmslie, B (2013) Does Institutional Quality Impact Innovation? Evidence from Cross-Country Patent Grant Data. Applied Economics 45(7):887-900

Tran, O. T., Le, H. D., & Nguyen, A. (2021). Role of institutional quality in economic development: A case study of Asian countries. Business Perspectives.

Uribe, J. M., & Guillen, M. (2020). Quantile Regression for Cross-Sectional and Time Series Data. SpringerBriefs in Finance.

Valeriani, E., & Peluso, S. (2011). The Impact Of Institutional Quality On Economic Growth And Development: An Empirical Study. Journal of Knowledge Management, Economics and Information Technology.

Wong, C.-Y., Lee, H.-S., & Chong, S.-C. (2020). The Impacts of Bilateral Trade and Foreign Direct Investment on Malaysia's Economic Growth: The Roles of Singapore. International Journal of Business and Society.

Wooldridge, J. M. (2010). Econometric Analysis of Cross Section and Panel Data. MIT Press.

Yıldırım, A., & Gökalp, M. (2016). Institutions and Economic Performance: A Review on the Developing Countries. Procedia Economics and Finance.

Zhao, J., & feng, J. (2018). Industrial structure change and economic growth: A China-Russia comparison. China Economic Review.

Annex

Country List

Upper Income	Upper Middle Income	Lower Middle Income	Lower Income
United States	Malaysia	Philippines	Ethiopia
United Kingdom	Turkey	Mongolia	Mozambique
Spain	Thailand	Tunisia	Burundi
Netherlands	South Africa	Uzbekistan	Gambia, The
Canada	Mexico	Iran, Islamic Rep.	Mali
Belgium	Kazakhstan	Ukraine	Uganda
Germany	Colombia	Moldova	Tajikistan
France	China	Kyrgyz Republic	Sudan
Denmark	Belarus	India	Madagascar
Japan	Argentina	Egypt, Arab Rep.	Burkina Faso