The Human Capital, Quality of Institutions and Economic Growth

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Human capital
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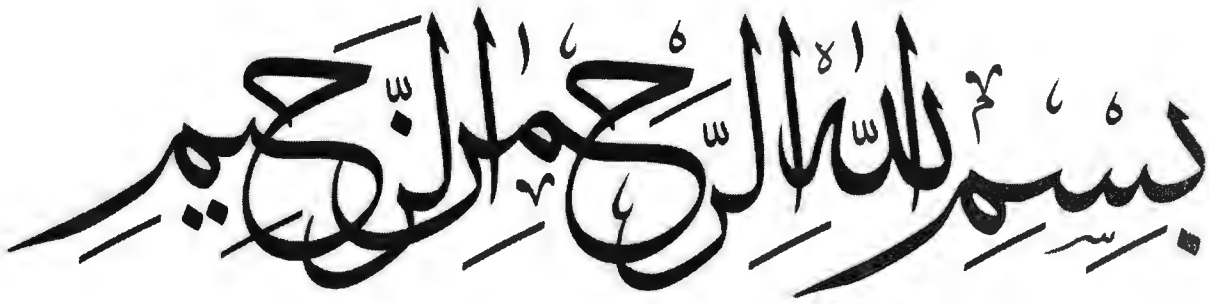
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The Human Capital, Quality of Institutions and Economic Growth

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DECLARATION

I hereby declare that this thesis, neither as a whole nor a part thereof, has been copied out from any source. It is further declared that I have carried out this research by myself and have complete this thesis on the basis of my personal efforts under the guidance and help of my supervisor Dr. Arshad Ali Bhatti, at the International Institute of Islamic Economics, International Islamic University, Islamabad (IIUI), as partial fulfillment of the requirements for the award of degree of MS in Economics.

Where the contribution of others are mentioned, every effort is made to represent this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. No portion of this work presented in this research has been submitted in support of any application for any other degree or qualification in IIUI or any other university.

Erum Abbas

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All praise to Almighty Allah, the Supreme, the most Compassionate and the most Beneficent. And after Almighty Allah to his Prophet Muhammad (P.B.U.H); the greatest blessings of Allah, the most perfect and glorious, forever a source of guidance for humanity.

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To my family!

Contents

Figures

Tables

List of Acronyms

Notation	Variable
HC	Human Capital
IQ	Institutional Quality
EG	Economic Growth
ICRG	International Country Risk Guide
GS	Government Stability
SEC	Socio Economic Conditions
INVP	Investment Profile
COR	Corruption
LNO	law and Order
MIP	Military in Politics
ET	Ethnic Tension
LY	Initial value of real per capita gross domestic product
GOV	Government Size
INV	Investment
OPEN	Trade Openness
INF	Inflation
RPCGDP	Real per-capita Gross Domestic Product

PCA	Principal Component Analysis
OLS	Ordinary Least Squares
WDI	World Development Indicators
BERI	Business Environmental Risk Intelligence
GLS	Generalized Least Square
TFP	Total Factor Productivity
FHI	Freedom House Indexes
EFW	Economic Freedom of the World
HFP	Heritage Foundation publishes
IMFP	International Monetary Fund Program
LRM	Linear Regression Model
GMM	Generalized Method of Moments
FEM	Fixed Effect Model
GCT	Granger Causality Test
WGI	World Governance Indicators
NCGT	Neoclassical Growth Theories
EGM	Exogenous Growth Models
EGT	Endogenous Growth Theories

Abstract

This study examines the channel and conditional effects of human capital on economic growth in the presence of institutional quality. Using the panel data of 90 countries (including both developing and developed countries) over the period of 1984-2011, it further investigates whether the quality of institutions (as a channel and conditional variable) increases the positive effects of human capital on economic growth. We construct a composite index of institutional quality comprising seven components such as, government stability (GS), socioeconomic conditions (SEC), investment profile (INVP), corruption (COR), military in politics (MIP), law and order (LNO) and ethnic tension (ET). This index is generated by using Principal Component Analysis (PCA). Further, to construct our econometric model we use moderated mediation approach (Muller *et. al,* 2005 and Preacher *et. al,* 2007) which is estimated by using the Seemingly Unrelated Regression (SUR) method as recommended by Biorn (2004). The results are as follows: first the human capital has a positive and significant effect on economic growth. Second, the quality of institutions as a conditional variable positively effects growth. Third, the effect of human capital on growth through the channel of institutional quality is also positive and significant. It implies that human capital have overall positive effect on economic growth. Further, it increases through the quality of institutions. In order to analyze in detail, we not only estimate the indirect effects of human capital on growth through the channel of institutional quality but also the conditional effects of human capital on economic growth, keeping institutional quality as a conditional variable. Our findings confirm that the channel and conditional effects of human capital on economic growth are positive and significant through the quality of institutions.

Chapter 1

Introduction

1.1 Background

For present governments the objective of sustained economic growth is of paramount importance in economic policies that may be attained through the extensive or intensive use of production factors. The extensive growth is the outcome gained via increasing the quantity of inputs in production. However, the other form of growth can be obtained by the increase in production per unit of input. Such kind of growth is influenced by the quality, efficiency and manner of combining production factors. The intensive growth factors encompass technical progress and enhancement of the total factors productivity (Irmen, A. 2005).

The Neo-classical growth theories focuses on physical capital accumulation as the most robust source of economic growth, particularly in the short period of time. Further, several studies show that growth varies due to the differences in terms of different path of factor accumulation. While, the difference in accumulation is merely due to differences in saving (Solow, 1956) and preferences (Cass, 1965 and Koopmans, 1965). However, a maiden study by Solow (1956) and Sawn (1956) includes many exogenous growth models. The exogenous growth models attribute to the long term economic growth to the exogenous technical progress and diminishing returns to capital. But, due to the theoretical limitations and lack of empirical evidence relating to the exogenous growth models encourage the researchers to explore for other possible theoretical linkages of growth.

New (Endogenous) growth theory helps us to make sense of the ongoing shifts from a resource based economy to knowledge based economy. Further, the endogenous growth theories predominantly give the theoretical prominence to human capital, beginning with Arrow (1962) and Uzawa (1965). The novelty of approach starts with Nelson and Phelps (1966), they highlight the distinguishing features of human capital in technology adoption and its influence on growth. While, the theory of human capital that is presented by Schultz (1961), Becker (1964) and Mincer (1974) promulgates that growth cannot be explained only by labor and capital, and therefore, human capital has turn into a main contributing factor of growth. However, its concept is finally embodied later, predominantly in works of Romer (1986) and Lucas (1988). The pioneering work of Romer (1986) which attempts to endogenize the sources of growth opens a new debate of self-sustaining growth process. Subsequently, the emerging endogenous growth literature introduces a new role of human capital. Instead of being just another input in the production function, the human capital acts as the engine of technological progress through its positive spillovers and inevitable contribution in research and development.

Conferring to Milken (2016), *"The macro vision sees the twenty first century defined by global struggle for the world's utmost valued asset, human capital*[1]*. Nations form this by firming education, healthcare, and right to use to technical knowledge, prospects for women & reasons that attract skillful migrants."* Further, Milken (2016) points out that, steady reforming of human capital is indispensable for higher growth. He embodies China for its steady and strategic opulence

[1] *"The potential in human beings to make use of the obtainable resources or their capability to contribute in economic activity. Human capital comprises of educational attainment as well as health status, learning by doing and on the job training. All these characteristics are fundamental elements of the human capital"* (Verda, Z. 2010).

which is essentially consequential by evolving the middle class by an "incessant emphasis on education".

Many theoretical and empirical studies concerning to human capital and economic growth mainly follow Barro (1991). Whereas, growth differences explain like human capital in terms of preferences and endowments are mainly highlighted by Romer (1990) and Grossman and Helpman (1991). Besides, Aghion and Howitt (1998) highlight its presence as an element endorsing greater investment in technology with progressive impact on growth. Mostly the empirical work uses education relatively than broader extents for human capital, together for data availability and that processes of education remain reasonably similar through countries. So far-off, the indication from empirical readings is diversed. Overall, it appears that there is a positive relation between education and growth, while the relationship with reference to investments in education and progression rates is more abstruse. For instance, the studies carry out by Benhabib and Spiegel (1994) and Pritchett (1996) put forward that modifications in educational level do not add to output changes, whereas, Temple (1999), Topel (1999) observe that the results may be disconcert because of measurement error or presence of outliers. Therefore, in the perspective of empirical evidences, we are still lacking ample understanding about ever increasing gaps in productivity and income per capita across the world. One line of argument asserts the strategic role of institutions to elucidate these dissimilarities in the prosperity of countries (North and Thomas 1973).

Considering the subject within the frame work of endogenous growth theories, it is ascertained that the human capital resources of a nation have significant impact on growth. In recent years, the pragmatic studies on growth also gradually proclaim for the growth process the existence of human capital (Ruggeri et. al,, 1999). However, the end result growth due to human capital can be inclined by the way it is utilized. Just like the elements, for example corruption,

government stability, law and order and socio-economic conditions may influence the human capital-growth linkages. In short, the link among them could be altered due to different institutional arrangements but typically overlooked (Dias and Tebaldi 2011).

Given the profound role of human capital in the theoretical growth theories, however the conventional growth models nosedive to track the role of institutions in influencing growth (Sobhee, 2012). The literature on the relationship between institutions and growth outlines the prominence of good institutions as an essential constituent in determining the income levels and economic growth, stimulating economic rewards that favor input accumulation and considering the main source to maximize the output.

Institutions are well-defined by North (1990) as, "*the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic.*"

Further, institutions in society such as structure of property rights and the presence of perfections of markets (specifically the economic institutions) are important because they influence the structure of economic incentive in society. Without property rights, individual will not have the incentive to invest in physical and human capital or to adopt more efficient technologies. Moreover, economic institutions are important because they help to allocate resources to their most efficient users. Societies with economic institutions that facilitates and encourage factor accumulation, innovation and the efficient allocation will prosper. When markets are missing or ignored (As U.SSR) gains from trade go unexploited and resources are misallocated. Whereas, Thomas and North (1973) contend that growth may influenced due to the institutional quality by means of reducing transaction costs, ensuring contract enforcement, protecting property rights and increasing productivity nevertheless providing a level playing field to economic agents.

Also, the institutions exhibit increasing returns to scale in their nature because they reduce the uncertainty through coordination effect and by initial setup cost. Furthermore, institutions are helpful in reducing economic instability (Rodrik, 1999; North, 1990; Quinn and Wooley, 1996, 2001; Aceomglu et. al,, 2003; Mobarak, 2005; Klomp and Haan, 2009). Likewise, institutions accelerate the process of growth/ development by declining the risk of trade and business activities, thus leading resources toward innovation rather than earning voracious rents.

Various empirical studies provide sufficient confirmation to sustenance the opinion that dissimilarities among the institutions may affect growth. As the pivotal study of Knack and Keefer (1995) highlight that the quality of bureaucracy, property rights and the political stability of a country all equally contribute to raise economic growth. Besides, Moers (1999) discovers that a wide measure of institutions has the strongest influence on growth. Studies in favor of the institutions-growth relationship claim that institutions are the cause to make best use of the output. While, Acemoglu *et.al,* (2001 and 2002) and Acemoglu and Johnson (2005) and, explore that the institutional quality has a robust influence over growth. Likewise, the outcomes of Ghatak *et. al,* (2009) and Klenow *et. al,* (2009) confirm that the strong institutions accelerate growth and development through better allocation of resources.

The substantial empirical evidence is present in several studies to support the vital role of institutions in many advanced countries of the world. These studies ascertain that wide-ranging, reliable, and effective institutional structure is a domineering precondition for economic activity and growth[2]. According to Acemoglu (2008), currently it is becoming accustomed that economic,

[2] [for instance, the relationship between economic freedom, democracy and economic growth (Barro 1996 ; Minier 1998) property rights and economic growth (North and Weingast1989; North, 1990) the impact of inequality and political instability on growth (Alesina and Rodrik 1994, Lee and Romer 1998, Barro 2000) social capability, trust and economic growth (Knack and Keefer 1995, 1997, Hall and Jones, 1997, 1999, Zak and Knack, 2001)]

financial, political, social, and legal institutions are central for the economic attainment and downfall of nations. He concludes that, each nation generate incentives for investment, technological advancement and the prospect to accrue human capital for the workforce, therefore accelerate the economic growth.

At present, mostly in the developing countries there exists an institutional vacuum which provides conditions for parasitic activities. These parasites embrace ordered burgles, distorted insurgent groups, intermediaries, legislators, job skivers in government sector, rent chasers, free provisos and individuals who make additional in comparison to whatever they legitimately be worthy of. The parasites, yet adoring entrepreneurial impending ensure not to increasc in production. Although these parasites do not only exist in advanced nations but also in less developed nations. In many countries happenings e.g. theft, subornation, corruption and etc. are very common. These types of illegal activities commonly occur because of the safety of strong, ethnic, political, and religious groups. In this way where the appropriate institutional structure is absent or inefficient thus lead to curlicue all sorts of illegal activities. However, if institutions are good enough to lessen the parasitic activities by proficiently keeping rights of property, administering law and order and providing social and economic justice (khan and khawaja 2001). Therefore, in recent years, the role of the institutions in fostering growth is induced an evident deal of scholarly consideration. Despite the fact, Lipset (1960) contends that human capital accumulation contributes to shape the efficient policies, less violence and more political stability.

Glaeser *et. al,* (2004) also favor the lipset's opinion and offer observed confirmation that human capital certainly effects political institutions and for that reason, promotes growth. In (2008) Climent correspondingly identifies the confirmation that increase in the level of education impacts democracy through both execution and constancy of democracies. In contrast to these opinions,

Acemoglu *et. al,* (2005) state that education does not have any considerable influence on the political institutional indicators. However, there seem diverse assessments about the connection of growth along with human capital and institutions. Many empirical studies cover the direct and indirect effects of human capital and institutions upon growth. After comparing the results of numerous studies we identify variant assessments regarding the degree and extent of both the variables on growth.

In the sight of above mentioned literature, it is evident that human capital and quality of institutions both are fairly imperative for growth. But either solely focusing on human capital or quality of institutions in relation to economic growth is not the novel approach, rather a combination of both (i.e. human capital and quality of institutions) simultaneously may provide the new dimension for empirical studies related to growth. Therefore, our study aims to cast light on the existence of relationship between human capital and economic growth in the presence of institutional quality. Specifically, we are interested to investigate the linkages among these variables through precise channel and condition. For estimation purpose, we use moderated mediation approach (Muller *et. al,* 2005 and Preacher *et. al,* 2007) to construct our econometric model, which is estimated by employing the Seemingly Unrelated Regression (SUR) method as suggested by Biorn (2004).

1.2 Objectives of the Study

In the current scenario, this study attempts to address the gap and explores into the extent to which the human capital matter in determining growth by using the quality of institutions as the channel variable as well as the conditional variable.

On the basis of aforementioned, we outline two main objectives of this study. First, to examine the effect of human capital on economic growth through the channel of the quality of institutions and second, to analyze the impact of human capital in fostering economic growth while considering the quality of institutions as the conditional variable. Therefore, this study investigates the direct plus indirect and conditional effects of human capital on growth. Inclusively growth may influence by human capital in two distinct ways owed to the quality of institutions as per the channel as well as the conditional variable. Moreover this study may provide ease to those who are pursuing optimum ways towards the human capital with special allusion to quality of institutions in connection of growth.

1.3 Plan of the Study

This study is organized as follows:

Second section gives an extensive review of the related literature. Third section includes theoretical frame work and there we also provide precise explanation of the data along with their sources, construction of the index of institutional quality and rationale for using Seemingly Unrelated Regression (SUR) Method. In fourth section we present our major findings and also discuss the results. Fifth section contains the conclusion, policy implications and suggestions for future research.

Chapter 2

Literature review

In the sphere of economic understanding, one may find massive literature which explores the influence of human capital indicators on economic growth and also searches the role of institutions in the determination of the growth pattern. The current obtainable literature on this topic is generally classified into three sections on the basis of the connection among these variables (human capital, institutions and economic growth). First section consists of those studies which scrutinize the association between human capital and economic growth. Second section of this literature incorporates the work which is relevant to the relation prevalent between the institutions and growth. Third section contains the studies which analyze the interrelationship among these three variables.

2.1 The Human Capital and Economic Growth

The manifold aspects of studying the literature regarding growth reveal that there is a need of human capital. Consequently, the subject of human capital is receiving extensive attention along with the rapid growth of globalization. On the other hand, job market is also been saturated due to the recent recession in various economies of the world. Studies demonstrate the outstanding yields from numerous forms of human capital accretion, such as: basic education, wisdom by achievement, training, research and capability building (Abbas *et. al,* 2007). However, human capital is not being paid much attention by the Malthus's or the Neoclassicists approach to growth; still, the close relation between investments in growth and human capital is quite strongly evident. The pilot theory of human capital has its origins in the forge efforts of Schultz (1961), Mincer

(1958) and Becker (1962). They believe that human capital is much similar to physical capital and it can be invested in by means of health, training and education. Such venture will raise the productivity and will contribute to the growth. They develop and scrutinize certain growth models, amplify with human capital and find ample positive association between them.

2.1.1 Positive effects of Human Capital on Economic Growth

Human capital is deliberated to be one of the foremost contributors of growth. In the main, there are two schools of thought concerning the influence of human capital on growth. One of these schools emphasizes on the human capital stock that has effect on growth (Nelson and Phelps, 1966). Whereas, the others focus is on the accretion of human capital which has impacts on growth and which can be used to represent growth differentials across countries (Lucas, 1988). Moreover, Romer (1990) comes up with the finding that both stock and growth of human capital can help in producing new ideas and as a result growth can upsurge.

In (1992), Mankiw *et. al,* also observe the impact of human capital on growth. He tries to test the Solow model with and without human capital. In this study, a set of data for 121 nations of (1960-1985) and OLS technique for estimation is used. The output growth is the explained variable, while the explanatory variables are education, labor and physical capital. They use school as a proxy of human capital. Results show that Solow model with incorporation of the human capital elucidates 80% of income discrepancy across countries. Later on, this framework is endorsed to be utilized for various studies. Likewise, Bernanke (2001), use the charter that is acclaimed by Mankiw (1992) to evaluate the impression of human capital on growth. The study employs an annual data set of 121 countries over the period of years 1960-1995. In this study as well, school is considered to be the proxy of human capital. Their results depict that the relation of

long run growth with the human capital is not obvious, rather it is related to behavioral variables like saving rate. Hence, this study approves long run growth as endogenous.

Pritchett (1996) suggests that the outcomes of across nation micro studies are consistent whereas those of macro studies are controversial and inconsistent. However, the studies show the positive influence of health and education on individual's efficiency and income. Bundell (1999), while examining the impact of human capital on growth, concludes that the output rate of growth depends on the rate of accretion of human capital and innovation; the source of which is the stock of human capital, education level, labor and productivity. Thus, human capital takes noteworthy prominence in the studies related to growth. But there are certain issues related to its measurement. Many examiners practice various proxy variables for human capital. For instance, in (1992) Mankiew *et. al,,* make use of secondary education enrollments, Bosworth *et. al,* (1995) and Barro and Lee (1993) use schooling average years as its proxy. Moreover, proponents of endogenous growth theories put emphasis on the creation human capital and deem it as a variable that clarifies the dissimilarity in output growth level of the countries (Romer 1986 and Lucas 1988).

Several studies prove a positive and robust link between growth and human capital. (Oketch 2006, Karagiannis 2007, and Atif *et. al,* 2012). Similarly, Elena Pelinescu (2015) discovers a positive and statistically substantial relationship between the innovative abilities of human capital, the qualification of personnel as required and expected according to the economic theory and the GDP per capita. The positive link of these two variables is described by many other studies; such as, Benos and Karagiannis (2007), they attempt the first effort to come up with a complete set of assessments of the impression of human capital dynamics on the evolution of Greek regions for a period (1981-2003). They perceive a positive association between the extension level

of an economy and proceeds to human capital following the theoretical models; which perceive it as a threshold variable.

Cohen and Soto (2007) provide another study which contributes to create a novel and dependable set of data on education procurable for many nations that might is required for future research in human capital related works. Moreover, Abbas and peck (2007) examine the influence of human capital on the growth of Pakistan for the period of (1961-2003). They use health expenses and stock of human capital as the proxy variable of human capital and employ co- integration technique to assess the effect. Their results show that making investment in the health sector comes up with a growing return to the physical and human capital. Furthermore, Lee and Kim (2009) reconsider the arguments in connection to the contributing factor of long-run progression and utilize the advanced methodology by conducting fixed effect method and system GMM valuations as well along with the cross section valuations. The results propose that tertiary education, knowledge and the institutions all are deliberated the contributing factor of long-run growth. Though Bilge *et. al,* (2008) examine the growth progression in Turkey and Nigeria. They find by employing both the OLS and the Granger causality techniques (GCT) in Turkey, the human capital is an important determinant; but in Nigeria, no relationship between growth and human capital are identified. Thus, the Turkish higher accumulation of human capital seems to be one of the vital sources of growth differences in these countries. However, the starring role of human capital in refining material wellbeing and in stimulating growth can hardly be overelaborated. The justification for government intervention is often delivered by the positive external effects related with human capital accretion and the change between secluded and social proceeds to education. In most countries, the communal sector mainly reserves the primary and secondary education, while the tertiary education is often supported by means of student loans and scholarships.

A number of studies submit that the government expenses on education bring progress in general welfare, decreases poverty and enhance growth. As far as the studies of growth in China are concerned, most of the empirical literatures treat human capital as a homogeneous concept. Chuanguo Zhuang and Lihuan Zhuang (2011) contend that, in china the human capital elements are at initial level that may enhance the growth. And as compared to the primary and secondary education, the level of tertiary education influences growth more. Likewise, the more advanced provinces take more gain of tertiary education, though the less developed are further dependent on primary and secondary education. Sapuan and Sanusi (2013) further emphasize that there is a cointegrating link between the growth and the expounding variables, like investment, social services expenditure and indicators of human capital.

Certain empirical studies search the effect of the human capital composition on the regional growth. In this context, Chuangu et. al, (2011) divide human capital not only mad about two levels of education but further presents a different variable, named the human capital structure to identify the desired level of education that influences growth in china. Their pragmatic results show that on the whole, in China, the structure of human capital is still at the stage of endorsing growth. Moreover, the comparatively more advanced provinces take more benefit thru tertiary education, whereas the less developed nations are more reliant on the secondary & primary education. Vischer and Sunde (2011) confer on the causes after the outcome of growth which is inflicted on the growth in the current cross country studies. They explain the model approach which is not usually taken into consideration the changes in growth due to the certain factors. In total, three important sets of data are accrued for the period alternating from (1970 to 2000); for average schooling years, above eighty countries. They recognize the two diverse channels: the changes in human capital and the initial levels of growth. The effect of human capital on the growth can merely evaluate until the

preliminary stages and variations in growth are interrelated. Outcomes submit that the influence of human capital is inclined to under estimation and biasness in observed description, which does not reason for the two channels. The study describes that in earlier works lower levels of the human capital are due to the heterogeneity prevailing in the cross nation data and other measurement concerns as well.

In the relevant literature, certain studies sort out causal relationship between growth and human capital. Like, Ferdi *et. al,* (2012) analyze the human capital-growth linkage by using panel causality test. They confirm the existence of a bidirectional ultimate association among education expenses & growth. Likewise, Asghar *et. al,* (2012), by using yearly data from 1974-2009, investigate the causation between growth and human capital in Pakistan. The actuality of three unidirectional connectedness i.e. education to health, growth to education index and growth to health index, are established by employing the Toda Yamamoto Causation Test. Additionally, the occurrence of stable long run relationship between both the human capital measures and growth is established by confirmation through the Johansen cointegration test. They also suggest that in order to obtain full benefits from growth, the formulation and implementation of operational pecuniary strategies regarding the bequest of health & education conveniences to the people is indispensible.

There are various studies established on cross sectional, panel and time series data which find human capital as one of the most significant factors in growth process. Nevertheless, a very limited literature is available so far, when it comes to demonstration of this theoretical and practically verified in connection to framework of macroeconomic modeling. This allows not just the investigation of human capital involvement in the process of growth, likewise the working of strategy replications to examine the impact of investing in human capital on crucial factors such

as employment, investment, and prices. However, Qadri *et. al,* (2014) develop a model at macro level for Pakistan economy. This is the first model constructed that focuses on the sway of the key macroeconomic variables due to the investment in human capital. Moreover, this model can be helpful in making the decisions concerned with the education spending.

However, Tzeremes *et. al,* (2014) use the "time dependent conditional frontier models" for the period of 1970-2011, testing a sample of 123 countries. They examine the bearing of human capital and time on the economic efficacy levels of the countries. The results point toward that the human capital causes the speeding up of the technological change in countries and has impact on their efficiency levels (technological catch-up). Apart from strong positive human capital growth relationship, there are some studies identify the negative link be them.

2.1.2 Negative effects of Human Capital on Economic Growth

Although the human capital is still measured as one of the essential components of growth, the empirical research in this scope is rather inadequate. Most considerably the recent economic crisis and the extreme increase of unemployment rate, it seems that higher investment in human capital is no longer an assurance of prosperity and decreased unemployment. However, a few studies ascertain weak rather negative impact of human capital on growth. For example, Benhabib and Spiegel (1994) find that human capital torrent is not having a growth impact but the stock devours the significant effect on growth. While, Barro and Sala-i-Martin (1995) observe that human capital collection does not add to gowth. Similarly, Pritchett (2001) assesses a negative growth effect of human capital. While, Bils and Klenow (2000), Temple (2001), Levine and Easterly (2001), Collins and Bosworth (2003) also remain unsuccessful in establishing positive relationship between indicators of human capital and growth.

In addition, Malik (2006) using OLS, also be unsuccessful to sort out positive connection between growth & human capital in Pakistan. While Mehraran *et. al,* (2013) study in Iran the human capital-growth association for the period over 1970-2010. This study is based on the ARDL method. They find a cointegrating rapport among labor force, investment, real GDP, revenues from oil and growth. In opposition with the other variables, human capital proxy that is extracted from enrolment rate in diverse levels and public spending on education contributes less to the long-run growth. As far as weaker impact of human capital on long run growth is concerned, they suggest that the government and policy makers must adopt in the market based reforms, a formal education system. However, Cadil *et. al,* (2014) in the context of the EU, NUTS two regions in the period over 2007 to 2011; find no clear positive effect of human capital on unemployment and growth. On the other hand, particularly in agricultural regions, they determine a negative effect of investment in human capital, not only on growth but also on unemployment.

To sum up, the above mentioned literature reveals mix results regarding the relationship between the indicators of human capital and growth. In the following subsection, we review the literature with another perspective that makes the relationship between institutional quality and growth prominent.

2.2 The Institutions and Economic Growth

The prime objective of almost all the countries is high and sustained growth. The nature and rate of economic growth is determined by numerous economic and noneconomic factors. Since the last three decades, the attention of discerning is moved away from the contiguous causes to the more basic and essential causes of growth (Nawaz.S 2015). In this perspective, researchers, policymakers and development authorities are giving supplementary focus on institutions to high light the modifications in growth. There is an eminent line of research which places the institutions

at the mid-point of growth analysis. The growth process of a country may be affected directly or indirectly by the institutions. As the institutions are very crucial mean for growth and development (North 1990; Dollar and Kraay 2002; Hall and Jones 1999 and Rodrick et. al, 2004).

2.2.1 Positive effects of Institutions on Economic Growth

Many studies put forward that the institutions perform a dynamic role to measure the increase in rate of growth of countries. The institutions of any nation show a significant influence in evaluating the development method through affecting not only the level of human capital, but also in technical novelties and advancement. Commonly it is assumed that institutes, mainly those concerned with safety of civil liberties, perform a critical role in shaping the growth in long time (Knack and Keefer, 1995 and Rodrik *et. al,* 2004). Where, in (1990) North contends that growth is determined by secured improved contract enforcement and property rights. Yet, weak institutions may incline to adopt bad policies and weaken the pliability of economies to exogenous shocks. Thus, poor institutions may result in more unstable and crisis lying economies, as compare to the situations where better developed institutions exist (Rodrick, 1999 and Aceomglu *et. al,* 2003). However, the influence of institutions appears to be noteworthy even when policy measures such as exchange rate overvaluation, differences in inflation, government deficits and openness are taken into account (Kambhampati *et. al,* 2010 and Reksulak *et. al,* 2010).

The literature relevant to the correlation of institutions with growth stresses on the significance of institutes by means of a crucial element in detecting levels of income and growth and in inspiring returns that influence factor inputs. Institutions are deemed to be the essential element of growth. In economic theory North (1990) introduces institutions and highlights their role as the ultimate factor of growth. He defined institutions as: "Humanly devised restraints that edifice political, economic and social interactions". Later on, many researchers highlight the role

of institutions as the stimulator for the effects of several growth factors i.e. saving, investment and trade etc[3].

Various studies related to growth provide sufficient conformation to include quality of institutions as one of the leading element of productivity (Dawson 1998, Acemoglu *et. al,* 2002 and Cole 2003). Though, Knack and Keefer (1995) emphasize on certain institutional measures from ICRG. They relate the impacts of the institutional indicators on both the cloistered investment and growth. The results provided ample support for the stance that there is great connotation of institutional origins of growth and convergence. However, Cernat (2002) explores the major determining factor of growth that focus on the precise role of institutional factors, by exhausting cross sectional analysis testing a sample of 10 Central and Eastern European (CEECs) over the period of years (1992-1998). The results submit a link between growth and the quality of institutions, but these results remain basic, because the accurate measurement of institutions is still vague. Furthermore, he suggests that the substitute methods of measurement, such as GLS or SUR may extend the analysis further.

Vijayaraghavan and Ward (2001) examine the empirical relation between institutions and economic growth for 43 countries; from the period (1975 to 1990).They incorporate a broad set of institutional indicators such as, political sovereignty, safety of property rights and governance. The results specify that the government size and safety of property rights are the most vital institutions that explicate the deviations in growth rates. Where, Ali and Crain (2002) explain the links among institutional bias, economic sovereignty and growth. By using a sample of 119 countries for the epoch from years (1975-1998), they conclude that civil liberties and political administration have

[3] (North 1990; Hall and Jones 1999; Dollar and Kraay 2002; Rodrick et. al, 2004 and Chami et. al, 2009).

no major impact on growth. Nevertheless, economic sovereignty plays substantial role in upraising growth. Adkins *et. al,* (2002) investigate the contributing factor of inefficiency using the stochastic frontier scrutiny employing two samples; one incorporating seventy three and the other involving seventy six countries. They find that the institutions are supportive in interesting economic freedom and efficiency, which in turn increases the growth.

There are many other studies which find significant relationship between institutions and growth. For instance, Ali *et. al,* (2003) make prominent the importance of institutions on development and growth and estimates the empirical results regarding the impacts of institutions on growth and investment. It provides sufficient evidence that the institutional environment incorporating an economic activity is a significant determinant of the growth. Where, Assane and Grammy (2003) examine the impact of "quality of the institutional structure" on economic progress. Their empirical results support the supposition that the efficiency and speeding up of growth is enhanced by good institutions.

In (2004), Doucouliagos *et. al,* analyze the institutions-growth relationship, in an instantaneous equation with errors constituent factor. In cross country productions and endogenous element inputs, they report the discrete heterogeneity, so that the direct and indirect effects of institutions on growth may be separated. Their findings suggest that the total effects (direct and indirect) of both economic and political freedom on growth are positive. Where, Gwartney *et. al,*(2004) ascertain the fact that the considerable reason aimed at dissimilarities in the rate of economic growth across countries is due to differences in institutions. The study submits that proliferation of the economic freedom index is a long run phenomenon. On the other hand, Acemoglu *et. al,* (2004) develop the theoretical and empirical stance that the fundamental cause of differences in economic progress is the dissimilarities in economic institutions. Besides,

Acemoglue and Robinson (2006) explore the importance of institutions in economic progress. They explain that differences in the quality of economic institutions are the reason of the main differences of economic performance among countries. The study recommends that it is essential to build superior quality economic institutions; though it is very difficult to do so, as it necessitates strong political power. While, Le. T (2009) explores for 67 developing economies, the relationship among institutions, trade, remittances and growth for the years (1970 to 2005). The study finds, using different estimation technique, that improved institutions results in enhanced growth in the long as well the short run. Meanwhile, *Hasan et. al,* (2009), in china from 1986 to 2002, find the relation among development of deepening of finance, institutions and growth. They apply GMM and OLS for analysis. They identify that development and legalization of market economy, expansion of financial system, safe guarding the property rights and liberalization are the main institutional developments for a developing country. The results present that deepening of finance, development of quality of institutes and legitimate environment have positive influence on growth. Likewise, Siddiqui and Ahmed (2009) confirm a strong association between institutional quality and growth. Their study, using a GMM, explores the impact of state institutes for stimulating growth. Specifically, with newly unconventional index of institutions and specific sub-indices such as "Risk decreasing technologies" and "Averse rent seeking technologies", it endeavored to test the influence of two extents of institutions on growth. Their result projected a strong causative relation between institutions and economic performance. It also inveterate conditional convergence as is anticipated in the contemporary theories of growth. Later on, Khan and Khawaja (2011) by using model of game theory, explore the relation among institutions, predation and growth. They find that predation is substantial obstacle in the way of economic progress because it reduces per capita consumption, lifts inequality and reduces output overall. Predators have relative advantage in predation, which is eradicated by high quality institutions and these

institutions enhance growth as well. Furthermore, Choudhary, A *et. al,* (2011) find evidences that per-capita growth rates are improved by strong economic and political institutions. They intend that good economic institutions reduce the impact of ethnic tension on per-capita growth, whereas good political institutions do not. Hence, countries which are being shattered by ethnic tension must focus towards building good and improved economic institutions.

Another study also support that the institutional quality puts impact on the growth, in a positive way, at various stages of expansion that is, Valeriani, E., and Peluso, S. (2011). They use panel data; through a combined regression model and Fixed Effect Model, which referred to 181 countries and contained observations from 1950-2009. They use three institutional indicators i.e. number of sanction players, civil rights and quality of government. They authenticate the positive impact of all the three institutional indicators on growth; on the basis of their results. There are certain studies that focus on the connotation of formal, regulative kind of institutions in which government appears as a creator, an enforcer of the directions and a mediator. Later, several studies attempt to construct the formal framework for evaluating the nexus among institutions and the aggregate economic performance. As, Kambhampati *et. al,* (2010) focus on macro level institutions (sustaining, growth igniting and conflict management institutions) and provide a framework within which informal and micro level institutions can be considered. The foremost contribution of their study is in concentrating on the relationship between formal (the nature of democracy and the extent of reservation) and informal (caste and religion) institutions and the way both together are likely to stimulate the processes of development. Moreover, Siddiqui and Ahmed (2011) give more supportive evidences for the observation of positive relationship between institutions and growth and they find a strong association between these two variables.

In literature, numerous studies present that the institutions may inspire the efficiency of redistribution policy, clearly associated with human capital accumulation. Implemented redistribution mechanisms endogenously determine the specific relationship between redistribution and growth.

The relevant literature on this specific topic has highlighted a dual effect: reflecting the prospect of an encouraging or repugnant redistribution effect on the growth and consequently making a clear difference between the efficient and inefficient redistribution. Sochirca and Silva (2011) study the way in which the quality of the institutional element may affect the competency of redistribution policy specially associated with accumulation of human capital. Actually, they identify the key factors which affect the decisive role of political institutions negatively and consequently, the efficient redistribution policy is distorted. In the applied research, the anticipated direction of causality goes from institutions to growth, but it could also go in the other way. The higher efficiency of institutions will not result in higher rates of growth only, but the higher rates of growth will turn a country richer and hence will empower it to improve the quality of its existing institutes. Later, Ismail *et. al,* (2013), examine the causative link among improvement in growth and institutions. Their work combines 2 different sets of data, the World Governance Index (WGI) and the ICRG. They identify two-way causation among economic progression and institutions. Improved quality of institutions nurtures economic advancement in advanced countries; while economic development inclines to enrich institution in lower income countries.

Many recent studies also establish the direct and positive relationships between institutional quality and growth; either by including larger number of quality of institutional indicators or by using various econometric methods in many countries. It is mostly observed that

the low or poor quality institutions affects the growth of per capita income undesirably[4]. Meanwhile, Siddiqui and Ahmed (2013) investigate the way in which institutional indicators effect growth in a theoretical structure, which is offered by North (1981). Their findings intend that favorable institutions affect the growth positively. For instance, Nawaz.S (2015) by using the panel data method over the period (1981-2010) for fifty six countries evaluates the influence of numerous institutions on growth. She estimates the stationary panel, commissioning the fixed effect method and GMM. The experimental examination ratifies the progressive correlation between growth and institutions. Thus, a comprehensive literature mentioned above validates a strong positive relationship between the indicators of human capital and growth. In the following subsection, we present the literature with another view that provides another way to study the combine relationship between these three variables.

2.3 The human capital, Institutions and Economic Growth

The intense study of the literature depicts the existence of the mix relationship among the human capital and growth in section one and visibly a positive linkage between the institutions and economic growth in section two. Apart from these relationships (i.e. presented in section 1 and 2), a few studies recognize the association between the role of human capital and institutions in urbanized countries. The theoretical and empirical evidence of high yields to input accumulation; especially human capital, along with the fact that some economies do not essentially practice higher rates of input growth, creates a paradigm. The quality of institutions is deliberated to be the key to enlighten this paradigm. Nevertheless, the studies related to human capital, institutes and growth highlights the significance of appropriate institutions along with the improved level of human capital in determining income levels and growth. It also emphasizes on their importance in

[4] (Pugh *et. al*, 2011, Sanjeev *et. al,* 2012, Sarwar *et. al,* 2013 and Siddiqi & Danish 2013).

stirring economic rewards which favor input addition. For example, Elmslie and Tebaldi (2008) state that "*Efficient institutes contribute to expedite the process of copyrights, to socialize concepts & endorse alliance through investigators, to accelerate the diffusion of technical information, to mend execution of property rights & to decline the ambiguity regarding progresses; those elements that enhance development & growth accomplishments*".

Later on, Sambit (2009) investigates the fractional impacts of institutions and human capital on growth. He finds on instrumented means of institutions and schooling, conferring to per capita GDP, that regressions athwart the countries of the log level are vague. He shows, by using the dynamic panel regressions, that both institutions and human capital have substantial effects on growth. He also uses Rodrick's[5] four way panel of institutions. His findings recommend that growth is improved by strong market generating institutions and market alleviating institutions. The Market modifiable institutions play role up to a definite extent but the market legitimizing institutions do not seem to matter. Far along, Diasa and Tebaldib (2012) demonstrate the significance of the association between human capital and institutions for elucidating the growth process. They find that structural institutions affect the elongated economic enactment positively. Conversely, political institutions are bringing into being not to be interrelated with productivity and longtime growth. Even though, Robinson *et. al,* (2014), revisit the link between institutions, human capital and growth. They contend to observe models which treat human capital and institutions as exogenous are not well indicated. Further, they show that when they accentuate on control for the influence of institutions and the historically firm differences in growth, the influence of institutions on extensive development outcomes to be vigorous.

[5] [Rodrik, D., 2005, Growth strategies. Handbook of Economic Growth 1 (1), 967–1014]

2.4 Conclusion

A brief review of the literature related to the human capital and economic growth reveals certain aspects regarding the underlying association between these the indicators of human capital and growth. Majority of the studies confirm the positive relationship but on the contrary few identify the negative association between these variables. In accordance with the relative unanimity in the theoretical and practical interpretations, there is a direct and positive link between institutions and economic growth. Similarly, the same are the results with institutional quality, human capital and economic growth. However, human capital might also have indirect impacts, through the channel of institutional quality on economic growth. Such impacts may or may not be positive, but the prevailing literature does not provide to study the relationship between the human capital and economic growth with some channels and conditions of institutional quality. The role of institutional quality is a distinguishing and desirable factor being channel and conditional variable, in detecting whether the impact of human capital on economic growth is negative, positive or both. Generally, the studies concentrate on the quality of institutions and human capital as the descriptive variables which influence the economic growth, but overlook certain channels and conditional, due to which economic growth may be affected. Hence, it will be attention-grabbing to scrutinize the linkages of these variables; particularly when the channel of human capital is clearly incorporated in the two equation model. Therefore, this study takes this issue into consideration and examines this relation in more detail, by exploring the precise conditions and channels through which we could observe the influences of human capital on economic growth.

Chapter 3

Theoretical frame work, Data and Empirical Methodology

3.1 Theoretical Framework

In most of the theoretical studies of growth, human capital is taken as an essential determinant of economic growth. Where, the educational attainment is measured as the main indicator of human capital[6]. The theoretical studies as regards to growth are separated broadly into two main groups:

The first group is of the Neo-classical growth theories which dominants till 1980s. This group (Cass, 1965 and Koopman, 1965) stresses the importance of savings and capital accretion together with exogenously resolute technical progress as the leading sources of economic growth. In addition to diminishing returns to capital the Neo-classical growth theories, recommend that in the long run all countries are alike to develop. But, the savings rate and rate of technological progress stay unexplained. Further, Mankiw *et. al*, (1992) extend the Neo-classical growth model by the addition of human capital as a supplementary element of growth in output level. However, the foremost shortcoming of the exogenous growth models is associated to the "exogeneity" of growth rate in long time. Keeping the rate of output equally specified doesn't offer sound justification of the intricate production progress contrivance. Further, the endogenous growth theorists (Romer, 1986 and Lucas, 1988) oppose the concept of Neo-classical growth theories that is, the technological advancement is exogenous. Moreover, the Neo-classical growth theories arc

[6] [Nelson and Phelps (1966), Lucas (1988), Becker, Murphy, and Tamura (1990), Rebelo (1992), Mulligan and Sala-i-Martin (1992)]

also argued by Hall and Jones (1999). Conferring to them the human capital is an imperative factor of development discrepancies among countries. While, the Endogenous growth theory holds that economic growth is primarily the result of endogenous and not external forces[7]. It further states that innovation, investment in human capital, and knowledge remain noteworthy providers to economic growth. All the variables are reflected as internal causes of growth. Moreover, the literature allied to human capital and growth provides diverse models. Where the first model is introduced by Lucas (1988) and motivated by Becker's (1964) theory of growth, is put together on the idea that growth is essentially determined by the stock of human capital. For that reason, growth depends on human capital which is an element of production and its accrual effects the growth of economy taking human capital as a flow variable. Therefore, growth rate fluctuates across countries and these disparities are due to the dissimilarities in rate of human capital accumulation.

The second model is centered on the pivotal contribution of Nelson and Phelps (1966) that is revived by the Schumpeterian growth collected works, describes growth as being resolute by the stock of human capital. This supplementary affects a country's capability to transform with more advanced countries. Transformations in growth rates through countries are then largely due to differences in human capital stocks and consequently in those countries' capacities to generate technical evolution. On the foundation of this model a new conception is recognized where the stock of human capital is directly related to innovation rate which auxiliary increases rate of production and also speed up output growth. Beside, a model of considerate technical progress is presented by Romer in (1990). According to this exemplary technology is not exogenous rather it is resolute by human capital and its rate of deployment in research and growth sector. While, the

[7] Romer, P. M. (1994). *"The Origins of Endogenous Growth"*. The Journal of Economic Perspectives **8** (1): 3– 22. doi:10.1257/jep.8.1.3. JSTOR 2138148

use of human capital depends on two things first, the extent of appropriability of the technology via blatant production and second the rate of transmission of knowledge to others. Thus, the research and development activity leads to higher productivity/economic growth[8]. Moreover, in (1986) a model of externalities and technical expansion is given by Romer. He illuminates that how capital accretion and technological advancement create positive external effects. Further, an important inference of the positive externalities is that the constant returns to scale at the firm level can coincide with the increasing returns to scale as a result per-capita growth is not just positive, but inclines to increase in the long run[9].

In view of the subject within the frame of endogenous growth theories, it is ascertained that the human capital resources of a country have a pronounced impact on growth. In recent years, the observed studies on growth also increasingly emphasize the role of human capital in growth process. It is also accentuated by the endogenous growth theories that in the development process, rudimentary health and education disbursements play an essential role in the foundation of economic growth and have a noteworthy contribution to the viable growth in longer period of time. Although Romer (1986) and Lucas (1988), endogenize sturdy state growth and technical improvement, but their description for income variations is analogous to that of the Neo-classical growth theories. For example, in the model of Romer (1990), a country may possibly be more progressive than the other country if it assigns additional resources to invention that is determined by the inclinations and attributes of the technology for generating notions. Nevertheless this

[8] Ray, D. (1998). *Development economics*. Princeton University Press.
Mankiw, N. G., Romer, D., & Weil, D. N. (1990). A contribution to the empirics of economic growth: National Bureau of Economic Research.

[9] Romer, D. (1986). A simple general equilibrium version of the Baumol-Tobin model. *The Quarterly Journal of Economics*, 663-686.

theoretical convention is still influential in economics and has delivered several comprehensions about the process of growth but this approach is impotent to give an ultimate reason for growth.

According to North and Thomas (1973), major justification of relative progress lies in dissimilarities among institutions. However, the quality of institutions stay absent in standard growth theory, but are often left implied. A huge literature reveals that the higher growth and development are the aftermath of quality institutions. Even though many scholars including Locke, Smith, Mill, North and Thomas give emphasis to the worth of institutions, while providing good whys and wherefores to believe that institutions are indispensable for growth.

In broad-spectrum, with the assistance of two theories, the starring role of institutions is illuminated in literature i.e. through the "Predatory Theory" and "Contract Theory". Delong and Shleifer (1993) support the Predatory Theory by concentrating on the implication of property rights and their precaution from expropriation. The Contract Theory builds the association between the kind and execution of indenture to the efficiency of organization (Coase in 1937; Grossman and Hart in 1986; Hart in 1995). Nevertheless, the connections through which institutions have impact on the growth, is yet the topic of a continuous debate. Further, a number of studies investigating the growth-institutions nexus use a version of the Neoclassical growth theories (Solow, 1956), enhanced to embrace measures of growth and institutions. North and Thomas (1973) and North (1990) present historic evidence that the safety of property rights offers incentives for economic growth in the world. Moreover, protected property rights likewise lead to an effectual allocation of investment and to an efficient usage of capital. Whereas, Acemoglu *et. al,* (2004) present a theoretical structure in which they highlight the two core state variables (in this context, the two variables are endogenous), first variable is human capital stock and the second is political institutions.

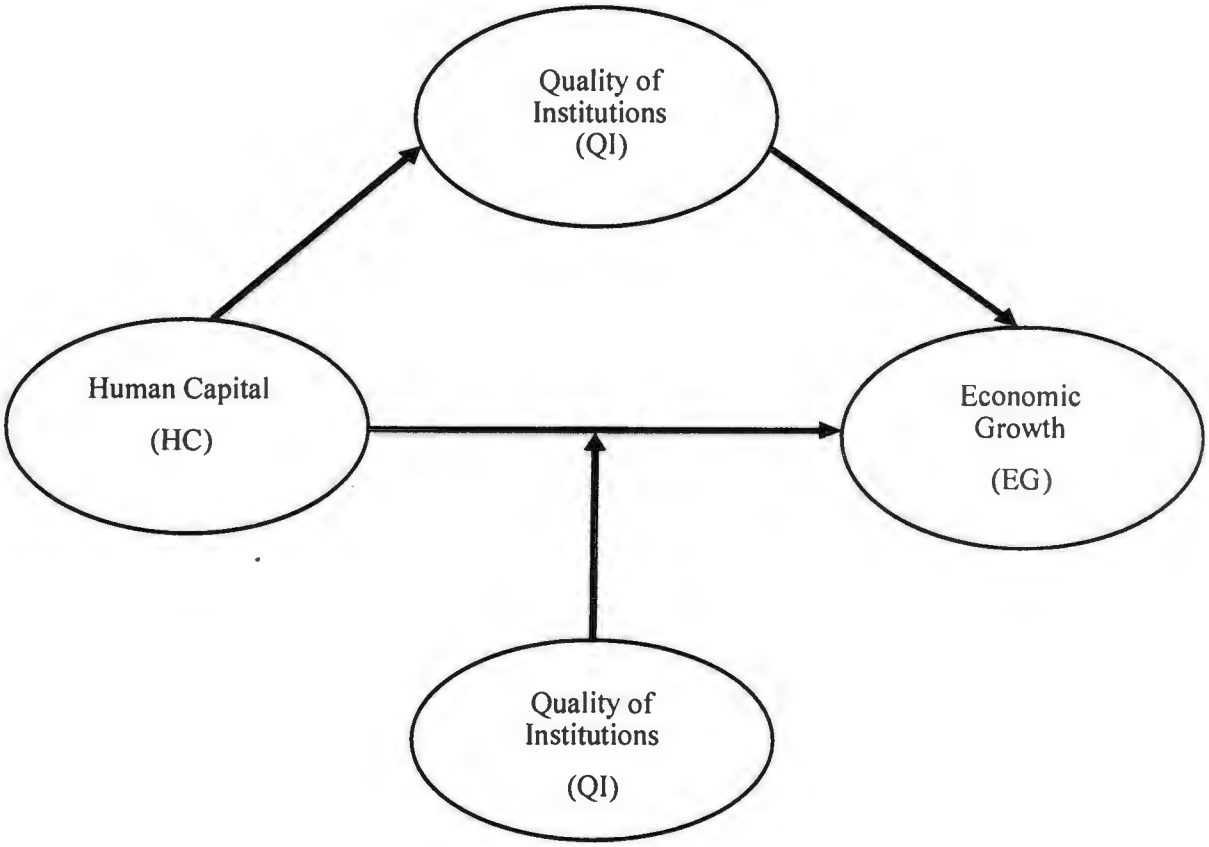
This framework indicates that through political institutions influencing equipoise economic institutions, which formerly determine growth. While, a renowned study by Rodrik *et. al,* (2002) finds the influence of institutes upon growth is comparatively larger than the trade and geography. Further, poor and weak institutions of the country lead to inadequate macroeconomic policies. Deficiency of property rights security reduces investment in physical capital and human capital that also harms the growth. On the other hand, the process of human capital accretion does not occur inevitably; it comes on or after the assessment which encumbrances the intertemporal recompenses commencing the accretion of human capital in contrast to its expenses. In this process the quality of institutions perform a decisive role in affecting the rate of return on education. The important institutes that foster the growth process lead to extend the return to education, further stimulating human capital accumulation. However, a few studies show a theoretical link among the human capital, institutions and economic growth, such as the theoretical growth model established by Tebaldi and Dias (2011) explain the interaction among the human capital and institutions to foster the process of development. They high light the strategic presence of institutions in deciding the path through this human capital accumulation take place. Further it raises growth in output and knowledge. Output then gives to upsurge the proceeds to human capital accumulation which in turn encourages the less educated workers to spend on knowledge and learning. Consequently, creates an accretion through self-sufficient contrivance which can be boosted by improving institutions.

Thus, in order to explore the important relationships between the human capital and economic growth through the channel of quality of institutions, we present some maiden baseline patterns among these variables. The relationships described in this section are not causative, but offer indication of remarkable linkages among the variables in order to relate our later apprehensions. In the prevailing literature on human capital and growth, the human capital is one

or the other presumed to stimulate economic growth directly or indirectly via specific conditions of institutions. Due to this reason the purposes of our study as mentioned in the first Chapter of the current study, we employ the moderated mediation approach by Muller *et. al,* (2005) and Preacher *et. al,* (2007). This study investigates the relationship between human capital and economic growth in the presence of another variable i.e. the quality of institutions which is basically an independent variable, but considered a mediator as well as a moderator variable. This works in a different way. A mediator variable is one that is exaggerated by the explanatory variable and in turn affects the explained variable. In other words, intermediating relationships take place when a third variable plays an imperative role in governing the link between the other two variables. However, a moderator variable is the one that modifies the relationship between two other variables. The influence of a moderating variable is categorized statistically as an interaction; that is generally a quantitative variable that affects the trend and/or strength of the association between independent and dependent variables (Hayes *et. al,* 2004).

Our schematic model for this analysis is given as follows:

(a) The effects of human capital on economic growth through the channel of the quality of institutions.



(b) The conditional impact of human capital on economic growth while considering the quality of institutions as the conditional variable.

In this model, the human capital may influence the economic growth in two distinct ways due to the inclusion of the quality of institutions as the conditional as well as the channel variable. Figure (a), illustrates the effects of human capital on economic growth through the channel of the quality of institutions. Here the quality of institutions acts as a mediation variable or mediator which serves to clarify the nature of the relationship between the human capital and economic growth. While, the amount of mediation is called the indirect effect. However, the total effect consists of the direct as well the indirect effect. The human capital plays a role of moderation variable that affects the quality of institutions which further effects the economic growth. As depicted in Fig (a) an arrow running from the human capital to quality of institutions and approaching to economic growth. Whereas Figure (b) represents the conditional impact of human capital on economic growth, keeping the quality of institutions as the conditional variable. In this model the quality of institutions plays as the moderator variable, who's effect is characterized statistically as an interaction that effect the direction and or strength of the relationship between the human capital and economic growth. As depicted through the projectile from the human capital to economic growth, aside from human capital itself, we introduce quality of institutions as a conditional variable.

In principle, each country has its own production function relationship in each of these directions, with links of varying strengths, depending on the country's initial conditions, the changing environment, and the policy setting. Strong chains where human capital have a relatively large impact on growth through better quality of institutions, and human capital has the significant impacts on economic growth through the channel of the quality of institutions, can lead countries into mutually reinforcing cycles, which can be either "virtuous," where both human capital and economic growth changes exceed the average for all developing countries, or "vicious," where a

endogeniety is due to the error in variables and some time because of the feedback effect. Whereas, error in variables may occur due to one of the main reasons for instance, various economic categories of certain variables are just projection to the true values of variables. As far as the other reason of the problem of endogeniety is concerned that is the feedback effect due to which estimates would become inconsistent and biased. Usually by using proxy variables, measurement errors may take place during estimations. Here, we also use proxy variables for both the main explanatory variables of our study that is why we take the lag (i.e. first lag) of the indicators of human capital and institutional quality. In (2011), Vischer *et. al,* take the lag form of the human capital and rest of the other variables in their analysis to the handle with the same problem that is endogeniety. Our model which is represented in this chapter, consists of two equations i.e. (3.1) and (3.2) designed to explain the behavior of endogenous variables in the model. Those are institutional quality and economic growth thus there exists the possibility of additional relationships between the explanatory and explained variables in any single equation and the independent variables may themselves be dependent. Thus the feedback effect may exist between the institutional quality and the economic growth due to which we may not be able to identify whether it is the institutional quality nurtures economic growth or it is growth which inclines to enrich institutional quality. As Ismail et. al, (2013) identify bidirectional causality between institutions and the economic development. Due to which their study seems tentative to conclude whether the improved quality of institutions that leads to economic development in advanced countries or the economic improvement which rallies the quality of institutions in poorer income countries. However, we also add a few but relevant regulator variables in order to plaid the strength of the findings such as, LY symbolizes the initial value of real per capita gross national product which is used to control for convergence, GOV denotes the government size which is general government final consumption expenditure (% of GDP), OPEN represents the trade openness, INF

indicates Inflation, GDP deflator, INV symbolizes the gross fixed capital formation (constant 2005 US$). We take the natural log of all the variables. The data is obtained from the World Development Indicators (WDI), 2013 database.

The current study mainly focuses on the conditional impact of human capital on economic growth and also highlights the institutional quality as the channel variable in the analysis. To accomplish these objectives the selection of the appropriate and reliable measure for human capital as well as for the quality of institutions is undoubtedly a crucial task, since the amount of influence is affected by the indicator chosen for estimation purposes. Mostly, the empirical studies employ certain proxy variables to measure the human capital and quality of institutions. Such as, Benhabib and Spiegel (1994) first introduce the number of years of schooling as a proxy for human capital. They find a non-significant and negative coefficient for the log of years of schooling. Besides, Barro-Lee (1993) and Islam (1995) take as an alternative for human capital, the average „number of year of schooling of the residents over twenty five years. While, Murthy and Chien (1997) in place of a proxy of human capital using a weighted average of the population listed in primary, secondary and tertiary education. They confirm a positive and significant relationship of human capital with economic growth. Furthermore, Lindahl and Krueger (2001) take the log change of returns over the variation in certain periods of school education and identify a positive but non-significant link between human capital and growth. Later on, Zhuang *et. al,* (2011) use the average years of schooling for measuring the extent of human capital that is by and large deliberated an important measure as compare to school enrollment ratio or the student-teacher ratio. They familiarize a new measure of human capital, named as human capital structure which is the percentage of human capital with tertiary education in order to probe whether the human capital structure matters in China and finally conclude that the tertiary education shows a more

fundamental role than primary secondary education on growth. Moreover, Qadri and Waheed (2014) use a narrow definition of human capital and employ gross enrollment rate at secondary education as a proxy for human capital for the reason of the accessibility of official data. They conclude that the investment in human capital has the noteworthy impact on the main macroeconomic gauges. Thus the outcomes make it apparent that the way human capital is apportioned with in growth models is still not totally free of imperfections. Theory development options remain open, for it remnants clear that human capital is an essential measure of the growth progression of nations.

Overall, the results of the above mentioned empirical studies make it evident that the way human capital is dealt with in growth models is still not totally free of imperfections. Theory development possibilities remain open, for it remains clear that human capital is an essential part of the growth process of nations. However, this study uses the Index of human capital per person, based on years of schooling (Barro and Lee, 2012) and returns to education (Psacharopoulos, 1994) as the proxy of human capital, because of the availability of official data for the selected countries, coverage of the two main aspects of education and it is widely used in several empirical studies. The other important variable of this study is the "Quality of Institutions" which is once considered as the conditional variable and another as the channel variable. Ever since, Popescu and Cuza (2012) recognize three characteristics that in their belief, define institutional quality: The first evaluation criterion of the institutional quality is universality (Kasper and Streit 2012). Universality infers general, open, abstract social rules, or as Hayek in (1973) stated "rules must be applicable to an unknown and indeterminable number of persons and circumstances". The second criterion is concerned with the important function of institutional quality (i.e. the reduction of transaction costs, and uncertainty in human interactions) consequently provides an extraordinary level of sanctuary and strength in social and economic affairs. In this regard, institutions should be

categorized mainly by credibility and stability. Another criterion is adaptability or the institutions ability not only to antedate fluctuations and provide incentives for agents to become accustomed to the ever-changing socio-economic circumstances.

For a longer period of time the role of institutions is being neglected in empirical growth studies due to the reason that it is quite difficult to measure the institutional quality through certain criteria. But now, currently a plethora of indexes endeavoring to proxy institutional quality exists, such as the Freedom House Index of political and civil freedom, measures of a further comprehensive assessment of institutions and exclusively economic institutions have been more elusive. This changed, however, with the publication of Economic Freedom of the World: 1975-1995 via Gwartney *et. al,* (1996). Their index is the furthermost all-encompassing indicators accessible in rapports of its reporting of countries, time and aspects of self-determination but the data is missing for many countries. Whereas, some other indexes of economic freedom are also notable. For instance, Wright (1982) encompasses the Freedom House Index of political and civil liberties to embrace a ranking of economic freedom, but exposure is limited to a fairly short time period. Another endeavor by Freedom House to bring out a measure of economic freedom appears in Messick (1996), but journal of this measure is currently obsolete. In (1991) Scully and Slottje paradigm an index of economic liberty, nonetheless this measure also has a scarce time dimension. While, The Heritage Foundation Publishes a measure recognized as "Index of Economic Freedom", which is alike in many aspects to the Economic Freedom of the World index (EFW), but it is accessible for a diminutive period of time and a restricted number of countries. However, International Country Risk Guide (ICRG) allude to as "the only risk rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries," in total 140 nations are rated by ICRG every month continuously the foundation of over thirty risk measures affecting, financial, economic and political risks, start from (1984) aimed at the most.

In this model, the human capital may influence the economic growth in two distinct ways due to the inclusion of the quality of institutions as the conditional as well as the channel variable. Figure (a), illustrates the effects of human capital on economic growth through the channel of the quality of institutions. Here the quality of institutions acts as a mediation variable or mediator which serves to clarify the nature of the relationship between the human capital and economic growth. While, the amount of mediation is called the indirect effect. However, the total effect consists of the direct as well the indirect effect. The human capital plays a role of moderation variable that affects the quality of institutions which further effects the economic growth. As depicted in Fig (a) an arrow running from the human capital to quality of institutions and approaching to economic growth. Whereas Figure (b) represents the conditional impact of human capital on economic growth, keeping the quality of institutions as the conditional variable. In this model the quality of institutions plays as the moderator variable, who's effect is characterized statistically as an interaction that effect the direction and or strength of the relationship between the human capital and economic growth. As depicted through the projectile from the human capital to economic growth, aside from human capital itself, we introduce quality of institutions as a conditional variable.

In principle, each country has its own production function relationship in each of these directions, with links of varying strengths, depending on the country's initial conditions, the changing environment, and the policy setting. Strong chains where human capital have a relatively large impact on growth through better quality of institutions, and human capital has the significant impacts on economic growth through the channel of the quality of institutions, can lead countries into mutually reinforcing cycles, which can be either "virtuous," where both human capital and economic growth changes exceed the average for all developing countries, or "vicious," where a

country's performance is below average in both dimensions. A part from the human capital, quality of institutions and economic growth we also include some control variables in our analysis such as initial value of real per capita GDP (LY), government size (GOV), trade openness (OPEN), inflation (INF) and investment (INV) to check the robustness of the results. However the trade openness and investment may positively associated with economic growth. On the other hand, government size and inflation may adversely affect economic growth.

3.2 Data and Empirical Methodology

3.2.1 Data

This study uses a panel data of 90 countries over the time span of (1984-2011). The selection of countries and time dimension is directed by the indicator of quality of institutions and the availability of the data. These countries comprise of both developed and developing countries. The use of panel data is believed to be appropriate because of the limited number of years for each country. Panel data sets are typically wide but short that is, with wide cross sectional units but a short number of years. In this study, because the number of years is 28 since we focus on a wide range of countries. However, the advantage here is that we reduce the large averaging effect that occurs in wide panel data sets. Thus, the estimation obtained in this study would better reflect the situation in these countries.

The dependent variable in our analysis is economic growth, this is proxied as real per capita gross domestic product (constant 2005 US$) obtained from World Development Indicators (WDI, 2013) database. In our analysis we take the log difference of real per-capita Gross Domestic Product. The main independent variable is human capital used as the Index of human capital per person, based on years of schooling (Barro and Lee, 2012) and returns to education (Psacharopoulos, 1994) which is taken from Penn World Table version, 8.1. Whereas, QI represents the quality of institutions which is considered not only as a conditional variable but also as a channel variable in our analysis, it is proxied by the indicators of institutional quality developed by International Country Risk Guide (ICRG) published by the (PRS) Group. We construct a composite index of institutional quality to represent the certain aspects regarding the quality of institutions in a single index instead of running the regression several times for each indicator of institutional quality separately. We have identified the indicators from ICRG which

could have the potential to display the quality of the institutions prevailing in the respective countries. Following are the variables; government stability (GS), socioeconomic conditions (SEC), investment profile (INVP), corruption (COR), military in politics (MIP), law and order (LNO) and ethnic tension (ET). The first three indicators (GS, SEC, INVP) are being rated at the scale of 1-12; lower rating (closer to 1) indicating lower level of risks and vice versa. While, the remaining four indicators (COR, MIP, LNO, ET) are being rated at the scale of 1-6; lower rating (closer to 1) indicating lower level of risks and vice versa. The detail description about all the variables is cited in appendix, Table A-1. Besides, the summary statistics and correlation matrix are given in appendix Table A-2 and Table A-3 respectively. Further, we proceed with factor extraction using the method of Principal Component Analysis. According to the practice, only those factors are retained in the analysis whose eigenvalues are above an arbitrary threshold that is one. Following this criteria in our analysis, we identified one factor with (3.49) eigenvalue that is component 1 among the 7 components. In order to construct a composite index of institutional quality from the seven indicators, we multiplied the coefficient of each indicator of institutional quality with its weights or loadings of component 1 and then added them all. The computation of the index is shown in appendix Table A-4. It is also clear from the scree plot that component 1 is visibly different from the others who's eigenvalue is highest among other components i.e. 3.49 as mentioned in appendix A-5.Whereas, (HC*QI) is an interaction between a measure of human capital and a measure of the quality of institutions. It explains that how the effect of human capital on economic growth changes as the level of institutional quality changes.

We take the lag of our main independent variables which are human capital, institutional quality and the interaction term to control the problem of endogeniety[10]. We may say that

[10] That is, when some of the explanatory variables also behave as explained variables and thus have correlation with the error term.

endogeniety is due to the error in variables and some time because of the feedback effect. Whereas, error in variables may occur due to one of the main reasons for instance, various economic categories of certain variables are just projection to the true values of variables. As far as the other reason of the problem of endogeniety is concerned that is the feedback effect due to which estimates would become inconsistent and biased. Usually by using proxy variables, measurement errors may take place during estimations. Here, we also use proxy variables for both the main explanatory variables of our study that is why we take the lag (i.e. first lag) of the indicators of human capital and institutional quality. In (2011), Vischer *et. al,* take the lag form of the human capital and rest of the other variables in their analysis to the handle with the same problem that is endogeniety. Our model which is represented in this chapter, consists of two equations i.e. (3.1) and (3.2) designed to explain the behavior of endogenous variables in the model. Those are institutional quality and economic growth thus there exists the possibility of additional relationships between the explanatory and explained variables in any single equation and the independent variables may themselves be dependent. Thus the feedback effect may exist between the institutional quality and the economic growth due to which we may not be able to identify whether it is the institutional quality nurtures economic growth or it is growth which inclines to enrich institutional quality. As Ismail et. al, (2013) identify bidirectional causality between institutions and the economic development. Due to which their study seems tentative to conclude whether the improved quality of institutions that leads to economic development in advanced countries or the economic improvement which rallies the quality of institutions in poorer income countries. However, we also add a few but relevant regulator variables in order to plaid the strength of the findings such as, LY symbolizes the initial value of real per capita gross national product which is used to control for convergence, GOV denotes the government size which is general government final consumption expenditure (% of GDP), OPEN represents the trade openness, INF

indicates Inflation, GDP deflator, INV symbolizes the gross fixed capital formation (constant 2005 US$). We take the natural log of all the variables. The data is obtained from the World Development Indicators (WDI), 2013 database.

The current study mainly focuses on the conditional impact of human capital on economic growth and also highlights the institutional quality as the channel variable in the analysis. To accomplish these objectives the selection of the appropriate and reliable measure for human capital as well as for the quality of institutions is undoubtedly a crucial task, since the amount of influence is affected by the indicator chosen for estimation purposes. Mostly, the empirical studies employ certain proxy variables to measure the human capital and quality of institutions. Such as, Benhabib and Spiegel (1994) first introduce the number of years of schooling as a proxy for human capital. They find a non-significant and negative coefficient for the log of years of schooling. Besides, Barro-Lee (1993) and Islam (1995) take as an alternative for human capital, the average „number of year of schooling of the residents over twenty five years. While, Murthy and Chien (1997) in place of a proxy of human capital using a weighted average of the population listed in primary, secondary and tertiary education. They confirm a positive and significant relationship of human capital with economic growth. Furthermore, Lindahl and Krueger (2001) take the log change of returns over the variation in certain periods of school education and identify a positive but non-significant link between human capital and growth. Later on, Zhuang *et. al,* (2011) use the average years of schooling for measuring the extent of human capital that is by and large deliberated an important measure as compare to school enrollment ratio or the student-teacher ratio. They familiarize a new measure of human capital, named as human capital structure which is the percentage of human capital with tertiary education in order to probe whether the human capital structure matters in China and finally conclude that the tertiary education shows a more

fundamental role than primary secondary education on growth. Moreover, Qadri and Waheed (2014) use a narrow definition of human capital and employ gross enrollment rate at secondary education as a proxy for human capital for the reason of the accessibility of official data. They conclude that the investment in human capital has the noteworthy impact on the main macroeconomic gauges. Thus the outcomes make it apparent that the way human capital is apportioned with in growth models is still not totally free of imperfections. Theory development options remain open, for it remnants clear that human capital is an essential measure of the growth progression of nations.

Overall, the results of the above mentioned empirical studies make it evident that the way human capital is dealt with in growth models is still not totally free of imperfections. Theory development possibilities remain open, for it remains clear that human capital is an essential part of the growth process of nations. However, this study uses the Index of human capital per person, based on years of schooling (Barro and Lee, 2012) and returns to education (Psacharopoulos, 1994) as the proxy of human capital, because of the availability of official data for the selected countries, coverage of the two main aspects of education and it is widely used in several empirical studies. The other important variable of this study is the "Quality of Institutions" which is once considered as the conditional variable and another as the channel variable. Ever since, Popescu and Cuza (2012) recognize three characteristics that in their belief, define institutional quality: The first evaluation criterion of the institutional quality is universality (Kasper and Streit 2012). Universality infers general, open, abstract social rules, or as Hayek in (1973) stated "rules must be applicable to an unknown and indeterminable number of persons and circumstances". The second criterion is concerned with the important function of institutional quality (i.e. the reduction of transaction costs, and uncertainty in human interactions) consequently provides an extraordinary level of sanctuary and strength in social and economic affairs. In this regard, institutions should be

categorized mainly by credibility and stability. Another criterion is adaptability or the institutions ability not only to antedate fluctuations and provide incentives for agents to become accustomed to the ever-changing socio-economic circumstances.

For a longer period of time the role of institutions is being neglected in empirical growth studies due to the reason that it is quite difficult to measure the institutional quality through certain criteria. But now, currently a plethora of indexes endeavoring to proxy institutional quality exists, such as the Freedom House Index of political and civil freedom, measures of a further comprehensive assessment of institutions and exclusively economic institutions have been more elusive. This changed, however, with the publication of Economic Freedom of the World: 1975-1995 via Gwartney *et. al,* (1996). Their index is the furthermost all-encompassing indicators accessible in rapports of its reporting of countries, time and aspects of self-determination but the data is missing for many countries. Whereas, some other indexes of economic freedom are also notable. For instance, Wright (1982) encompasses the Freedom House Index of political and civil liberties to embrace a ranking of economic freedom, but exposure is limited to a fairly short time period. Another endeavor by Freedom House to bring out a measure of economic freedom appears in Messick (1996), but journal of this measure is currently obsolete. In (1991) Scully and Slottje paradigm an index of economic liberty, nonetheless this measure also has a scarce time dimension. While, The Heritage Foundation Publishes a measure recognized as "Index of Economic Freedom", which is alike in many aspects to the Economic Freedom of the World index (EFW), but it is accessible for a diminutive period of time and a restricted number of countries. However, International Country Risk Guide (ICRG) allude to as "the only risk rating agency to provide detailed and consistent monthly data over an extended period for a large number of countries," in total 140 nations are rated by ICRG every month continuously the foundation of over thirty risk measures affecting, financial, economic and political risks, start from (1984) aimed at the most.

Moreover, it is the most cited source of the quality of institutions data set used in numerous empirical studies based on the relationship between quality of institutions and economic growth.

On the basis of the above mentioned features of ICRG data set, we employ the indicators of ICRG as the proxy variable of the institutional quality in our analysis. We construct a composite index which encompasses seven components of ICRG risk measures. These are aggregated into a single summary. The seven major components of the index are defined earlier. Many studies by researchers find ICRG data to be positively correlated to better IMF program enactment, lower ascendant spreads, and with inconsistency in bank loaning volume. Others find ICRG data to "provide information that has great predictive value with respect to future equity returns globally," and offers a "reliable, consistent, and valid measure of property rights protection". A wide-range of empirical studies uses ICRG data as the main proxy variable to quantify the QI in their analyses. For instance, Knack and Keefer (1995), succeeding Hall and Jones (1999), use a partisan average extent of institutions commencing the ICRG dataset for hundred and twenty seven countries. They make certain that the variances in social substructure amongst nations are exaggerated via enormous dissimilarities in assets accretion, learning accomplishment, along with throughput. Besides, Nigar (2012) also employ the ICRG data for the panel of nine low and lower income mid income countries covering the period of 1984-2010 and finds that the influence of institutional quality on growth is progressive.

3.2.2 Methodology

In this section, we present our model for estimation along with the proposed methodology that we use in our study to evaluate the channel and conditional effects of human capital on economic growth through the quality of institutions.

3.2.2.1 Model

The current study indicates that the human capital is either assumed to effect growth directly or indirectly via the channel of institutional quality. However, this also focuses on the conditional impacts of human capital on growth while considering the quality of institutions as the conditional variable. In order to achieve the objectives of this study, further the mediation moderated method (Preacher et. al,. 2007 and Muller et. al,. 2005) is used to make the econometric model and assessed via commissioning the SUR method as recommended thru Biorn in (2004).

For estimation purpose, we construct our econometric model as:

$$QI = \alpha_1 + \alpha_2 HC + \mu_1 \quad (3.1)$$

$$GROWTH = \beta_1 + \beta_2 HC + \beta_3 QI + \beta_4 (HC*QI) + \beta'_5 Z + \mu_2 \quad (3.2)$$

Where, QI is the quality of institutions which is not only considered as the channel variable but also a conditional variable in our analysis, proxied as an index of quality of institutions, HC represents the human capital and μ_1 is the stochastic error term in equation (3.1). Whereas GROWTH is considered as the dependent variable, (HC*QI) is the interaction between a measure of human capital and a measure of the quality of institutions. It explains that how the effect of

human capital on growth changes as the level of institutional quality changes. However, Z is the vector of some other important variables that are compulsory for growth regressions, it includes the GDP (LY), (GOV), (OPEN), (INV) and μ_2 is the stochastic error term in equation (3.2).

The above system of the two equations i.e. (3.1) and (3.2) is used to describe the effects of human capital on economic growth through the channel of the quality of institutions.

Indirect effect of human capital (HC) using the channel of quality of institutions (QI)

For the purpose of testing the hypothesis linked to the effects of human capital on growth through the quality of institutions, the above mentioned equations such as (3.1) and (3.2) are considered for further analysis.

$$\frac{\partial G}{\partial HC} = \frac{\partial QI}{\partial HC} \cdot \frac{\partial G}{\partial QI} \tag{3.3}$$

$$\frac{\partial G}{\partial HC} = \alpha_2 (\beta_3 + \beta_4 HC) \tag{3.4}$$

The sign of the above mentioned indirect effects be influenced by the signs and magnitude of the α_2, β_3 and β_4. As mentioned earlier that we apply Seemingly Unrelated Regression method for estimation purpose. However, the interaction term between the human capital and the quality of institutions indicates that how we can examine our conditional hypothesis by computing the total effect of human capital on economic growth as shown by the following partial derivative of growth with respect to human capital.

$$\frac{\partial G}{\partial HC} = \beta 2 + \beta 4QI \quad (3.5)$$

Equation (3.5) shows the effect of human capital on growth is conditional on the level of the institutional quality. However, interpretation of the coefficient of interaction term include in our regressions is not as simple as the coefficient of constitutive variables. Because of two different standard errors, the interpretation describing the significance of interaction term requires keen carefulness. In (2006) Bramber *et. al,* identify the regression conclusions that are not just enough in place of relating the additional impacts of the interaction term that is (HC*QI) intended for the explained variable. Therefore, they suggest using the measurements of regression outcomes that is standard errors, variances and covariance to construct the marginal effect plots with upper and lower 95% confidence intervals. This would not only provide us the marginal effects of human capital on economic growth with the full range of institutional quality but also indicate the significance level of marginal effect.

3.2.2.2 Seemingly Unrelated Regression (SUR) Method

This method is given and recommended by Zellner (1962), which is a generality of a Linear Regression Model. It is made up of several equations in the regression model. Where every equation possesses its particular explained variable represented on the left hand side of the equation and can be assessed clearly and showed that the subsequent estimators could be further precise than those attained by OLS. It is presumed about the disturbances that are interconnected crosswise in the equations of the model. SUR method may be regarded in place of the diffident procedure of Generalized least square method in which different quantities in β matrix are reserved to be equivalent to zero, in other words by means of the common usage of the GLM wherever the

explained variables are endorsed to be diverse in the model. Therefore SUR method may be supplementary indiscriminate in to the simultaneous model of more than one equation, wherever the independent variables represented on the right hand side of the equations might be estimate within the model. Though, referring to the current exploration, this study utilizes SUR approach because we experienced with the pooled data which is highly unbalanced for the selected countries. We prefer seemingly unrelated regressions because of two main reasons; first is related to the fact that thru merging evidence related to diverse equations in the model one can increase effectiveness in estimation. Besides, the second motivation is to impose and/or test restrictions that involve parameters in different equations.

This study is different in certain aspects from the existing literature. First, we not only study the channel of the quality of institutions through which the human capital may affect the economic growth, but we also investigate whether the human capital influence the quality of institutions, or increases the positive effects of the quality of institutions (interaction effect) on growth. Second, the conditional impact of human capital on growth while considering the quality of institutions as the conditional variable has not been considered discretely for 90 nations over the time of twenty eight years. Third, modern econometric technique for estimation is utilized in the analysis.

Chapter 4

Results and discussion

In this section, we explain the findings of our estimations. The observed examination explores not only the direct as well as the indirect effects of human capital on economic growth through the precise channel of the quality of institutions but also the conditional effects of human capital on economic growth, using a composite index of quality of institutions of selected indicators. For this purpose we use model underlined in equations (3.1) and (3.2).

4.1 Estimation: In the following subsections, estimates obtained from our model are discussed.

4.1.1 Model

In table 4.1, the model shows the effects of human capital on growth through the channel of quality of institutions. The equation of quality of institutions of this model shows that the effect of human capital on quality of institutions is positive and significant at 1% level. This is consistent with the studies showing positive relationship between human capital and quality of institutions. While, the equation where GROWTH is taken as the explained variable displays the bordering effect of human capital on growth is positive and significant at 1% level. This is consistent with the studies showing positive link between human capital and growth such as, Oketch (2006); Karagiannis *et. al,* (2007); Silvie *et. al,* (2012); Atif *et. al,* (2012) and Pelinescu (2015).

The effect of quality of institutions on Growth is correspondingly positive and significant at 1% level. This is consistent with furthermost of the empirical studies which find resilient

positive connotation between the institutions and economic growth for example, Ali *et. al,* (2003), their significant study provides ample substantiation that the institutional situation, in which an economic bustle takes place, is an important determinant of growth. Assane and Grammy (2003) scrutinize the effect institutional quality on economic change. The results of their study sustenance the proposition, that quality institution improve proficiency and increase growth rate. Moreover, the coefficient of (HC*QI) confirms the presumed relation among the two variables. It suggests that the positive effect of human capital on growth rises as per the quality of institutions increases. In on other way, human capital influences growth more in those countries where the quality of institutions is comparatively better than other nations. But, the impact is relatively weaker due to the ineffective quality of institutions. This finding is consistent with Diasa and Tebaldib (2012). They validate the prominence of the interface between growth and institutes in order to explain the expansion method. Furthermore, we perceive that the growth effects of OPEN, LY, INV, INF and GOV are in accordance to the prevailing works (Fischer 1993; Barro 1996; Doppelhofer and Bleaney 2000 and Nishiyama 2002). We include the initial value of real per-capita GDP (LY) to accommodate the convergence impacts in regressions related to growth. In this model it is negative but substantial and indicates that lower initial per-capita GDP will lead to higher average growth rate. Government size in Table 4.1 exhibits a negative but having substantial impact on economic growth. It seems that with the rise in the government expenses particularly the non-developmental expenses lead to slower the economic growth. (Fischer, 1993 and Bhatti *et. al,* 2013). The impact of investment on growth is similarly positive and momentous, which means that by growing the investment, growth will also increase. Trade ingenuousness considerably enhances the economics. The coefficient of OPEN is positive and substantial that is unswerving by way of the current works (Harrison 1991 and Barro 1996), as mentioned in table 4.1. However, the impact of INF on growth is negative and noteworthy which support the negative relationship between inflation and growth

(Fischer, 1993). As a whole, we analyze the channel and conditional impacts of human capital on growth. The sign of the coefficients are positive and significant at 1% level. Yet, the indirect effects of human capital on economic growth via the channel of the quality of institutions as clarified through computing the above set of equations (3.1 and 3.2) specified in chapter 3. Whereas, the Table 4.2 represents the estimated results of indirect impacts with their confidence intervals. For determining the importance of these impacts of human capital, further the confidence intervals are made at low, medium and high levels of human capital as formulated in 4.2 table.

Hereafter, Table 4.2 approves the indirect impacts of human capital on growth via the channel of institutional quality at low, medium and high[11] levels of human capital are the same as expected. The indirect effect of human capital increases from lower to higher levels of economic growth. This is evident from the results that as the level of human capital increases, growth also increases through the inclusion of another variable that is the quality of institutions. However, the conditional effects of institutional quality are mentioned in Table 4.3. The results show that the relationship between human capital and growth is conditional upon the level of institutional quality; that is, it increases as the level of institutional quality increases. Thus, the positive interaction between human capital and quality of institutions suggest that by improving the institutional quality from low to high level, respectively growth raises. Hence, our findings from table 4.1, 4.2 and 4.3 put forward about the entire estimations of this study particularly the effects of human capital on growth provide a clearer situation about the relationship among the selected variables while including the channel of institutional quality instead of analyzing the traditional ways of study.

[11] Where, low level of human capital represents the 25th percentile, medium shows the 50th percentile and high indicates the 75th percentile.

Table 4.1: Growth effects of human capital through the quality of Institutions.

Variables	Quality of Institutions	Growth
HC	1.161414*** (0.000)	1.52402*** (0.000)
IQ		0.1760615*** (0.000)
HC*IQ		0.4331665*** (0.000)
LY		-0.1413573*** (0.000)
GOV		-2.366459*** (0.000)
INV		1.411589*** (0.000)
OPEN		0.6590339*** (0.000)
INF		-0.4471997*** (0.000)

The probability value of every coefficient is prearranged within the brackets. Whereas,*** shows importance at 1%. The explained variable is growth which is the log change of real percapita Gross Domestic Product. The main independent variable is human capital (HC) as The Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994). Whereas IQ is the index of institutional quality (constructed through the indicators of ICRG). HC*QI presents as the connecting measure of human capital and a measure of the QI. However, LY symbolizes the initial value of real per capita gross national product GOV denotes the government size which is general government final consumption expenditure (% of GDP), INV symbolizes the gross fixed capital formation (constant 2005 US$), OPEN represents the trade openness and INF indicates Inflation, GDP deflator,. We take the natural log of all the variables.

Table 4.2: Indirect effects of human capital on Growth

Channel of institutional quality	Level of Human Capital	Indirect effects	95% Conf. Interval	
Institutional quality	Low	0.5264551*** (0.000)	0.4002751	0.6526352
	Medium	0.6421649*** (0.000)	0.5004487	0.783881
	High	0.7226586*** (0.000)	0.5666954	0.8786217
The probability value of every coefficient is prearranged within the brackets. Whereas,*** shows importance at 1%. Low human capital implies mean human capital minus one standard deviation (SD) of human capital. High human capital implies mean human capital plus one standard deviation (SD) of human capital.				

Table 4.3: Conditional effects of human capital on Growth

Conditional effects of human capital	Level of Institutional quality	Conditional effects	95% Conf. Interval	
Institutional quality	Low	1.801246*** (0.000)	1.693296	1.909196
	Medium	1.900874*** (0.000)	1.812847	1.988902
	High	1.970181*** (0.000)	1.893434	2.046928
The probability value of every coefficient is prearranged within the brackets. Whereas,*** shows importance at 1%. Low institutional quality implies mean institutional quality minus one standard deviation (SD) of institutional quality. High institutional quality implies mean institutional quality plus one standard deviation (SD) of institutional quality.				

We can compute the benchmark or the threshold level of the quality of institutions from the conditional effects of quality of institutions. This can be done by substituting the estimated valuve of the coefficient of human capital along with the coefficient of interaction term and then equating the equation (3.5) to zero. We obtained the value that is (-3.5183) by taking the antilog, the valuc is (0.0296). This shows the threshold level beyond which the quality of institutions is considered as high and below which the institutional quality considered as low.

Hence, our findings from table 4.1, 4.2 and 4.3 suggest that the growth effects of human capital can more clearly be explained by incorporating the channel of institutional quality and its role as a conditional variable to influence the human capital-growth relationship.

Chapter 5

Conclusion and Policy Implications

5.1 Conclusion

The current study uses a panel data of 90 countries to explore the impacts of human capital on economic growth in the presence of the quality of institutions as the channel and conditional variable. We employ (SUR) method to achieve the objectives of this study. Overall, this study investigates the marginal, conditional and indirect effects of human capital on economic growth.

Our estimation results are as follows: first, the human capital has a positive and significant effect on economic growth. Second, institutional quality positively and significantly affects growth. Third, the coefficient of the interaction term is also positive and significant. It implies that human capital has overall positive effect on economic growth. Further, it increases through the interaction of the institutional quality. In order to analyze in detail, we also estimate the indirect effects of human capital on growth through the channels of institutional quality. Our findings confirm that the indirect effects of human capital on growth are positive and significant through the channels of institutional quality. Likewise, the conditional effects of human capital on growth (taking quality of institutions as the conditional variable) are also positive and substantial. Thus, our findings are consistent not only with the studies which confirm the positive relationship between human capital and economic growth[12] but also the quality of institutions and economic growth (Gwartney *et. al,* 2006, Ahmed and Siddiqui 2011). Moreover, this study confirms a positive significant impact of the interaction between human capital and the quality of institutions

[12] (for example, Khan et. al, 2005; Eric and Bilge 2008; Maysam musai et. al, 2013)

on economic growth consistent with the Dias and Tebaldi (2011). However, we observe convergence in our model, which is consistent with the studies related to growth (Barro 1990 and Doppelhofer 2000). Further, openness and investment are found to have significant positive association with the growth (Harrison 1991 and Barrow 1996). We also find evidence that the increase in the level of government size and inflation are negatively allied to growth (Barro 1991, Fischer 1993, Barro 1996).

5.2 Policy Implications

Mostly in the developing countries, the economies have not yet flourished in true sense as it is supposed to be after elapse of considerable time period. The infra-structure to pave the way of economies has not yet grown/established to accelerate the pace. Although, the institutions with particular reference have not attained the quality which could play as catalyst on the other hand the human capital yet require a much more to get its due importance in particular reference to play its due and significant role to determine the economic growth. But, still the impact of these variables (the human capital and quality of institutions) is highly supported by many theoretical and empirical studies in relation to economic growth. Therefore, this study attempts to highlight the effect of human capital on economic growth in the presence of institutional quality (as the channel and conditional variable) and provide some evidence to justify the importance of human capital and quality of institutions for economic growth.

The overall findings point toward the direct impact of human capital on economic growth is positive and significant. Therefore, the policy makers of a country may focus towards the strategies that lead to raise the existing level of human capital. It is also evident from the results that the institutional quality exerts positive effect on growth. For that reason, importance must be specified for the establishment of all kinds of institutes. Eradication of corruption and bureaucratic

inefficiencies and bequest of competitive market may reduce hunger and poverty until count on the risk reducing institutions for that persistence may not be very rewarding. Even so, administering law and order and the reinforcement integrity arrangements would be operative merely if reinforced thru firming, struggle, along with political and civil rights. Further, this study may provide a guideline to the policy makers so that most effective and appropriate policies are formulated and implemented enabling to overcome the ever emerging problems related to decreasing level of human capital and poor quality of institutions. As already mentioned, the institutions diminish uncertainty and contract costs so that people can cooperate with confidence and ease. Appropriate institutions reduce transaction costs, a crucial element for modern societies, which inevitably rely on a complex division of labor and continuous innovation. It is observed that improved institutes correspondingly make available the nonmaterial profits and lead to insure the safety and expedite the collective contacts (Streit 1998).

Theoretical linkages along with considerable confirmation in our study place the preceding path of development by the succeeding perception, if the institutional structure does not exist or inefficient, at that juncture the progression of redistributing the skills and knowledge to the people (particularly the uneducated) might be extravagant thru worse proportions of the educational gains. This may grounds the skills or the knowledge accretion advancement to be deliberate, thus affecting long run economic performance. However, institutional progresses would reflect instantly in more knowledge conception via an improved rate of return to education. The speeding up of growth rate of human capital generates supplementary enhancements in the quality of institutions.

This study suggests that the countries may reform and improve their institutions progressively with time, consequently to accomplish high level of economic growth in future. Although, the institutional reform is undoubtedly strenuous as well as time consuming process but possess the everlasting financial, social, political and economic benefits. Further, it is ascertained that appropriate combination of policy measures effectively enhance the quality of institutions. For example, an appropriate combination social and economic policies help to decrease the corruption that further accelerate the economic growth. As we identify considerable subsidiary impacts of human capital on growth via the channel of quality of institutions. This stresses in lieu for the required state intervention leading towards the sustainable economic growth and development in the country. In this way a new dimension (through interaction) would be another source of rising the existing level of growth and development of the countries. Further, it is observed that the investment and openness are positively associated with economic growth. Thus, favorable environment for investment and sound trade policy are required to compete in globalized world. Moreover, governments may introduce such reforms which facilitate both the investors and investment. Conversely, government size and inflation adversely affect growth. This requires a comprehensive government policy for price stability and reduction of government expenditures specifically the non-developmental expenditures.

5.2.1 Suggestions for future research

With reference to our findings regarding the relationship among the human capital, quality of institutions and economic growth, some suggestions for the advancement in this research are as below:

- This study specifically incorporates the index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994) as the

proxy variable for human capital. A part from education there exists certain other aspects of human capital such as health status and experience of the skilled labor force that could be included further to cover all the aspects regarding the measurement of human capital.

- This study is based on a sample of 90 countries (both developed and developing countries). The same analysis can be repeated separately on the sample of developed and developing countries for comparison. Most of the prominent studies on human capital, institutions and growth employ a mix sample of countries. So by using a separate sample, the issues and problems existing in these studies can be better examined.

- As the current study particularly highlight the role of institutional quality as the channel as well as the conditional variable to examine the human capital-growth relationship, further it can be extended by incorporating the impact of technological innovations or research and development (R&D) activities as the conditional variable instead of institutional quality. In this way it would be interesting to study the existing relationship among human capital, quality of institutions and economic growth in the presence of the above mentioned variables.

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Appendix

Table A-1 Data Description

S.No	Variable	Variable symbol	Description	Source
1	GDP Growth (annual %)	GROWTH	The log difference of real percapita Gross Domestic Product.	World Development Indicators (WDI, 2013) database
2	Human Capital	HC	The Index of human capital per person, based on years of schooling (Barro/Lee, 2012) and returns to education (Psacharopoulos, 1994)	Penn World Table version, 8.1
3	Government Stability	GS	An assessment of the government,,s ability to carry out its declared program(s) and its ability to stay in office, is based on government unity, legislative strength and popular support.	International Country Risk Guide (ICRG) published by the (PRS) Group
4	Socio economic conditions	SEC	This is an assessment of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction is based on unemployment, consumer confidence and poverty.	ICRG
5	Investment profile	INVP	This is an assessment of factors affecting the risk to investment The risk rating assigned is the Sum of, Contract Viability/Expropriation Profits Repatriation Payment Delays	ICRG
6	Law and order	LNO	This is an assessment of two components; i) strength and impartiality of the legal system, ii) popular observance of the law.	ICRG
7	Corruption	COR	This is an assessment of corruption within the political system. The most common form	ICRG

			of corruption met directly by business is financial corruption in the form of demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans.	
8	Military in politics	MIP	This is an assessment of military participation in government that may be a symptom rather than a cause of underlying difficulties. Overall, lower risk ratings indicate a greater degree of military participation in politics and a higher level of political risk.	ICRG
9	Ethnic tension	ET	This is an assessment of the degree of tension within a country attributable to racial, nationality, or language divisions.	ICRG
10	Institutional Quality	IQ	A composite index of institutional quality comprising seven components such as, GS, SEC, INVP, LNO, COR, MIP and ET	ICRG
11	Log of initial value of real per-capita GDP	LY	Real per capita GDP constant at US $ 2005	WDI (2013)
12	Government size	GOV	General government final consumption expenditures (% of GDP)	WDI (2013)
13	Investment	INV	gross fixed capital formation (% of GDP)	WDI (2013)
14	Openness	OPEN	Trade(% of GDP)	WDI (2013)
15	Inflation	INF	Inflation, GDP deflator (annual %)	WDI (2013)

Table A-2: Summary Statistics

Variables	Observations	Mean	Median	Minimum (min)	Maximum (max)	Standard deviation (Sd)
PID	2520	45.5	45.5	1	90	25.98431
Year	2520	1997.5	1997.5	1984	2011	8.07935
GROWTH	2426	1.768094	2.17711	-104.9744	65.062	5.5652
HC	2520	.8258837	.8788128	.1000103	1.286128	.2609491
GS	2503	1.985487	2.058388	0	2.484907	.3482527
SEC	2503	1.681169	1.791759	-.6931472	2.397895	.4887315
INVP	2501	1.935592	1.969906	-.6931472	2.484907	.3991417
MIP	2406	1.247949	1.386294	-2.484907	1.819158	.5838306
COR	2459	1.078121	1.098612	-2.525729	1.791759	.4857515
LNO	2497	1.227697	1.386294	-.8675006	1.791759	.4851311
ET	2482	1.303414	1.386294	-2.484907	1.791759	.4766015
LY	810	8.39821	8.17759	4.272493	22.59763	2.23657
GOV	2457	2.653216	2.690685	.7164347	3.998484	.3962726
INV	2437	3.012205	3.054749	.6933678	3.969137	.3356066
OPEN	2485	4.146611	4.150186	-3.863269	6.102689	.6518617
INF	2286	1.856853	1.808688	-13.49343	10.19488	-13.49343
IQ	2279	1.349071	1.385996	-1.225276	1.678939	-1.225276
HCIQ	2279	1.166651	1.214281	-.5179989	2.065167	.4723317

Table A-3 Correlation Matrix

The following table demonstrates the correlation of each variable with all the corresponding variables. (Figures in parenthesis are P values)

	Growth	HC	IQ	LY	GOV	INV	OPEN	INF
Growth	1.0000							
HC	0.0908 (0.0000)	1.0000						
IQ	0.0005 (0.9806)	0.5424 (0.0000)	1.0000					
LY	0.0404 (0.2792)	0.5750 (0.0000)	0.4882 (0.0000)	1.0000				
GOV	-0.0855 (0.0000)	0.3144 (0.0000)	0.3144 (0.0000)	0.3576 (0.0000)	1.0000			
INV	0.2788 (0.0000)	0.3366 (0.0000)	0.3038 (0.0000)	0.2874 (0.0000)	0.1225 (0.0000)	1.0000		
OPEN	0.0711 (0.0000)	0.2442 (0.0000)	0.3132 (0.0000)	0.2408 (0.0000)	0.2054 (0.0000)	0.1912 (0.0000)	1.0000	
INF	-0.0810 (0.0000)	-0.3152 (0.0000)	-0.3386 (0.0000)	-0.2387 (0.0000)	-0.2974 (0.0000)	-0.2548 (0.0000)	-0.2676 (0.0000)	1.0000

Table A-4 Construction of the composite index of institutional quality

. . pca lgs lsec linvp lcor lmip llno let

Principal components/correlation

Number of obs = 2365

Number of comp. = 7

Trace = 7

Rotation: (unrotated = principal) Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.4928	2.38973	0.4990	0.4990
Comp2	1.10307	.226682	0.1576	0.6566
Comp3	.876387	.371132	0.1252	0.7818
Comp4	.505255	.0500781	0.0722	0.8539
Comp5	.455177	.128117	0.0650	0.9190
Comp6	.32706	.0868067	0.0467	0.9657
Comp7	.240253	.	0.0343	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Unexplained
lgs	0.3085	0.6828	0.0035	-0.0136	-0.4564	0.1922	0.4395	0
lsec	0.3972	-0.1971	-0.3741	0.6000	0.3645	0.0369	0.4114	0
linvp	0.3901	0.4111	-0.3870	-0.1114	0.3008	0.1016	-0.6448	0
lcor	0.3745	-0.5097	-0.0255	-0.0084	-0.4961	0.5494	-0.2266	0
lmip	0.4112	-0.2198	-0.0122	-0.7553	0.2716	-0.1038	0.3569	0
llno	0.4482	-0.0899	0.1617	0.1599	-0.3413	-0.7658	-0.1908	0
let	0.2910	0.0990	0.8266	0.1768	0.3633	0.2287	-0.0819	0

. gen iq7=0.3085*lgs+0.3972*lsec+0.3901*linvp+0.3745*lcor+0.4112*lmip+0.4482*llno+0.2910*let

A- 5 Scree plot