ROLE OF INSTITUTIONS IN GROWTH CONVERGENCE

A CROSS-COUNTRY ANALYSIS

By

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DEPARTMENT OF ECONOMICS

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

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<u>CERTIFICATE</u>

This is to certify that this thesis entitled: **"Role of Institutions in Growth Convergence: A Cross-Country Analysis"** submitted by Mr. Muhammad Safdar is accepted in its present form by the Department of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

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DEDICATED TO

Allah Almighty

&

My Parents

My Father Lal Din (late)

My Mother Sakina (late)

(May Allah Almighty Blessed them in Jannah 'Aameen')

"Who are my actual sources of inspiration for their unwavering and unconditional love throughout my life & who dreamed about me to the level of excellence where I am standing today"

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL!

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Abstract

Growth theory has been a great focus in economic research. Our study is concerned with the evolution and change of institutions across countries over time based on the real per capita GDP. We focused on, whether contemporary differences in per capita income and institutional quality across countries have become wider or narrower? i.e. finding growth and institutional quality convergence, because theoretically institutions affect the growth of economy. Enormous literature regarding convergence of per capita GDP levels is available across countries, but neither theoretical nor the previous empirical literature provided any clear evidence of institutional quality convergence. Controversial analysis on catching-up hypothesis that "Why doesn't capital flow from rich to poor countries" by Lucas (1990), concludes three reasons which hinders the capital flow, namely; differences in human capital, external benefits of human capital and imperfect capital market. Kalemli-Ozcan et al. (2003) called it "Lucas Paradox". He argues two factors, which hinders the way of capital flow (I) differences in fundamentals of affecting production and (II) international capital market imperfections. Authors investigated that institutional quality is the most natural variable in explaining the "Lucas Paradox". We observed growth and institutional quality 'catch-up' across the world by presenting cross-section and panel data tests of convergence based on OLS estimates and 2SLS for the period 1984-2015 in six groups, categorized by IMF system. Result of panel data analysis and 2SLS shows the improvement in per capita GDP and institutional quality levels which means poor economies are catching-up the richer ones in both measures (growth & institutional quality), implies strong evidence of convergence within each group. The cross-sectional dispersion in both measures is also reducing overtime, implies strong evidence of sigma convergence within group and across the world. Dispersion in per capita GDP and institutional quality is diminishing overtime, implies strong evidence of sigma convergence across countries. We concluded that speed of convergence is significantly enhanced in both measures and data analysis by incorporating set of control variables, implies strong evidence of conditional convergence. Finally, we finished with that institutions are fundamentals to long-run growth and institutional quality convergence lead to growth convergence, within the group and across the countries.

Key Words: Convergence; Growth; Institutional Quality; Lucas Paradox

JEL Classification: O47; F43; E02

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

"Once one starts to think about economic growth, it is hard to think about anything else".

Robert Lucas (1988)

Economic growth remains a key factor in explaining the state's prosperity, performance and its inhabitant's standard of living. It is spurred by many indicators, and there may or may not exist growth convergence among the different economies of the world e.g. advanced, transition and developing. In addition, there are large differences in living standards across economies, but are not permanent e.g. *'Growth Miracles'* in East Asian Tigers (South Korea, Hong Kong, Taiwan, Singapore) and *'Growth Disasters'* in Argentina after 1960s.

Different growth theories given by renowned growth economists suggest a variety of indicators for economic growth. The fundamental model of growth theory, known as Solow-Swan (1956), predicts the *exogenous factors* (technology) as the foundation-stone of economic growth. Ramsey (1928) and Cass-Koopmans (1965) provided *endogenous determinants* for economic growth. However, new growth theories by Romer (1986 & 1992) and Lucas (1988) incorporated the role of human capital and R&D to model the question of economic growth. Finally, Aghim & Howill (1992) and Grossman & Helpman (1991) argue that technological progress results from R&D which further enhances growth. Neoclassical growth models for closed economies presented by Ramsey (1928), Solow-Swan (1956) and Cass-Koopmans (1965) argues that per capita GDP growth rates are inversely related to the initial points i.e. if economies are identical in terms of preferences and technology, then poor economies will grow faster than richer ones' due to law of diminishing returns, implies catching-up

process. Hall & Jones (1996, 1999) and Klenow & Rodriguez-Clarke (1997) suggest that there exist force which promotes convergence for per capita product and income levels in economies.

Barro (1991) argues that significant positive association exist between growth rate of real per capita GDP and initial human capital (proxy of secondary school enrollment rate) which implies less fertility rate and high ratio of physical investment to GDP, affected by massive level of human capital. Political stability enhances growth rates whereas market distortions deteriorate growth rates. The Analysis is consistent with neoclassical growth models such as Solow-Swan (1956), Cass-Koopmans (1965) that country's real per capita GDP growth rate is inversely related to its initial level, but especially if they share the identical preferences and technology (conditional convergence) then poor countries will tend to grow faster than richer ones' in terms of real per capita GDP, due to diminishing returns to reproducible capital. Economies with less capital to labor ratio embodies higher marginal product of capital catch-up than economies having more capital to labor ratio with less marginal product of capital, due to international mobility of capital and technology. The evidence is stable with Barro and Sala-i-Martin (1990), in terms of capital stock in Cass-Koopmans (1965) model, only if elasticity of marginal utility is constant. The catching-up hypothesis is inconsistent with cross-country evidence and shows only little correlation among real per capita growth rates with its initial product level.

No doubt growth theories and models explained by renowned growth theorists and economists, enlightened the fundamental causes of long-run growth, but there are many other factors affecting economic growth significantly. And key determinant of entire rest one are *'Institutions'* especially strong economic and political institutions (Global Competitiveness Report). A vast literature among the association of institutions and growth shows that institutions (economic & political) are crucial determinant to spur the growth process of the economy. Analysis of well-known economists shows that growth convergence exists only in economies where these institutions (economic & political) prevail as strong enough to control the factors which impede the growth process. Thus literature also

supports that institutions are the fundamental causes to long-run growth, affecting directly or indirectly.

"Institutions are the humanly devised constraints that structure political, economic, and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights). Throughout history, institutions have been devised by human beings to create order and reduce uncertainty in exchange".

Douglass C. North. (1991)

At an inefficient level institutions serve the interest of minority (Acemoglu & Robinson, 2006 & 2008).

"The domination of an organized minority, over the unorganized majority is inevitable. The power of any minority is irresistible as against each single individual in the majority, who stands alone before the totality of the organized minority. At the same time, the minority is organized for the very reason that it is a minority".

Gaetano Mosca (1939, 53)

Institutions perform in a variety of ways to spur the economic growth of an economy. Findings of well-known institutional economists strongly suggest that political institutions enhance growth (Acemoglu, Johnson & Robinson, 2001 & 2002; Easterly & Levine, 2003; Hall & Jones, 1999; Rodrik et al. 2002). Aidt (2009), Hall & Jones (1999) and Acemoglu, Johnson & Robinson (2001) found that corruption reduces growth in economies where good-governance and strong political institutions prevail. According to them, good-governance and institutional quality is pre-requisite for economic growth, development and standard of living. Acemoglu et al. (2004, 2008)) found that differences in economic development are due to differences in economic and political institutions, which in turn lead to differences in the prosperity across nations. Lastly, differences in per capita income are caused by differences in economic institutions, more than luck, geography or culture

(Acemoglu, 2009). Keefer & Knack (1997) and Knack (1996) found that ability of poor economy to catch-up the income levels of rich ones' is largely determined by the quality of institutions.

All of the above mentioned studies show that institutions are crucial determinant to economic growth across economies. We also have analyzed some studies regarding growth convergence to check the effectiveness of institutions toward the growth process.

Convergence hypothesis means how the poor economies will catch-up to richer ones' in terms of real per capita GDP because these can import the richer countries' technology without having the ability to re-invent it at high cost. The analysis is based on neo-classical growth model that *"Capital should flow from rich to poor countries",* due to law of diminishing returns to reproducible capital. Economies' having less initial capital stock bears the ability to grow faster than economies having bulk stock of capital. Economist suggest that country having initially low per capita income should have some *'Social Capabilities'* to absorb the technology of advanced economies, capital stock and access to global market for the purpose of catching-up.

The concept of conditional convergence holds in our neo-classical growth model of Solow-Swan (1956) in which all variables are fixed throughout the analysis and grows at constant rate towards steady state level. All developed economies; OECD, Japan prefectures, European regions and United States, follows the pattern of absolute β-convergence (Sala-i-Martin, 1996). Only the developing and poor economies explain conditional β-convergence, which strongly follows Solow-Swan model (1956). Barro and Sala-i-Martin (1992) also proved that absolute β-convergence holds only in case of OECD and United States, but not for the case of poor economies. And σ-convergence holds only for the East Asian Tigers; Taiwan, Singapore, Hong Kong and South Korea. *Neo-classical growth economists* argue in favor of conditional convergence, originated in Solow-Swan model (1956), but *endogenous growth theorists* are against the argument and thus support unconditional convergence.

We also have incorporated *controversial studies encountering convergence hypothesis.* Lucas (1990) made controversial analysis on convergence hypothesis that *"Why doesn't capital flow from rich to poor countries".* He says that puzzle of capital flows inadequacy can only be resolved by assuming identical marginal product of capital across nations. He made theoretically suggestions via logical reasoning that why marginal productivity of capital is low in poor countries relative to rich ones', and for that reasons they are not catching-up. He argues that *differences in human capital, external benefits of human capital* and *imperfect capital markets* are major factors hindering capital flow.

Firstly, differences in human capital shows that it's very tough and requires long-horizon to replace labor of poor country with efficient and skilled labor of rich country. All this lead to differences in constant (labor) and increasing return to scale (efficient & skilled labor). Therefore, differences in returns to scale imply differences in wage rate and marginal productivity of capital, which in turn hinders the flow of capital. *Secondly,* external benefits of country's stock of human capital are major factors creating hurdles in flow of capital, due to *zero spillover of knowledge* across national boundaries. Imply that it is beneficial only at local level e.g. single cities or even small neighborhood of cities. And if local knowledge spillovers are approaching unity this means that human capital differentials and their expected return ratios can be reduced between very rich and very poor countries. *Lastly,* capital market imperfection leads to the political risk e.g. political agreement between rich and poor countries has deteriorated trade and technology, conditionality's imposed by rich countries on poor ones' at the time of aid. However, *heavy private taxation* on capital inflows imposed by the poor countries is result of rising mistrust on foreign investors. In-a-nutshell, *political risk is the root-cause* of limited capital flow and speed of international factor equalization prices i.e. wage rates and return on capital.

Lucas (1990) basically made analysis on US and Indian economy in 1988 based on neoclassical growth model that *"Capital should flow from rich to poor countries".* He concluded that marginal

product of capital in India is 58 times higher than that of US; this means that capital should flow from India to US, but not happened in reality. He then tried to resolve the issue of differences in marginal productivity of capital by taking some assumptions, but all in vein. Kalemli-Ozcan et al. (2003) called it *"Lucas Paradox"*. They suggest that under the standard assumption, if countries are producing identical goods by utilizing identical factors of production and constant return to scale and if capital is free to flow then return to investment at any location should also be identical. However, Lucas (1990) shows somewhat different, but these assumptions can be grouped in two categories *(I) differences in fundamentals of affecting production* and *(II) international capital market imperfections* e.g. asymmetric information, which leads to reversal of capital flow direction relative to perfect information (Gertler & Rogoff, 1990), and political risk. First group is result of omitted variables of institution (Acemoglu, Johnson & Robinson, 1992), factors of production (King & Rebelo, 1993), government policies (Razin & Yuen, 1994) and property rights (Tornell & Velasco, 1992). The literature on institutions and economic development shows that countries with strong institutions (secured property rights, non-corrupt government, and managed rule of law) invest more in physical and human capital, practice the factors efficiently and achieve high growth. The authors investigated that *institutional quality is most natural variable in explaining Lucas paradox.*

They have empirically concluded that *human capital* and *asymmetric information* plays crucial role as the major determinant of capital inflow, but government policies can't fully account for the paradox. They indicated that *institutional quality* is the major pillar to shape international capital flows for the period (1971-98), because it not only attract foreign capital but also enables the host economies to maximize benefit from such investment, consistent with analysis of North (1981, 1994), Hall & Jones (1999), Acemoglu, Johnson & Robinson (2001, 2002). Lastly, *government stability, bureaucratic quality, non-corrupt behavior of government, law and order* play pivotal role in explaining the lack of capital flows from rich to poor countries.

However, *opposite policy responses to Lucas paradox* are also presented. For example, human capital to explain *Lucas paradox* may paly role in the transfer of capital goods from rich to poor countries would be offset by reducing private foreign investment OR by increasing investment in poor countries. And of course, asymmetric information may lead to crowding-out of investment by decreasing collateral wealth of domestic entrepreneurs.

Finally, we reach to conclusion that beside many core determinants, institutions play crucial role in the long-run determination of output. Literature shows evidence of growth convergence (non-convergence) exist across different countries and states, based on their level of institutional quality. Therefore, poor institutional quality would eventually catch-up the institutional quality of advanced economies in terms of *rule of law, bureaucratic quality, non-corrupt government and legal system and property rights.* Hence, theoretically institutional quality convergence leads to growth convergence.

1.2   Historical Research Gap/Objectives of the Study

History shows that economists and policy makers had tried their best to point-out the core foundations of economic growth. They have proved that growth is spurred by many indicators and there exist unconditional growth convergence among the developed countries and states, but convergence of all types doesn't hold in single economy due to prevalence of diverse factors in those specific states and countries. Literature illustrates theoretically that institution significantly spur growth of the economy, but history fails to argue empirically that growth convergence is caused by institutional convergence, a major source of exploration. The argument remained unsuccessful due to this flaw, thus our core objective is to empirically investigate how the institutional convergence lead to growth convergence. One of the objectives of this study is to present a brief historical review on economic growth and convergence research. We'll find that how the gap of income levels between poor and rich economies and poor and high quality institutes will be minimized *(growth convergence,*

institutional convergence) due to institutional effect on growth of the economy. Imply that how poor institutional quality would eventually catch-up the institutional quality of advanced economies in terms of *rule of law, bureaucratic quality, non-corrupt government and legal system and property rights.*

1.3 Research Questions

This study will empirically address the following research questions: exist

- Does there exist "Growth Convergence" among the selected countries?

- Does there exist "Institutional Convergence" among the selected countries?

- Does "Institutional Convergence" lead to "Growth Convergence" among the selected countries?

1.4 Organization of the Study

Rest of the study is organized as follows; Chapter 2 provides short overview about the importance of Institutional Quality Convergence with the supportive mechanism of *The Global Competitiveness Report* prepared by *The World Economic Forum* for the reason that *'Why we may expect Convergence in Institutional Quality' (and why we may not)*? Chapter 3 discusses brief literature of the previous studies. Data, variables description and results of descriptive statistics are expressed in Chapter 4. Estimation methodology and theoretical background of the study is defined in Chapter 5. We discussed the empirical results of models in Chapter 6. Lastly, Chapter 7 concludes whole study.

CHAPTER 2

Why We May Expect Convergence in Institutional Quality (and why we may not)

Should we expect convergence in institutional quality across countries? Theories of convergence have not yet given us any clear answer about the possibility of institutional quality convergence across the economies, but a little-bit evidence is evident. However, by taking into account *exogenous factors* affecting the institutional quality in many of the countries e.g. *strict conditions* imposed by *International Monetary Fund* (IMF) and *World Bank* on the aid recipient nations, *globalization, war incidents* and *influence of the former colonial powers.* And, *endogenous factors* e.g. *institutional reforms* within the states by the actors of state residents to change institutions in strategic interaction. Increasing globalization leads to institutional quality change, caused by improved level of exchanging ideas, which further encourages *Foreign Direct Investment* (FDI). And will result in adoption of excellent rules and regulations and transfer of legal knowledge, which improves the institutional quality at national and international level, implies convergence, (La Porta, Lopez-de-Silanes & Shleifer, 2008). Increased share of FDI in GDP leads to lower level of corruption and improved level of institutional quality for a broad cross-section of countries, (Larrain & Tarres, 2004). *The structural adjustment programs,* in Africa and Latin America since 1990s, pressurized from IMF and World Bank to adopt the *western-style market institutions* implies higher speed of institutional quality convergence in developing countries rather than developed ones', due to the less marginal space of institutional reform in developed nations. And, it's true for transition economies at the end of *Cold War.* The decade of institutional reform was followed by the end of Cold War in the early 1990s, as *non-socialist* developing and transition economies adopted similar production and exchange mechanism which found to be based upon privatization and deregulation. However, the developing and transition economies didn't deliver the expected results of institutional reform due to existing social and cultural context and not good capabilities of nation's government to adopt western-style

market institutions, implies weaknesses of policy makers, (Chang, 2007; Evans, 2004; Khan, 2012, Roland, 2004). Besley & Persson pointed-out that the incidents of war provides the incentive to invest in fiscal and legal institutions due to common interest public goods e.g. *defense*. Differences in institutional quality are due to differential colonial policies adopted by colonizers e.g. European colonizers set-up *extractive institutions* (a major determinant of economic development) where they didn't migrate and settle (Asia, Africa) and European like *inclusive institutions* where they did settle (North America).

Now coming to the *endogenous mechanism* of institutional quality convergence, we apply the law of diminishing returns to institutional quality as it was for real per capita GDP convergence, because every next unit of institutional reform is easier and less costly to attain. For example, in poor rule of law economy it's relatively easier for an economy to guarantee some basic order rather than implementation of rule of law to tackle *cybercrime* in developed economy. The literature suggests that the strategic interaction of elites and non-elites hinders the way of change in institutional reforms. The rich (poor) can't commit to compensate the poor (rich) after old rules have been replaced with new ones' (Acemoglu, 2003; Bardhan, 2005) implies persistence of bad institutions. Acemoglu & Robinson (2006, 2008 & 2012) argues that political elite always hinders the way of institutional reform due to maintaining of political power and distribution of resources.

Similarly, it is very difficult to switch from a state of massive level of corruption and poor economic development to a state of less level of corruption and massive level of economic development, (Blackburn, Bose & Haque, 2006), implies strict complementarity and trade-off between corruption and economic development. The literature suggests that we have no clear and unambiguous answer of institutional quality convergence due to difference of speed of institutional change in economic and political institutions. For example, economic institution may need a long horizon to evolve due to

implementation of rule of law, property rights and many other standards. However, political institutions change frequently e.g. *democracy to dictatorship.*

Introducing *The Global Competitiveness Report* (GCR) prepared by *The World Economic Forum (WEF)*, define *competitiveness* as the *set of institutions, policies, and factors that determine the level of productivity of an economy,* which in turn sets the level of prosperity that the country can achieve. The productivity level also determines the rates of return obtained by investments in an economy, which in turn are the fundamental drivers of its growth rates. In other words, a more competitive economy is one that is likely to grow faster over-time.

Global Competitiveness Index (GCI) shows progress in building and enabling environment for innovation for the advantage of only few economies. In addition, future growth will also depend on the ability of economies to safeguard the benefits of openness to trade and investment that has led to record reductions in poverty rates in recent decades. Against this background, this *Report* serves as a critical reminder of the importance of competitiveness in solving both our international macroeconomic challenges and laying the ground for future prosperity. Recovering growth in the context of *The Fourth Industrial Revolution* will require the recognition that policymakers need a shared assessment and understanding of the future sources of competitiveness. By reducing complexity and providing a tool to identify strengths and weaknesses and track progress, *Report* serves as a means to inform conversation and to support policymakers, businesses, and civil society in their development of a shared long-term vision.

The GCI combines 114 indicators that capture concepts that matter for productivity and long-term prosperity. These indicators are grouped into 12 pillars (Figure 1): *institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation.*

These pillars are in turn organized into *three sub-indexes: basic requirements, efficiency enhancers, and innovation and sophistication factors.* The three sub-indexes are given different weights in the calculation of the overall Index, depending on each economy's stage of development, as proxies by its GDP per capita and the share of exports represented by raw materials.

Many of the competitiveness challenges we see today stem from the aftermath of the *financial crisis.* Today, productivity and growth are not picking up in advanced economies, and the consequences of low and even negative productivity growth in many emerging economies are now evident. The great recession led many advanced economies to implement very loose monetary policy, which in turn fueled a global commodities boom that masked many of the competitiveness challenges of commodity-exporting emerging markets.

Figure 1: The Global Competitiveness Index framework

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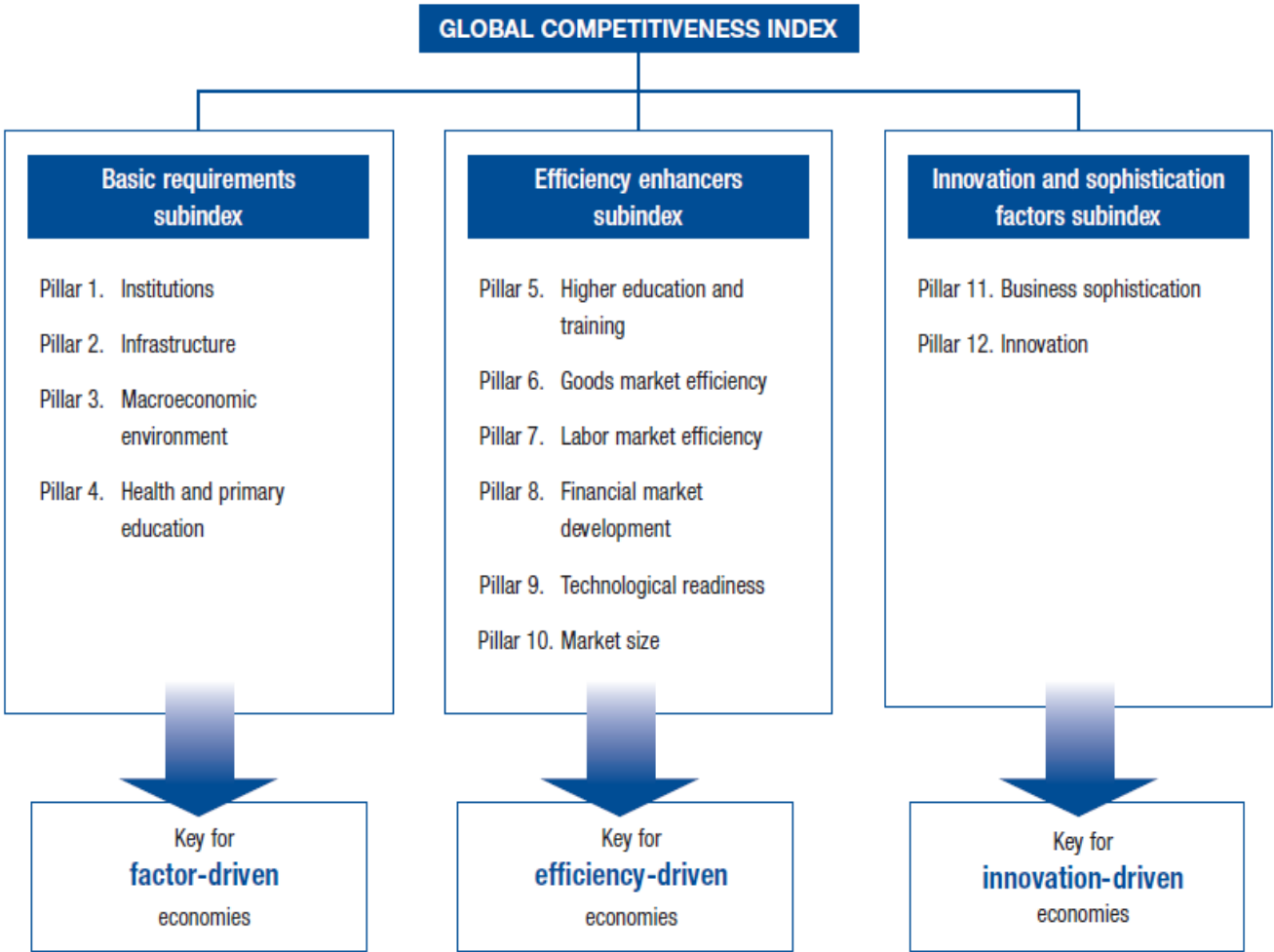
INSTITUTIONAL PERSPECTIVE

The institutional environment of a country depends on the efficiency and the behavior of both public and private stakeholders. The legal and administrative framework within which individuals, firms, and governments interact determines the quality of the public institutions of a country and has a strong bearing on competitiveness and growth. It influences investment decisions and the organization of production and plays a key role in the ways in which societies distribute the benefits and bear the costs of development strategies and policies.

Good private institutions are also important for the sound and sustainable development of an economy. The 2007–08 global financial crises, along with numerous corporate scandals, has highlighted the relevance of accounting and reporting standards and transparency for preventing fraud and mismanagement, ensuring good governance, and maintaining investor and consumer confidence.

CHAPTER 3

REVIEW OF LITERATURE

Growth theory remains a great focus in economic research. Economic growth remains a key factor in explaining state's prosperity, performance and its inhabitant's standard of living. No doubt growth theories and models explained by renowned growth theorists and economists enlightened the fundamental causes and variety of indicators for long-run economic growth. However, many other factors affect economic growth significantly and the key determinant of the entire rest one are *'Institutions'* especially strong economic and political institutions. Enormous literature among the association of institutions and growth shows that institutions (economic & political) are crucial determinant to spur the growth process of an economy. Therefore, we'll proceed to see if institutions are crucial determinant to economic growth then whether institutional convergence would lead to growth convergence? is the focus of our study. There is huge literature expressing strong relationship between institutions and economic growth, suggested by different institutional economists and growth theorists. However, we have divided the literature into three parts:

3.1   Literature on Institutions and Economic Growth

3.2   Literature on Real Per Capita GDP Convergence

3.3   Literature on Institutional Quality Convergence

3.1   Literature on Institutions and Economic Growth

We have discussed immense literature on association between institutions and economic growth, which at one side favors *neo-classical growth models* and at on the other hand supported *new growth theories*. Acemoglu and Robinson (2008) argue that output per-capita in an economy or society is diligently related to amount of human and physical capital and access of technology, including the

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ability of society to improve these factors. Imply that technological differences refer not only to techniques available but also the organization and efficient use of available resources. They had also argued that differences in economic institutions are core determinants of differences in prosperity across economies. The political nature of an institutional equilibrium refers to problematic mechanism in terms of reform and support of good economic institutions to resolve the problem of development and poverty. Acemoglu et al. (2004) found that differences in economic development are due to differences in economic and political institutions. Author claims that economic institutions encourage growth only when political institutions allocate power to groups with interests in broad-based property rights enforcement, effective constraint on power-holders and elites, and when few rents to be captured by power-holders/elites of the society. Institutions, culture and geography are the variables which determine the long-run growth rates, (Acemoglu, 2009). Tabellini (2010) found that there is strong association among past political institutions & low literacy rate, and cultural legacy & current economic performance. In some cases legal institutions do not matter (Acemoglu & Johnson, 2005), due to endogeneity between institutions and economic growth and substantial quality overlap between legal institutions and property rights institutions. Good governance is pre-requisite for sustained increase in standard of living, advocated by growth theorists, development experts and aid donors (Knack; Democracy, Governance & Growth). Imperfect understanding of how politics shapes governance and developmental outcome is a major difficulty to the field of governance. Empirical finding show that democracy is inefficient system for developing economies, which strictly requires developmental dictatorship for economic growth in those economies (Gregor, 1979). The research indicates that to reap the benefits of democracy long horizon is mandatory for a full democratic state. Hence, democracy can enhance growth only where sustainable level of development has been achieved, implies strong democratic institutions are needed. Increased tax collection, GDP per-capita, and decreased military spending have better potential to enhance institutional quality in Thailand, Bangladesh, India, Pakistan, Philippines and Srilanka. However, an increase in the level of education,

tax collection and trade openness have better potential to enhance the institutional quality in China, Malaysia, Singapore, South Korea and Indonesia. Research on corruption by the experts, policy makers, economists and research scholars depicted two types of the people in the world; *'Sanders'* *and 'Greasers'*. First one are *'Sanders'* whom believe is that *corruption is an obstacle to economy's* *development* (Murphy et al. 1993 & Mauro, 1995) due to low income which further enhances poverty traps (Andving & Moene, 1990 & Black-burn et al., 2006, 2008) and corruption according to this view *'sands' the wheels of development and causes difficulty for economic and political transitions,* *including payment of bribes* e.g. Peru in 1990s. And, *'Greasers'* believing that corruption can (in some cases) *'greases' the wheels of economy's development and foster growth* (Leff, 1964) e.g. corruption facilitates beneficial trades (not exists in reality), promotes efficiency in private sector to evade the pre-existing government failure e.g. speed money paid to government officials by business peoples in order to speed-up the bureaucratic procedures. Aidt (2009) concluded that corruption reduces growth at the margin (at least in the societies) where good governance and strong political institutions prevail. He argues that sustainable improvement in human welfare is only refers to development, and hence GDP per capita is not a good measure of welfare. *Trust, respect for others* *and confidence in individual self-determination* were the individual indicators of values and belief to measure culture and literacy rate at the end of the 19th century, and *political institutions* are the two historical variables used as instrumental variables. Therefore, Tabellini (2010) shows strong correlation among culture and current regional economic development (endogenous today) after controlling for national effects contemporaneous education and urbanization rates around 1850 (Hall & Jones, 1999; Acemoglu, Johnson & Robinson, 2001) which favors strong political institutions; especially institutions which protects property rights. Aldashev (2009) made analyses to fundamental question of development economics, *'Why some economies are so much richer than others'?* He argues that it does not constitute a single-cause answer but a host of inter-related factors affecting the efficiency of the allocation of resources which in turn derives the long-term differences in economic

performance across economies. Glaeser et al. (2004) suggest that these are political institutions that cause growth, consistent with finding of Acemoglu, Johnson & Robinson (2001 & 2002), Easterly & Levine (2003), Hall & Jones (1999) and Rodrik et al. (2002). Otherwise, it is growth and human capital accumulation which lead to institutional development, proved by Symour Martin Lipset (1960). The authors concluded that human capital is a major determinant of economic growth rather than institutions, and good policies (often pursued by dictators) derives the poor economies out of poverty trap, implies advances in political institutions (Djankov et al. (2003). Dellepiane-Avellaneda (2010) found that governance matters to economic development, evidence is consistent with estimates of Douglas North & Mancur Olson. Cervellati (2008) argues that for the implementation of law, democracies are neither necessary, not sufficient. Hence suggest that all groups support the efficient oligarchies which can emerge and persist for the longer periods. Zakaria and Fida (2009) investigated the weak and negative association between democracy and output growth in Pakistan. They suggested that democracy influences output growth, but indirectly through positive connection to physical and human capital, government consumption, trade openness practices and inflation (except for rising oil prices in 1970s), consistent with the findings Kurzman et al. (2002). Eregha and Mesagan (2016) concluded that growth of per-capita income was insignificantly enhanced by institutional quality, a big question to institutional quality. He also suggested that strength of institutional quality is known by its authority to restrict rent-seeking behavior. Murphy & Vishny (1993) says that rent-seeking, poor protection of property rights and market imperfections are bad and so costly to growth. They explained two reasons that why rent-seeking is so costly to growth. Firstly, rent-seeking exhibits naturally increasing returns and an increase in rent-seeking activity leads to more attractive productive activity which in turn creates bad multiple equilibria with high rent-seeking and low level of output. Secondly, the public rent-seeking hurt innovative activities with high intensity than the everyday production, implies hampering growth more severely than production. Their results coincide with Acemoglu (1992, 1995), Murphy et al (1991) and North (1981). They argued that rent-

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seeking leads to unproductive activities which creates negative externalities for productive agents. Plekhanov et al. (2014) studied the determinants of the quality of economic institutions, especially democratic institutions, e.g. control of corruption and rule of law as a potential determinant. They found that economic institutions tend to be better in economies more open to trade and financial inflows and natural resource abundant. In shaping economies, economic institution, history and culture play pivotal role. Jose and Carlos (2004) suggested that static & dynamic efficiency, credibility & predictability are the major determinants to affect institutional quality. The historical features e.g. colonial origin, geographical location or legal system doesn't matter for institutional quality but the ethnic fragmentation and natural resource abundance, via income distribution and decreasing tax revenue. The development level which foster growth, tax revenue and education affect directly and creates virtuous circle between growth and institutional quality. Islam and Montenegro (2002) found that trade openness is positively related to institutional quality. The export of natural resources in bulk quantity refers to poor institutional quality, but natural and policy measures of trade openness are important. They concluded that income inequality and ethnic diversity are not associated with institutional quality. Finally, the freedom of press and checks and balance, on every shock (endogenous & exogenous) to the economy, are important and positively affect the institutional quality. Isace and Oasis (2013) suggest that institutional quality is positively affected by the intelligence (IQ) e.g. government efficiency, regulatory quality, rule of law, political stability and voice and accountability. Therefore, better government institutions are the results of higher average IQ. Moreover, economic growth is enhanced by the positive effect of higher population IQ and institutional quality. Nadeem and Naveed (2011) found that increase in the efficiency of tax system, education level, international trade openness, per-capita income and decrease in debt level, have the potential to improve the institutions in short-run. Moreover, decrease in military spending and increased check & balance over the political elite further improves the quality of institutions for longer periods.

Savoia et al (2009) found theoretically as well empirically that exploitative and inefficient institutions are always the product/outcome of societies with no manners and values, inequality, unsecured property rights, and ensures no law and order. Savoia et al (2014) argues that in short term institutions are the important factor to capture legal, bureaucratic and administrative quality for policy maker in post-2015 development agenda. They have concluded that governance in long-run needed institutional quality support at national and international levels. Savoia et al (2013) says that there exist strong positive relationship among income inequality and protection of property rights due to political power of the dominant class in developing economies. Savoia et al (2009) suggested two paths for low-income countries to come out of poor governance and low income. Firstly, institutional quality despite of low income may result in governance surplus, which further enhances economic growth. Secondly, achieving high growth despite of poor governance further enhances demand for better institutions of governance, implies governance as main hindrance to growth, instead of the facilitator. They concluded that Bangladesh's social development indicator has improved significantly instead of systematic governance failure, high corruption, natural resource disaster, land scarcity and liberation war, Mahmud et al (2009) called it *'development surprise'* and Savoia et al (2009) says it an *'outlier'*. Imply that governance improvement may hinges on countries development. Acemoglu et al (2000) argue that Europeans setup inclusive institutions (with great emphasis on private property rights and checks and balance against government expropriation) where did they settle facing low mortality rates, and extractive institutions (with no protection of private property rights and no checks and balance against government expropriation) where they didn't settle facing high mortality rates. They pointed out that potential settler is pre-requisite of settlements which forms the basis of early institutions, which clues current institutions and thus indicates current economic performance. North et al (1989) says that sudden after Glorious Revolution of 1688, institutions allowed the government to credible commit for upholding property rights e.g. evidence of capital markets. Acemoglu et al (2006) concluded that elite follows the 'Iron law of oligarchy' when

there is change in political institutions to save their identity which can go hand-to-hand with policies and economic institutions. Acemoglu et al (2008) argue that economic institutions evolved due to political institutions which alter the distribution of political power. They also concluded that it may create investment opportunities to offset the change in political power which may persist overtime. Moe (2005) found that there exists no cooperation or mutual benefit for the people affected due to political power and rules of the game involved in the creation and design of the democratic institution. Acemoglu et al (2008) argue that urbanization and population density (proxy for economic prosperity) leads to the rich colonial regions of Europe 1500 years ago into relatively poor. Imply negative impact of geography prevail in the region causing institutional reversal. Acemoglu et al (2013) argue that limited inequality and comprehensive social welfare system leads to higher growth on average. However, capitalism structure of the societies, domestic constraints and unions of political parties hinders the way to opt for the same institutions. Acemoglu et al (2005) says that rise of Western Europe after 1500 is purely the result of trade with new world, Africa and Asia via the Atlantic Ocean, which affected directly and indirectly through institutional change. Aron (2000) suggest significant positive association between institutional quality, investment and growth. North says that weak institutions reduce the efficiency of investment by directly affecting growth. And indirect effect of weak institutions on growth is caused by decline in investment due to increase in transaction costs via bribes and *rent-seeking* (consistent with Solow model). Hussain (2013) argue that route cause of Pakistan's sustained growth lies in economy's institutional structure and governance. He found that low domestic saving rate, poor exchange rate, elite class domination (excluding minority), inequality, mass poverty and disincentives for savings, inefficiency in innovative and international competitiveness are major constraints to sustained growth. Easterly et al (2000) says that policy and institutional quality are endogenous factors which build constraints to policy reforms and affecting standard of living of poor class implies good politicians association with bad policies due to their personal interest. Easterly (2006) argues that institutional quality is purely

and endogenously determined by ethnic tensions and income inequality, implies long-run growth determinants of growth. Porta et al (2004) found that human capital is a main source of growth as compared to institutions and poor economies can get out of poverty trap only through the implementation of good policies (often pursued by the dictators) which in turn improve the political institutions of respective poor states. Gwartney et al (2003) an index (different from 15 years ago) which measures the consistency of nation policies and institutions with economic freedom. They have found that personal choice, voluntary exchange, freedom to compete and protection of person and property are the key ingredients of economic freedom. Dollar et al (2002) investigated that trade and institutions jointly play very crucial role for the long-run growth, but trade is so persuasive in short-run. They also concluded that countries with better and massive investment in trade grow more rapidly than the rest ones. And also the economies embodying better institutions tend to trade more. Qazi et al (2010) suggest strong association among institutional quality and growth and argues that anti-rent seeking technologies impact growth more than *risk-reducing technologies* consistent with the results of Acemoglu and Johnson (2005) termed as *'property rights'* and *'contracting'* respectively. Przeworski et al (1993) says that political institutions do matter for growth but doesn't capture the relevant difference of real per capita GDP across states in terms of regions. They found ambiguous answer of democracy that whether it hinders or fosters growth by considering indirect impacts of regimes on growth e.g. via investment and public sector size. Rodrik (1994) argues that policies which maximize growth causes solely and purely about capitalists because of optimal response of government. The result shows that higher taxation rate and lower growth are caused by inequality of wealth and income. Scully (1988) concluded that efficiency and growth rates are significantly caused by institutions. He found that politically open societies grow at three times the rate and two and one-half times efficient compared to societies banned from economic and political freedom. Alesina (2003) says that state borders are man-made institutions which evolve overtime due to different size of countries and role of national government. He concluded that trade-off among size

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of benefits, economies of scale, externalities and military strength is useful perspective for political borders. Slive (2015) argues positive association among quality of economic institutions and innovation which in turn enhances long-run growth. The economies grow faster in long-run which has high level of innovation caused by quality institutions. Masuch et al (2016) found that quality institutes are pre-conditions for catching-up in Europe and fixed exchange rate economies, but not for flexible exchange economies due to fluctuations in that economy caused by flexible exchange rates. Commander (2010) indicates significant and robust link among the measures of institutions and economic performance. Bart et al (2004) concluded that institutions affect very weakly to per capita GDP in the presence of geography and trade which is strongly influenced by institutions itself. Flachaire et al (2011) argue that political institutions tends to be deep cause of economic development indirectly affecting growth of economy by their impact on policies in that specific regime. However, economic institutions directly affect growth rates of the economy in each regime. The finding coincide with Hall & Jones (1999), Acemoglu et al (2001), Easterly & Levine (2003), Barro (1996), Persson (2004) and Persson & Tabellini (2006).

3.2 *Literature on Convergence of Real Per Capita GDP*

Human capital plays special role in number of endogenous growth theories models such as Romer (1990), Nelson and Phelps (1996) suggested that human capital is the key input to research sector which generates new product or ideas that underlie technological progress. Therefore, countries having more initial human capital will experience high rate of introduction of new goods and hence will grow faster. They argued that huge human capital stock absorbs new products and ideas and grow faster and catches up more rapidly to technological frontier. Quah (1995) investigated persistence immobility of capital and polarization as dominant features of cross-country income dynamics. These empirics shows that growth miracles always occur with regularity strictly contrasting with the evidence of Barro and Sala-i-Martin (1992), Sala-i-Martin (1994) which explains

2 per cent speed of convergence across states. Barro & Sala-i-Martin (1991) argue that there exists convergence across sectors, states and 73 regions of Western Europe on aggregate level but speed of convergence is approximately 2 per cent per year, implies distance to the steady state is halved after 35years, which is very low. Barro and Sala-i-Martin (1992) provide clear evidence of convergence of all US states, after holding constant a set of control variables affecting long-run growth, implies strong evidence of conditional convergence. However, the speed of conditional convergence is little bit high when compared with the unconditional one. Barro (1991) found that there exists strong positive association among growth rate of real per capita GDP initial human capital, but negatively with initial level of real per capita GDP, implies strong evidence of convergence in a cross-section of countries. Share of government consumption in GDP and market distortions exhibit negative relationship, but political stability affect growth positively. Barro et al (1995) suggest that in an open economy version of growth model, by incorporating the role of capital (financed by domestic savings) higher rates of convergence will prevails. Helliwell (1992) found no net effect of democracy on subsequent economic growth due to various issues in the economy. Easterlin (1981) found that speed of technological knowledge to small elite, instead of mass education, hinders the way of whole world development. Easterly et al (1993) argue that shocks to terms of trade and technological change are the core determinants of long-run growth, instead of education levels and political stability. Abramovitz (1986) state that differences in productivity levels across countries solely depends upon social capabilities of the states to absorb advanced technologies. And education and organization leads to slow but long-run development of institutional and human capital. De long (1988) concluded that forces of divergence are stronger than convergence which casts doubt on technology as a long-run factor of growth. He strongly acclaimed the argument of Romer (1986) that relative income gaps among rich and poor countries are widening. Alesina et al (1996) says that there exist significant negative association between political instability and growth. Weingast (1997) says that game-theoretic approach to resolve the problem of political officials respect and policing of rights is

hindered by asymmetries entered into the process of coordination among the citizens. However, democratic stability in Glorious Revolution of seventeenth century England and elite pacts and plural societies are the main examples of institutional change. Weingast (1995) argues that secure political foundation plays pivotal role in the limited governance which in turn forms strong political institutions for the protection of property rights and contract enforcement in order to confiscate the wealth of state citizens. He states that by adopting this mechanism the west e.g. England (18th century) and USA (19th and 20th century) added a remarkable economic rise with critically focusing on federalism. Similar, factor underpins the economic growth in China over the past 15years. Quah (1993, 1996) argues that after World War II era, rich countries become richer, poor countries poorer and the middle class dies out.

How fast do economies converge?

The findings of Barro and Sala-i-Martin (1991, 1992), Barro (1991) and Mankiw et al (1992) predicts that economies converge to their balanced growth path with an average rate of 2 per cent a year, implies very low due to only one reproducible factors of production (FOP) i.e. physical capital. They concluded that human capital must be qualitatively identical to that of physical capital and also the elasticity of output with respect to all reproducible factors must be about 0.8 which is larger than physical capital alone. Although the results obtained are consistent with the neoclassical growth theory and model, but are based on some unrealistic assumptions. Evans (1997) made counter argument to this approach and states that results favoring neoclassical growth theory and model are consistent only in case of restrictive assumptions. However, an alternative approach produces consistent estimates under weak assumption. And states that speed of convergence is enhanced to 5.89 per cent a year for the sample of 48 countries, and 15.50 per cent a year for US states. Finally, the author concluded that only the weaker and realistic assumptions should be incorporated for purely approaching the growth theories and models. Alesina et al (1994) found strong positive relationship

among economic growth, capital accumulation political freedom and democratic institutions and negative among economic growth, political instability and income inequality. Khan (2012) says that growth is inclusive if it supports high level of employment and rising wages. Imply that achievement competitiveness in new sectors and technologies for developing nation's policies to support inclusive growth is needed e.g. political settlements and social orders, which are structural different across states in terms of political stability, governance, strategies and strong enforcement of property rights to tackle the market failures. Masoud (2014) says that neoclassical growth theory has improved the development of growth models. And there are many elements affecting growth in the long-run e.g. education, technology, education and government policies, capital accumulation. Barro (1996) found that higher level of initial schooling and life expectancy, lower inflation, less government consumption, political freedom, improved terms of trade and rule of law, and democracy has strong positive influence on the standard of living on a country's prosperity, implies long-run determination to overall economic growth. He concludes that effect of democracy on economic growth, after controlling for all the long-run determinants of economic growth, is weakly negative. The subjective indices of political freedom e.g. growth and democracy follows the pattern of enhanced standard of living e.g. health, improved GDP and human capital, to substantially enhance the political freedom and in turn growth. Beyaert (2003) says that there exists strong evidence of convergence of real per capita GDP due to their mean reverting property of per capita output. Acemoglu et al (2000) found that countries having more distance from the equator or lying in Africa have high income levels, due to low temperature. The augmented Solow model by Romer, Mankiw & Weil (1992) exhibited the role of human capital for long term economic growth assuming identical technology across economies OR taking technological differences as residuals for growth. However, Hall & Jones (1996, 1999) and Klenow & Rodriguez-Clarke (1997) suggest a strong association among productivity levels and output per worker, which casts doubts on the conditional convergence scenario. Colvin and Darbishire (2009) examined the study of Anglo-American countries; US,

Canada, UK, Ireland, Australia and New Zealand to check the convergence among these economies, due to large variations across the economies. They showed that there exists growing convergence at the current state of employment relation among the six economies in labor rights toward private ordering of employment relations. Skidmore and Deller (2008) suggest that competition at regional level leads to convergence of per capita output for factors of production (FOP). And empirical finding shows strong evidence for the convergence of government spending at the local level. Balcerowicz (2007) found that borrowing and adoption of broadly-defined technologies, stemmed from the advanced economies, are the proximate cause of convergence and to explain the differences among economies real income levels. Knack and Keefer (1998) analyzed the predictions of the early neoclassical economists that due to technological advances and diminishing returns, the poor economies would grow faster than the wealthy ones'. But in reality the poor economies are falling back than the rich ones' rather than catching-up. Richard and Grace (2012) empirical found that the designed test-cities of China in its state policy on 10th five year plan (not others) made some progress at the local level but a little bit at the national level, implies weak evidence of convergence. Quah (1996) suggests that poor economies become poorer; rich ones, richer; and the middle class die out. And shows that exist comprehensible convergence across U.S states. Cross-country differences divergence in the world economies dominates 2% speed of convergence; hence implies huge differences in income levels across the world economies. Khorshed (2004) shows no evidence of absolute β-convergence and σ-convergence; implies the increasing dispersion in real income levels for the SAARC sample. However, weak evidence regarding the conditional β-convergence occurs, for the short period only. Postiglione et al. (2013) found that 19th century shows the strong evidence of convergence, due to the globalization phenomena. The empirical result strongly rejected the absolute β-convergence hypothesis, but evidence supports conditional β-convergence for the Middle East and North American (MENA) countries. Rassekh et al. (2001) argues that convergence in the OECD economies after the postwar period occurs through investment, government consumption and export.

Nguyen-Van et al. (2011) found that there exist non-linearity and heterogeneous growth, implies no convergence for low and high income regions, except for medium income regions. Cunado (2011) shows no strong evidence of conditional convergence for OPEC economies towards U.S economy. Lee (2009) shows long run productivity convergence exists in trade and FDI related activities in OECD economies. Empirics also indicate that grouping leads to more significant evidence for trade patterns, which dominates FDI patterns, in terms of speed of convergence. Overall analysis proved that trade is more important than FDI. Beyaert (2003) empirically found no evidence of convergence for the European Union sample. However, the empirical evidence shows only a little bit evidence of conditional convergence, and hence reduces regional inequalities, for short-run only. Yasin et al. (2011) empirically found no absolute β-convergence and σ-convergence in Pakistan and also in rural-urban areas, except for conditional convergence. Andrew et al. (2008) argues that β-convergence is statistically significant across the United States and many of its individual states. The null hypothesis for United States and 24 of its individual states is significantly larger than that of early period, implies σ-divergence. Skewness and Kurtosis measure of income distribution makes the income distribution more peaked which is suggesting σ-convergence for the majority of the individual states, but not at the aggregate level. Payne (2013) contributed on convergence process of per capita energy use for the sample of 25 OECD economies for which his results suggests that log of per capita energy use is stationary relative to average of OECD economies, implies strong convergence. Andrea et al. (2010) provide empirical evidence on a sample of 21 OECD countries on the role of human capital accumulation in economic growth. Result shows positive and significant impact of human capital accumulation to output and speed of convergence. The estimated speed of convergence appears to be consistent with augmented Solow model, but is more compatible with Uzawa-Lucas model in terms of constant returns to scale. Nakamura (2001) found results of high initial income (HI) and low initial income and low growth (LILG) are not consistent with convergence process, due to the fact that former has already achieved steady state, not the later one yet. The coefficient of convergence is not

significant for low initial income and high growth (LIHG), hence weak evidence of convergence. Bernard et al. (1995) found evidence of cross-section test which shows negative correlation between initial per capita income and subsequent growth rates, implies strong evidence of convergence. Miller et al. (2001) supports absolute and conditional β-convergence for total factor productivity (TFP), but shows only conditional β-convergence to real per capita GDP. The absolute β-convergence exists only for developed countries but not for mixed economies as the conditional convergence requires. Salvatore (2009) provides significant evidence of convergence regarding environmental quality and individual's preferences in OECD sample. Empirical evidence of double convergence hypothesis (DCH) fits for the individual countries but not for all economies. And the idea of diminishing returns to capital (in terms of marginal returns) is applied which indicates diminishing, implies strong evidence of convergence. Klomp et al. (1997) argues no evidence regarding convergence hypothesis in OECD economies, except for sub-samples. Dowrick et al. (2002) suggest that countries are converging at the rate of 5% per year to its steady state level of capital, implies that after 14 years the distance from steady state level is halved. Results also explains 3.5% rate of technological catch-up per year, implies that long-run growth is due to fact of leading technology economies. The evidence supports only conditional β-convergence, but not the absolute and cross country income convergence. Eatzaz et al. (2000) shows the absence of strong β-convergence and σ-convergence in different countries, and the dispersion in income level has risen, except for the case of East Asian. Lichtenberg (1994) found convergence in OECD economies. Sala-i-Martin (1996) found the evidence of convergence across US, Japan prefectures and five European regions. Estimated speed of convergence is 2% per annum means half of the distance to steady sate path would be covered in 35 years, implies very slow due to the inverse relationship of technology adoption and its cost of imitation. Kang (2006) shows that augmented Solow model with human capital is capable to grow faster in the Korean economy. Evidence supported neoclassical growth model which shows convergence towards the steady state path, but not true for the non-decreasing returns to scale

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hypothesis. Sajjad et al. (2011) shows no unconditional convergence across Pakistani provinces, due to dualistic structure of the economy, but strong evidence of conditional convergence does exist. And the estimated speed of convergence is 11% per year, implies half of the distance to the steady-steady level would be captured approximately in 6 years.

3.3   Literature on Institutional Quality Convergence

Huge part of differences in per capita income across economies are explained by differences in the institutional quality e.g. quality of rules, regulations, laws and policies that affect economic incentives to invest in technology, physical and human capital (Hall & Jones, 1999; Acemoglu, Johnson & Robinson, 2001 and Rodrik, Subramanian & Trebbi, 2004). Advanced economies are embodied with better quality institutes and higher per capita income than emerging ones' in the world; economies especially located in North America, Western Europe, Australia and New Zealand (Chang, 2011). Differences in per capita income are caused by differences in economic institutions, more than luck, geography or culture (Acemoglu, 2009). Traditionally, convergence is concerned with the convergence in real per capita income levels, but we can proceed for institutions as well through quality of indicators (Quah, 1993; Sala-i-Martin, 1996; Pritchett, 1997; Barro, 2012; Rodrik, 2011 & 2013). There exists partial evidence of convergence in financial systems across OECD economies (Bruno et al. 2012). Ravallion (2012 & 2013) found no evidence of poverty convergence, but of income distribution. There exists convergence in life expectancy across economies (Deaton, 2004; Cauming, 2012), weak absolute convergence in human development (Noorbakhsh, 2007). Keefer & Knack (1997) and Knack (1996) found that ability of poor economy to catch-up the income levels of richer ones' is largely determined by the quality of institutions. Institutions are path dependent e.g. group of economies having high-quality institutions today, would largely be the same in the future (Mahoney, 2000). At an inefficient level, the institutions serve the interest of the minority (Acemoglu & Robinson, 2006 & 2008). The ruling elite would never replace the extractive and political

institutions with inclusive ones' if it not serves their interest (Acemoglu & Robinson, 2012). Significant historical events may change the institutions e.g. end of the cold war (Acemoglu, Johnson & Robinson, 2001). The evolution of international politics since 1980s is a major factor explaining convergence process e.g. political and economic systems of many economies has increasingly favored institutions to restrict the uninformed actions of rulers and bureaucrats implies the strong basis for market freedom, and the advancement of political democracy documented by Huntington (1991). However, the robustness of the model follows that improvement in institutional quality convergence got weakened significantly at the end of Cold War, and almost disappeared in the new millennium. And these suggest that better quality institutes may not necessarily replace weak institutions in the developing economies. Savoia and Sen (2016) concluded that regardless of the initial conditions, institutions converged but relatively slow process of convergence exist, resulting from major historical events e.g. end of the Cold War. By contrast, institutional catch-up is significantly enhanced amongst the economies of identical structures, implies conditional convergence. They suggest that gap between developing and an advanced economy is reduced due to the improvement in institutional quality of the poor/emerging economies. Schaffer et al. (2008) concluded that growth pattern at the economy sectoral and firms' level indicates considerable and rapid growth towards developed market economies. Finally, strong evidence of convergence does exist in the transition economies that joined the European Union, implies convergence in institutions, technology, productivity and economic structure. As the market economies industrialized, their structure changes such as; share of manufacturing and services sector rises and agricultural falls, in GDP and employment (Kuznets, 1955 & 1965; Chenery et al. 1968 & 1975; Dohra & Heilmann, 1996; Raiser, Schaffer & Schuchhardt, 2014).   Grusevaja and Pusch (2015) concluded that there exist inertia for the institutional variables, implies weak evidence of institutional convergence among.

Boulhal (2004) found that technology diffusion significantly affects economic growth which lead to conditional convergence, conditioned upon; appropriate institutional quality-mix of R&D, innovation

and capital-risk supporting. The estimated speed of annual convergence to the technological frontier is from zero to 12.4 percent, depending upon the economy's structure. Poor institutional quality is source of annual growth rate loss from 2.4 percent point to 6.1 percent point to the respective economy. Economies catching-up process is conditional upon sharing the identical technology and quality of institutions. Marelli and Signorelli (2010) analyzed the nominal and real convergence within the European Union economies by making advances in the institutional integration. The descriptive analysis of sigma-convergence of selected real variables shows that institutional integration affect real convergence. Hall (2015) suggest that beta-convergence in economic freedom exist, implies economies with low levels of economic freedom catch-up with advanced economies at an average rate high percent per year. The structural characteristic which contributes to institutional change shows that democratic institutions don't contribute towards the conditional convergence. He found that economies with identical levels of democracy show no evidence of convergence. Exit-ability is stronger within the country rather than across the countries, implies restriction on immigrants and control on passport. Greater exit-ability within the economy refers to the higher levels of economic freedom. Iancu (2009) argues that efficiency and impact of institutional quality and capital are used to fill the economic gap between economies in the context of enforcement and implementation of European Integration strategy implies strong evidence of convergence among the EU economies. Karasan (2015) highlighted the importance of productivity and institutions in the convergence process of economic growth. The results reveal that estimated speed of conditional convergence is relative higher in productivity analysis. And therefore conditional convergence depending upon institutions is slow, implies that economic growth is spurred more by growth determinants, leads toward process of development. Botcheva and Martin (2001) suggest that there exist convergence among the member states due to institutions but others resulted in divergence for unintended reasons e.g. these may be of lack of cooperation, coordination, compliance and poor efficiency of institutions. Finally, convergence among the states behavior arises due to significant

positive externalities and appropriately designed institutions. Marsiliani and Renstrone (2004) used parliament as a benchmark institutions where all decisions are made and party entry, bargaining coalition formation and parliamentary composition as the endogenous components. They suggest that lower growth exist mainly due to constitution to separation of powers and productivity, inefficiency. The study is consistent with the work of Persson, Poland and Tabellini (2000) that parliamentary system plays pivotal role in political institutions and is more able to enhance public spending which leads toward economic growth (Persson & Tabellini; 2003, 2004). Economic growth is spurred by the parliamentary system and proportional electoral rules (Persson, 2004). The research concluded that institutions are the fundamental cause of economic development, greater than the features of natural environment, technological use and supplies of factor, (North, 1997; Rodrik, Subramnian & Trebbi, 2002; Acemoglu, 2003). The institutions which protects property rights (North & Thomas, 1973; Acemoglu, Johnson & Robinson, 2001), but also the factors that assemble savings and coordinate investment (Bardhan, 2004; Bordo & Cortes Conde, 2001), finally the rulers to sanction by the rulers OR are held accountable, are good *"better for development"* (Benhabib & Przeworski, 2005; Keefer, 2005). Przeworski and Curvale (2006) states that stable institutional framework is a luxury whether it protects property rights or not, provide public infrastructure or not, control corruption or not, in many of the economies in the world. Institutions may be destabilizing when new groups hurt the incumbent interest badly, implies institutional instability hampers economic development. Knack and Keefer (1998) concluded that poor institutional quality is the root cause of this divergence. They have also analyzed the different indicators of institutional quality e.g. rule of law, massive corruption, risk of expropriation and contract repudiation. And found that institutional environment, in which economic activity takes place, determines in large part the ability of poor countries to catch-up. Knack and Keefer (1995) found the results which strongly support three propositions; firstly, institutional quality has insufficient proxies of Gastile political and civil liberties and Political violence, which protects property rights, implies dire need of direct indicators for institutional influence. Secondly, institutions

that protect property rights are crucial to economic growth and to investment. And even after controlling for investment, institutions affect growth, implies secured property rights affects not only the magnitude but also the efficiency of investment. Thirdly, strong evidence of conditional convergence emerges after controlling institutions. Knack (1996) shed-light on the findings of Delong and other renowned economists that only the currently-industrialized economies and universal-literacy nations embodied cross-country convergence in income per capita. Especially in the groups of ex-ante economies the income dispersion has failed to decline. He concluded that there exist strong convergence in income per capita among the economies with institutions which secure property rights and are conducive to saving, investing and producing. Finally, after controlling for institutions, incomes levels converge for ex-ante rich samples. Kim (2011) contributed on the convergence process of Korean economy's famous institutions; broadcasting and telecommunication, for which he argues that generous growth in market entry increases the potential for competition due to the emerged services. And therefore the market converges with the creation of innovative services in respective sectors. Gianfranco et al. (2010) empirically found that growth model with spatial effect of institutions and geography represents a best candidate for the European regions growth patterns. Relative location effect is highly significant and increases regional spatial dependence of output per worker but decreases the speed of convergence. Holding fixed the geographical distances and regions with the same institutional framework have a tendency to converge with greater speed. Tosun (2012) argues that all the countries at individual level didn't converge to the EU model; implies divergence, but indicates strong evidence of convergence at the aggregate level. Fung and Arnold (2010) empirical findings didn't support absolute β-convergence, as less productive bank is not growing faster than the highly productive one. Result supports conditional β-convergence, as banks are converging toward their own steady-state TFP path. Manca (2010) evidence shows that economies endowed with the quality institutes are growing faster in terms of technology catch-up. Trade openness and enforcement of property rights are important determinants for innovation, leads to

technology catch-up in the open economies due to the adoption of new and high technology e.g. China and India. In-a-nutshell, historical literature shows significant association between institutions, economic growth and macroeconomic stability. Therefore, institutional quality is affecting growth and in turn their improvements lead to the enhancement in growth, implies significant convergence relationship.

3.4   Literature Gap

History shows that economists and policy makers had tried their best to point-out the core foundations of economic growth. They have proved that growth is spurred by many indicators and there exist unconditional growth convergence among the developed countries and states, but convergence of all types doesn't hold in single economy due to prevalence of diverse factors in those specific states and countries. Literature illustrates theoretically that institution significantly spur growth of the economy, but history fails to argue empirically that growth convergence is caused by institutional convergence, a major source of exploration. The argument remained unsuccessful due to this flaw, thus our core objective is to empirically investigate how the institutional convergence lead to growth convergence. One of the objectives of this study is to present a brief historical review on economic growth and convergence research. We'll find that how the gap of income levels between poor and rich economies and poor and high quality institutes will be minimized *(growth convergence, institutional convergence)* due to institutional effect on growth of the economy. Imply that how poor institutional quality would eventually catch-up the institutional quality of advanced economies in terms of *rule of law, bureaucratic quality, non-corrupt government and legal system and property rights.*

CHAPTER 4

DATA, VARIABLES DESCRIPTION & DESCRIPTIVE STATISTICS

4.1   DATA & VARIABLES DESCRIPTION

The data of all corresponding variables and countries is picked-up for the period of 1984-2015. The reason to choose this period is simply the comparison of institutional quality convergence with the convergence of real per capita GDP. And that the data of institutional quality variables starts from 1984 to onward. So we used this in our study to check the effectiveness of institutions on economic growth. And will investigate their respective convergence for the whole period.

For the purpose of analysis we have selected the sample of 120 countries. Further, we have divided the sample into 6 sub-groups; Advanced, Developing, East Asian Tigers, European Union, G7 and Transition Economies, following IMF classification of countries, based on their level of real per capita GDP, export diversification and degree of integration into the global financial system.

The data of the variables used in our study is extracted from various sources, as discussed below: Real per capita GDP, investment, saving, expense, trade openness, education, population growth rate, inflation rate and R&D expenditure data uses the source of World Bank (World Development Indicators). Data of human capital is taken from PWT 9.0 and economic freedom, polity 2 (political democracy) uses Freedom House Dataset. Role of military in power & politics, government stability, corruption in government, bureaucratic quality, law & order, religion in politics, ethnic fractionalization/tensions, used International Country Risk Guide (ICRG) Dataset. Data of governance indicators (voice & accountability, political stability & absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, control of corruption) comprised of the period (1996-2015), extracted from World Governance Indicators (WGI). Quality of legal system and

security of property rights uses Fraser Institute Index of Economic Freedom. Data of legal origin dummies is taken from Andrei Shleifer's website and distance from the equator simply uses internet source.

Now we'll go through the details of each variable, that how it is used and what scale it follows in our study. We used growth rate of *real per capita GDP* to find out the convergence of per capita GDP. *Investment, saving, expense* and *trade openness* are used as ratio of GDP. Next, we used simple the *inflation rate* and *population growth rate*, but *education* follows secondary school enrollment rate. *R&D expenditure* is used as percentage of GDP. *Human capital* is calculated from years of schooling & return on education (Barro/Lee, 2012; Psacharpoulos, 1994). It is an important factor to economic growth e.g. effective work leads to higher level of innovative ideas which in turn enhances the efficiency of that specific sector. *Economic freedom* and *polity2* (political democracy) are highly correlated e.g. higher level of political democracy means no/less military role in power & politics, implies higher level of economic and political freedom. These both variables follow the data range between 0 and 10, zero corresponds to lowest and 10 imply the highest level of economic and political freedom. *Economic freedom* index comprised of four major pillars namely; rule of law, open market, limited government role, and regulatory efficiency. *Government Stability* is assessed by the ability of government to carry out its declared program(s) and its ability to stay in office. The data ranges between 0 and 12, zero refers to low and 12 imply the highest level of government stability, implies strong positive impact on growth. *Corruption in government* refers to the threat to FDI due to several factors (inherent instability, reducing effectiveness of government & business, distortion of political, financial and economic environment) involved in the political system. It is rescaled to range between 0 and 10, zero corresponds to the lowest and 10 indicate the highest level of corruption in government. *Military in power & politics* is nowhere elected by anyone; therefore its involvement in politics (even at the gross-route level) hinders the way of democratic accountability, implies no

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political freedom. It is rescaled to range between 0 and 10, zero corresponds to lowest and 10 refer to the highest role of military in power & politics. *Religion in politics* arises from the domination of single religious group in the society who replaces civil law by religious law. And it aims at to exclude other religions of the state from the political & social process which implies single religious group departure from the state. It is rescaled to range between 0 and 10, zero corresponds to lowest and 10 refer to the highest level of religious tensions in the state. *Law and order* refers to the strength of the legal system, both from judicial system (high rating) and crime rate (low rating). It is rescaled to range between 0 and 6, zero corresponds to lowest and 6 refer to highest level of law and order in the state. *Ethnic fractionalization/tensions* refer to the degree of tension within a country attributable to racial, nationality or language divisions. It is rescaled to range between 0 and 6, zero corresponds to lowest (country with high rating) and 6 refer to the highest level (country with low rating) of ethnic tensions in the state. *Bureaucratic quality* shows the strength of government institutions with the objective to observe the shocks and minimizes revisions of policy whenever the fluctuation takes place in government policy. It is rescaled to range between 0 and 4, zero corresponds to lowest level of bureaucratic quality due to high political pressure and 4 refer to the highest level of bureaucratic quality due to low level of political influence. *Legal system and property right* refers to the strength of the legal system in attaining/transferring the property rights/ownership to the respective owner OR without delaying and creating further hurdles in the attainment of ownership. It comprises of legal and political environment, physical property rights and intellectual property rights. And is rescaled to range between 0 and 10, zero corresponds to lowest level of legal system and property rights and 10 refer to the highest level. *Governance* refers to the action or manner of governing a state, organization. Quality of governance determines the quality of policies and overall rules and regulations of the socio-economic system. We used average of its 6 main indicators (voice & accountability, political stability & absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, control of corruption) in our analysis. Estimate of governance ranges

from approximately -2.5 (weak) to 2.5 (strong) governance performance. *Voice and accountability* refers to the ability of country's residents to select government, their freedom of association (economic, political) and freedom of expression in media. *Political stability and absence of violence/terrorism* shows that up-to what extent political instability and political-motivated violence prevails in the state, including terrorism. *Government effectiveness* indicates the quality of public and civil service provided, the degree of political freedom (political independence), quality of policy implementation and the credibility of government commitment to such policies. *Regulatory quality* refers to the strength of government in the formulation and implementation of sound policies and regulations which promotes private sector of the economy. *Rule of law* shows the extent of confidence of agents to abide by the rules of the society, especially the quality of contract enforcement, property rights, police, courts, crime and violence. *Control of corruption* reflects that up-to what extent public power is exercised for private gain as well as to capture the state elites and private interests. *Legal origin* suggests that historical origin of country's law is highly associated with its legal rules and regulations and economic outcomes, implies legal origin matters for the long-run economic growth of the respective state. *Distance from equator* states that higher the distance of the country is from the equator, leads to lesser of the temperature, which in turn affects climate change positively, and implies higher growth.

4.2 DESCRIPTIVE STATISTICS

4.2.1 Institutional Quality Convergence

Institutions are persistent phenomenon, thus we examined trends of legal, bureaucratic and administrative institutional quality measure over the long periods, by focusing on cross-country dataset. Institutional quality used in our study follows the average of four indices, namely; quality of legal system and security of property rights, bureaucratic quality, rule of law and corruption in government. *Rule of law* is an indicator of states' legal capacity. *Corruption in government* and *bureaucratic quality* shows level of bureaucratic and administrative quality. And lastly, *quality of legal system and security of property rights* refer to the strength of legal system in transferring the property rights to the respective owner, without delaying the process and creating any further hurdles. It comprises of legal and political environment, physical property rights and intellectual property rights. All the indices are of continuous variables and possess a specific data range which shows the lowest and highest level/strength of that specific index. A lower score in rule of law, bureaucratic quality and legal system and property rights index implies poor institutional quality, and higher score shows high institutional quality. However, corruption in government index follows the reverse pattern that its lower score corresponds to the high institutional quality, and higher score refers to the poor institutional quality. To observe the trends of all the indices we had gone through the mean and cross-sectional dispersion (coefficient of variation, CV), by comparing economies at different stages of development over the period 1985-2015. An improvement in mean value OR decrease (increase) in cross-sectional dispersion (CV) of rule of law, bureaucratic quality and legal system and property rights indices, will leads to the improvement (deterioration) in institutional quality measure, implies institutional quality convergence (non-convergence). Reverse is true for corruption in government. Institutional quality convergence means countries with poor quality institutes tend to catch-up

Table 4.1   (A) Quality of Legal System & Security of Property Rights Index

Dependent Variable: SIGMA				
Method: Least Squares				
Variable	Coefficient	S.E	t-value	Prob.
C	2.7228	0.2502	10.8844	0.0000
Trend	-0.3826	0.0407	-9.4026	0.0000
R-squared	0.4368			
Prob. (F-statistic)	0.0000			

(B) Bureaucratic Quality Index

Dependent Variable: SIGMA				
Method: Least Squares				
Variable	Coefficient	S.E	t-value	Prob.
C	4.6986	0.6901	6.8082	0.0000
Trend	-1.4097	0.2389	-5.9003	0.0000
R-squared	0.2421			
Prob. (F-statistic)	0.0000			

(C) Rule of Law Index

Dependent Variable: SIGMA				
Method: Least Squares				
Variable	Coefficient	S.E	t-value	Prob.
C	4.4980	0.3136	14.3417	0.0000
Trend	-0.9017	0.0717	-12.5808	0.0000
R-squared	0.5900			
Prob. (F-statistic)	0.0000			

(D) Corruption in Government Index

Dependent Variable: SIGMA				
Method: Least Squares				
Variable	Coefficient	S.E	t-value	Prob.
C	1.2078	0.2854	4.2320	0.0000
Trend	-0.3930	0.0671	-5.8540	0.0000
R-squared	0.2375			
Prob. (F-statistic)	0.0000			

the economies with high quality institutes in terms of improved rule of law, strong bureaucratic quality with no political pressure and high economic and political freedom, well-established legal system and managed property rights, excessive control over the government corruption.

Firstly, we have investigated that whether the cross-sectional dispersion in institutional quality indices is increases or decreases overtime, implies testing sigma convergence *table 4.1*. Analysis of all the indices show that the cross-sectional dispersion in diminishing overtime, for the whole sample and period. And hence suggest strong evidence of sigma convergence in institutional quality measure. The results are statistically significant, but the speed of convergence varies across all indices. The coefficient of bureaucratic quality is high, followed by rule of law, legal system and property rights, and lastly corruption in government, implies that it's very difficult to combat with corruption in any economy, sector and institution.

Table 4.2   *Institutional Quality around the world 1985-2015*

Year		1985	1990	1995	2000	2005	2010	2015
Panel (a): Quality of Legal System and Security of Property Rights Index								
Whole Sample	Mean	6.00	6.42	6.95	7.16	6.54	6.47	6.42
	CV	0.30	0.31	0.43	0.26	0.26	0.23	0.23
Advanced Economies	Mean	7.00	7.52	8.01	8.26	7.71	7.46	7.41
	CV	0.19	0.16	0.14	0.14	0.12	0.13	0.13
Developing Economies	Mean	4.24	4.19	5.20	5.24	4.99	5.23	5.15
	CV	0.34	0.37	0.20	0.29	0.28	0.26	0.27
East Asian Tigers	Mean	5.91	6.21	7.37	7.24	7.86	7.69	7.64
	CV	0.27	0.13	0.21	0.18	0.11	0.14	0.14
European Union Economies	Mean	6.62	7.49	7.54	7.77	7.19	7.02	6.98
	CV	0.22	0.14	0.17	0.17	0.16	0.15	0.15
G7 Economies	Mean	7.38	8.00	8.25	8.69	7.71	7.45	7.37
	CV	0.81	0.05	0.12	0.08	0.11	0.10	0.11
Transition Economies	Mean	5.25	5.21	4.57	5.37	5.00	5.32	5.39
	CV	0.37	0.36	0.23	0.28	0.14	0.11	0.10
Panel (b): Bureaucratic Quality Index								
Whole Sample	Mean	2.66	2.72	2.99	2.92	2.84	2.85	2.84
	CV	0.49	0.45	0.37	0.36	0.36	0.37	0.36
Advanced Economies	Mean	3.55	3.49	3.69	3.67	3.59	3.59	3.59
	CV	0.18	0.21	0.13	3.13	0.16	0.16	0.16
Developing Economies	Mean	1.63	1.66	1.91	2.01	1.96	1.98	1.92
	CV	0.64	0.62	0.50	0.34	0.34	0.34	0.38
East Asian Tigers	Mean	3.33	2.83	3.50	3.33	3.33	3.33	3.33
	CV	0.09	0.23	0.21	0.17	0.18	0.18	0.18
European Union Economies	Mean	3.04	3.15	3.40	3.31	3.22	3.22	3.22
	CV	0.39	0.31	0.24	0.25	0.25	0.25	0.25
G7 Economies	Mean	3.83	3.83	3.93	3.86	3.64	3.64	3.64
	CV	0.11	0.11	0.05	0.10	0.18	0.16	0.10
Transition Economies	Mean	1.00	1.88	1.88	1.64	1.59	1.68	1.71
	CV	0.49	0.45	0.45	0.41	0.42	0.45	0.17

Year		1985	1990	1995	2000	2005	2010	2015
Institutional Quality around the world 1985-2015								
Panel (c): Rule of Law Index								
Whole Sample	Mean	3.95	3.90	5.19	4.64	4.49	4.43	4.39
	CV	0.43	0.45	0.23	0.28	0.26	0.26	0.27
Advanced Economies	Mean	5.05	4.93	5.88	5.37	5.21	5.19	5.18
	CV	0.25	0.30	0.06	0.15	0.13	0.12	0.13
Developing Economies	Mean	2.44	2.31	3.94	3.64	3.40	3.31	3.23
	CV	0.46	0.51	0.30	0.36	0.34	0.34	0.34
East Asian Tigers	Mean	4.28	3.67	5.67	5.00	4.88	5.00	5.00
	CV	0.30	0.34	0.11	0.20	0.04	0.04	0.03
European Union Economies	Mean	4.78	4.85	5.83	5.04	4.95	4.91	4.89
	CV	0.28	0.25	0.07	0.18	0.16	0.18	0.18
G7 Economies	Mean	5.29	5.33	5.92	5.68	5.07	5.00	4.96
	CV	0.11	0.10	0.04	0.08	0.12	0.10	0.10
Transition Economies	Mean	2.50	2.90	2.90	3.64	3.85	3.75	3.64
	CV	0.40	0.37	0.37	0.31	0.22	0.17	0.17
Panel (d): Corruption in Government Index								
Whole Sample	Mean	4.00	4.01	4.20	3.52	3.16	3.30	3.30
	CV	0.43	0.37	0.32	0.38	0.41	0.39	0.38
Advanced Economies	Mean	5.13	4.97	5.00	4.33	4.08	4.15	4.16
	CV	0.22	0.22	0.19	0.25	0.25	0.24	0.24
Developing Economies	Mean	2.44	2.66	2.92	2.54	2.08	2.32	2.28
	CV	0.53	0.41	0.32	0.34	0.33	0.27	0.26
East Asian Tigers	Mean	4.33	3.67	4.67	3.42	3.67	3.96	3.98
	CV	0.49	0.35	0.22	0.16	0.29	0.22	0.22
European Union Economies	Mean	4.76	4.76	4.78	4.16	3.61	3.66	3.67
	CV	0.27	0.22	0.20	0.27	0.31	0.34	0.33
G7 Economies	Mean	5.33	5.00	4.86	4.00	4.08	4.22	4.22
	CV	0.16	0.13	0.23	0.29	0.24	0.20	0.21
Transition Economies	Mean	3.50	2.74	2.12	1.79	1.98	2.07	2.16
	CV	0.17	0.27	0.32	0.23	0.23	0.35	0.47

Table 4.2 shows that gap between advanced and poor economies decreases overtime, implies institutional quality convergence. Firstly, quality of legal system and security of property rights index has experienced improvements for the whole sample and rest of the economies, implies strong institutional quality convergence. The index shows has decreased in the cross-sectional dispersion, approximately in all the economies, is generally monotonic until 2000, picked up again or becomes stable, implies that either the institutional quality convergence is stopped or decelerated. Secondly, bureaucratic quality index shows that cross-sectional dispersion has decreased in whole sample and all rest of the economies (except transition one) implies convergence of institutional quality. But the decrease in cross-sectional dispersion is monotonic until 1995, approximately in all the economies (except developing one). Thirdly, rule of law index has experienced improvements for the whole sample and rest of the economies, implies strong institutional quality convergence. The cross-sectional dispersion has decreased in all the economies, (except G7) and is monotonic until 1995. And lastly, corruption in government index has also revealed the improvement in cross-sectional dispersion for the whole sample and rest of the world, implies strong institutional quality convergence. But the cross-sectional dispersion is monotonic until 1990 in most of the economies, and has also experienced the deterioration in transition economies which shows that the index has not improved in transition economies. Finally, we conclude that all the indices on aggregate shows improvement, except for transition economies which show greater variability in institutional quality at the end of the period, imply strong institutional quality convergence. And the cross-sectional dispersion on aggregate is generally monotonic until 1995, which follows the period of end of Cold War. A significant acceleration in the speed of institutional quality convergence is resulted from the end of Cold War in early 1990s. However, the effect is weakened for the transition and developing economies in new millennium.

4.2.2   *Convergence of real per capita GDP*

Table 4.3 provides little description of cross-sectional dispersion of real per capita GDP is provided to check the sigma convergence among the selected groups. Results vary across every group of countries, due to their diverse structural characteristics, e.g. cultural, social, political, economic and geographical attributes. The analysis found evidence of sigma convergence in the whole sample, but the dispersion is not decreased very much. All the developed economies (advanced, G7, European Union) shows no strong evidence of sigma convergence, which strictly follows Sala-i-Martin (1993) that "beta convergence is necessary, but not sufficient condition for sigma convergence". Because economies after importing technology from the developed nations boost-up their productivity, by efficiently utilizing their unused resources, to a level higher than the developed ones'. The logic behind the scenario is that if good rule of law, political stability (political & economic freedom), voice and accountability prevails in the state, then importing technology from abroad and efficient use of human capital leads to the higher growth rates of the nations. However, our results favors these scenario, that developing and transition economies has gained remarkable output by implementing these policies, implies strong evidence of sigma convergence. Finally, the cross-sectional dispersion is decreases in all developed economies until 2005, but developing follows the same pattern until 2010. And amazingly, the major advanced economies i.e. G7 shows no strong evidence of sigma convergence for the sample period.

Table 4.3　　　　　　*Real Per Capita GDP Growth Rate around the world 1985-2015*

Year	1985	1990	1995	2000	2005	2010	2015
Whole Sample Mean	1.53	1.95	2.00	3.91	3.91	2.81	1.52
CV	2.49	2.66	2.57	0.73	0.98	1.26	2.10
Advanced Economies Mean	2.66	2.91	3.00	4.34	2.85	2.08	1.71
CV	0.62	0.87	0.74	0.47	0.75	1.59	0.89
Developing Economies Mean	-0.30	1.23	1.48	1.56	3.36	3.63	1.09
CV	-18.38	3.44	3.11	2.04	1.08	1.24	4.63
East Asian Tigers Mean	1.76	5.86	4.02	7.23	5.21	8.41	1.49
CV	2.30	0.41	0.94	0.09	0.32	0.49	0.47
European Union Economies Mean	2.49	2.36	3.62	4.52	3.67	1.52	2.30
CV	0.35	1.42	0.61	0.41	0.86	1.53	0.71
G7 Economies Mean	3.29	1.93	1.89	3.20	1.46	2.31	0.94
CV	0.44	1.19	0.28	0.22	0.56	0.67	0.55
Transition Economies Mean	-0.82	-0.79	-1.75	5.97	7.86	3.86	1.04
CV	-6.26	-17.12	-6.18	0.45	0.72	0.77	3.64

CHAPTER 5

ESTIMATION METHODOLOGY & THEORETICAL BACKGROUND

5.1   THEORETICAL BACKGROUND OF THE STUDY

Institutional quality is a crucial determinant to economic growth and differences in per capita income. But we need to understand that how institutions evolve and under what circumstances they change. One way is to check predictability of convergence in per capita income and institutional quality levels i.e. *low income economies with poor quality institutes are catching-up the rich nations with high quality institutes.* No doubt growth theories and models explained by renowned growth theorists and economists enlightened the fundamental causes of long-run growth. However, there are many other factors affecting economic growth significantly and the key determinant of the entire rest one are *'Institutions'* especially strong economic and political institutions. A vast literature among the association of institutions and growth shows that institutions (economic & political) are crucial determinant to spur growth process of economy. Analysis of well-known economist show that growth convergence exists only in those economies where these institutions prevail as strong enough to control the factors which impede the growth process. Thus literature also supports that institutions are the fundamental causes to long-run growth, affecting directly or indirectly.

Much of empirical growth literature focus on examining the causes of differences in growth rates across countries. Many theories have been put forth in this regard and recent decades has surged the interest to test these differences. One answer that has re (gained) popularity is *"institutional setting for technological change"* determines long-run growth in a country. In this regard, the *"Institutional Setting"* (institutions) refers to rules (constitutions, laws and regulations, political systems) and the informal rules (values systems, beliefs, social norms) that humans use when interacting within wide variety of repetitive and structural situations at multiple levels of analysis (North, 2005; Ostrom,

2005). Ultimately difference in institutional quality causes differences in growth patterns, Acemoglu et al (2001, 2002, 2004), Keefer and Knack (1997), Rodrik et al (2004), Easterly and Levine (2003), Bardhan (2005). Second influential and not so new theory states that these differences are due to an *exogenously given set of geographical factors* which are conducive for growth e.g. *soil quality, weather conditions and natural resource availability affect productivity and attitudes,* directly (Montesquieu and Weber, 1748 *"The Spirit of The Coups";* Diamond, 1997; Gallup et al, 1998; Sachs, 2001; McArthur and Sachs, 2001; Masters and McMillan, 2001). And lastly, *countries openness to trade* explains large variations in growth across states (Frankel and Romer, 1994; Dollar and Kraay, 2001, Sachs and Warner, 1995).

Acemoglu et al (2000) concludes that obviously institutions matter (at some level) e.g. *the divergent paths of North & South Korea, East & West Germany,* where one part of the country stagnated under central planning and collection ownership, and rest one is prospered with private property and market economy. We have ambiguous evidence that institutional differences have large effect to explain differences in output levels. And it is found likely that better institutions are affordable only by rich economies. Therefore, economies which differ for a variety of reasons are also different in institutional quality and their level of real per capita GDP.

Controversial analysis on convergence hypothesis that *"why doesn't capital flow from rich to poor countries"* by Lucas (1990), concluded three reasons which hinders flow of capital namely; *differences in human capital, external benefits of human capital and imperfect capital market.* Kalemli-Ozcan et al. (2003) called it *"Lucas Paradox".* He argues two groups, which hinders the way of capital flow *(I) differences in fundamentals of affecting production* and *(II) international capital market imperfections. Importantly, authors investigated that institutional quality is the most natural variable in explaining the "Lucas Paradox".* They found empirically that human capital and asymmetric information plays crucial role as the major determinant of capital inflow, but government

policies can't fully account for the paradox. They indicated that institutional quality is the major pillar to shape international capital flows because it not only attract foreign capital but also enables host economies to maximize benefit from such investment, consistent with analysis of North (1981, 1994), Hall & Jones (1999), Acemoglu, Johnson & Robinson (2001, 2002). Lastly, government stability, bureaucratic quality, non-corrupt behavior of government, law and order play pivotal role in explaining lack of capital flows from rich to poor countries. Therefore we are interested in, *whether poor countries are narrowing (or widening) their real per capita GDP OR institutional quality gap with richer one's.* An appropriate starting point is statistical notion of *convergence*, that two countries exhibit convergence if one economy with lower initial real per capita GDP and poor quality institute tends to catch-up higher real per capita GDP with high quality institute (growth convergence & institutional quality convergence) due to institutional effect on growth of economy.

5.2 ESTIMATION METHODOLOGY

We'll empirically investigate three types of convergence in our study, namely; sigma convergence, absolute/unconditional beta convergence, and conditional beta convergence. Firstly, sigma convergence says that economies are converging in a sense that the dispersion of their real per capita GDP OR institutional quality levels is diminishing over-time (Sala-i-Martin, 1993). Next, absolute/unconditional beta convergence says that how the poor economies of the world are growing faster in terms of real per capita GDP OR institutional quality levels than richer one's (Sala-i-Martin, 1993). And lastly, conditional beta convergence explains that countries are converging to each other in the long-run in both, real per capita GDP and institutional quality, (Sala-i-Martin, 1993).

5.2.1   *Growth Convergence Models*

For all types of growth convergence tests, we'll follow the models proposed by Chowdhury (2004).

I. Sigma Convergence

Sigma growth convergence is calculated by estimating equation (I),

$$\sigma_t = \alpha + \beta_t + \mu_t \qquad\qquad (I)$$

In equation (I), α and β are parameters, μ_t is the stochastic error term. A significant negative (positive, $\beta \geq 0$) value of parameter β implies convergence (non-convergence). And for the value of σ_t we'll use y_{it} as the growth rate of real per capita GDP for economy. Whereas, $i(\ i=1,2,3....N)$ stands for each country and t for time period, and thus σ_t would be the standard deviation of y_{it}, across i at time t.

II. Absolute/Unconditional Beta Convergence

Absolute/unconditional beta convergence is obtained by estimating equation (II),

$$(y_{it} - y_{i,t-T}) = \alpha + \beta y_{i,t-T} + \mu_t \qquad\qquad (II)$$

In equation (II), dependent variable is the annual growth rate of real per capita GDP, α and β are parameters to be estimated, μ_t is a zero mean error term. A significant negative (positive, $\beta \geq 0$) value of β implies convergence (non-convergence). And y_{it} is the growth rate of real per capita GDP for economy. Whereas, $i(\ i=1,2,3....N)$ stands for each country, t stands for end time period and t-T is the beginning of time period. The magnitude of β expresses speed of convergence (divergence).

III. Conditional Beta Convergence

Normally outcomes of unconditional convergence suggest that differences in real per capita GDP levels between countries are closing, but this would be rather a slow process due to diverse structural characteristics prevailing in those countries. Would this process be faster among countries that share the same structural characteristics? This means considering the conditional convergence hypothesis i.e. countries' real per capita GDP levels converge to one another in the long-run, if their structural characteristics are identical (that is, differences may be permanent due to cross-country structural factors). And a test equation (III) for real per capita GDP levels convergence is then:

$$(y_{it} - y_{i,t-T}) = \alpha + \beta y_{i,t-T} + \gamma \chi_i + \mu_t \qquad \text{(III)}$$

In equation (III), dependent variable is the annual growth rate of real per capita GDP, α and β are parameters to be estimated, μ_t is a zero mean error term, lastly χ_i is a set of explanatory/control variables that account for long-run determinants of real per capita GDP change across countries. A significant negative (positive, $\beta \geq 0$) value of β implies convergence (non-convergence), only when $\gamma \neq 0$. And y_{it} is the growth rate of real per capita GDP for economy. Whereas, *i(i=1,2,3....N)* stands for each country, *t* stands for end time period and *t-T* is the beginning of time period. Again, the magnitude of β expresses speed of convergence (divergence).

5.2.2 *Institutional Quality Convergence Models*

For institutional quality convergence tests, we'll follow the models proposed by Savoia & Sen (2016).

I. Absolute/Unconditional Beta Convergence

Absolute/unconditional beta convergence is obtained by estimating equation (IV),

Let G_{it} denote the observed institutional quality measure in country i observed at both date t=0 and t=T, that is, at the beginning and at the end of the sample period, respectively. A test equation for institutional quality convergence is then:

$$(lnG_{iT}-lnG_{i0})/T=\alpha+\beta G_{i0}+\varepsilon_i \qquad with\ i=1\ .\ .\ .\ N \qquad (IV)$$

In equation (IV), dependent variable is the average annual growth rate of institutional quality, α and β are parameters to be estimated and ε_i is a zero mean error term. A significant negative (positive, $\beta \geq 0$) value of β implies convergence (non-convergence). And, the magnitude of β expresses speed of convergence (divergence).

II. Conditional Beta Convergence

And again (as it was same for growth convergence), normally the results of unconditional convergence suggest that differences in institutional quality between countries are closing, but this would be rather a slow process due to diverse structural characteristics. Would this process be faster among countries that share the same structural characteristics? This means considering the conditional convergence hypothesis i.e. countries' institutional quality converge to one another in the long-run, if their structural characteristics are identical (that is, differences may be permanent due to cross-country structural factors). And a test equation for institutional quality convergence is then:

$$(lnG_{iT}-lnG_{i0})/T=\alpha+\beta G_{i0}+\gamma\chi_{i0}+\varepsilon_i \qquad with\ i=1\ .\ .\ .N \qquad (V)$$

In equation (V), dependent variable is the average annual growth rate of institutional quality, α and β are parameters to be estimated, μ_t is a zero mean error term, lastly χ_{i0} is a set of explanatory/control variables that account for long-run determinants of institutional quality change across countries. A significant negative (positive, $\beta \geq 0$) value of β implies convergence (non-convergence), only when $\gamma \neq 0$. Again, the magnitude of β expresses speed of convergence (divergence).

CHAPTER 6   RESULTS & DISCUSSIONS

Our study is concerned with the evolution and change of institutions across countries and over time, based on per capita income levels. We'll check whether contemporary differences in per capita income and institutional quality levels between countries have become wider or narrower? Converging OR not? Firstly, the results of two-stage least square (2SLS), due to endogeneity between growth and institutional quality, shows strong evidence of convergence among countries of our sample *(table 6.1)*. And, the speed of convergence enhances by incorporating control variables in all measures. Next we'll proceed for panel & cross-section data analysis based on OLS estimates.

Table 6.1	*Fraser Institute Measures*	*ICRG Measures*		
	Legal System & Property Right	**Bureaucratic Quality**	**Rule of Law**	**Corruption in Government**
Panel (a): Unconditional Convergence				
Initial Value	-0.002***	-0.004***	-0.003***	-0.003***
	0.001	0.001	0.001	0.001
Constant	0.011***	0.025***	0.022***	0.024***
	0.003	0.004	0.002	0.004
F.Stat	14.134***	32.365***	54.825***	12.764***
R. Squared	0.125	0.212	0.234	0.123
Obs.	90	104	104	104
RMSE	0.022	0.042	0.03	0.034
1st stage F.Stat	86.02***	1454.378***	1657.434***	2234.659***
Panel (b): Conditional Convergence				
Initial Value	-0.006***	-0.008***	-0.007***	-0.005***
	0.001	0.001	0.001	0.001
Constant	0.024*	0.045	0.034*	0.023
	0.004	0.013	0.012	0.015
F.Stat	8.215***	9.023***	12.934***	5.75***
R. Squared	0.445	0.605	0.756	0.434
Obs.	77	84	84	84
RMSE	0.008	0.017	0.012	0.013
1st stage F.Stat	62.214***	301.194***	456.76***	390.489***

*Notes: the dependent variable is the average annual growth rate of institutional quality measure. Symbols *, ** and *** stand for significant level at 10, 5 and 1 per cent, respectively. Standard errors are in the parentheses. The control variables used in conditional convergence regression includes: initial values of institutional quality measure, real per capita GDP growth rate, education level (secondary school enrolment rate) and polity2 (political democracy), human capital, investment, R&D, governance index, religion in politics, ethnic fractionalization, geography (log of distance from the equator in KM), legal origin dummies (UK, France, Germany, Socialist).*

6.2 PANEL DATA ANALYSIS

Table 6.2   ***Results of Real Per Capita GDP Convergence***

Panel (a): *Sigma*	Advanced	Developing	East Asian	European Union	G7	Transition
Trend	-0.0223	-0.0475	-0.0548	0.0100	-0.0108	-0.1765
S.E	0.0102	0.0198	0.0249	0.0163	0.0101	0.0798
Constant	2.7435	5.1144	2.8758	2.4792	1.3951	9.1166
S.E	0.1832	0.3573	0.4487	0.2937	0.1818	1.4402
Prob. (F.Stat)	0.0357**	0.0229**	0.0354**	0.5422	0.2930	0.0348**
R. Squared	0.1389	0.1608	0.1392	0.0125	0.0368	0.1402
Panel (b): *Unconditional*						
Initial Value	-0.9044	-0.8250	-0.9198	-1.0096	-0.9784	-0.8861
S.E	0.0273	0.0322	0.4376	0.0278	0.0819	0.0621
Constant	1.7945	1.7535	3.4945	2.3335	1.3849	2.0574
S.E	0.1283	0.1535	3.5491	0.1308	0.3163	0.4708
Prob. (F.Stat)	0.0179**	0.0211**	0.0383**	0.0281**	0.0001*	0.0257**
R. Squared	0.5367	0.4069	0.0463	0.6382	0.399	0.3117
Panel (c): *Conditional*						
Initial Value	-1.0245	-0.8951	-10.1608	-1.0155	-1.1104	-2.3439
S.E	0.0407	0.1121	11.3262	0.0435	0.2791	0.5507
Constant	-9.4586	-5.1459	156.7321	-10.6536	3.4454	44.8969
S.E	2.9034	4.0415	96.0064	3.8154	15.3586	50.3485
Prob. (F.Stat)	0.0018*	0.0357**	0.0223**	0.0179**	0.0018*	0.0892***
R. Squared	0.6722	0.5004	0.5709	0.7548	0.6389	0.8890
Panel (d): *Conditional (sig)*						
Initial Value	-1.0273	-0.9382	-1.8829	-0.9735	-1.1993	-0.9190
S.E	0.0373	0.0316	0.8523	0.0344	0.1134	0.0647
Constant	-6.8316	-2.9970	30.0649	-11.8798	-11.9896	7.6049
S.E	2.0767	0.6398	808.8772	2.2585	3.5900	1.8814
Prob. (F.Stat)	0.0739***	0.0025*	0.0021*	0.0225**	0.0011*	0.0001*
R. Squared	0.6727	0.5141	0.3073	0.7558	0.6226	0.7311

Notes: the dependent variable is the annual growth rate of real per capita GDP. Symbols *, ** and *** stand for significant level at 1, 5 and 10 percent, respectively. Standard errors are in the parentheses. The control variables used in the conditional convergence regression includes: initial value of per capita GDP growth rate, human capital, saving, investment, trade openness, R&D, expense, inflation rate, population growth rate, institutional quality, economic freedom, polity2, govt. stability, military in power and politics.

Table 6.3   ***Results of Institutional Quality Convergence***

Panel (a): _Unconditional_	Advanced	Developing	European Union	Transition
Initial Value	-0.6002	-1.5901	-0.5487	-0.1942
S.E	0.0812	0.2982	0.1093	0.3513
Constant	3.1576	5.7264	2.7569	1.0821
S.E	0.4220	0.8676	0.5281	1.2403
Prob. (F.Stat)	0.0010*	0.0082*	0.0015*	0.5892
R. Squared	0.6456	0.4867	0.5018	0.0214
Panel (b): _Conditional_				
Initial Value	-0.8293	-1.7729	-0.9621	-0.1359
S.E	0.2104	0.6581	0.1037	0.3590
Constant	2.9669	-4.9211	10.3697	1.0610
S.E	2.8513	7.7074	4.2756	1.2476
Prob. (F.Stat)	0.0333**	0.0489**	0.0052*	0.5780
R. Squared	0.8515	0.9430	0.7946	0.0809

Notes: the dependent variable is the average annual growth rate of institutional quality measure. Symbols * and ** stand for significant level at 1 and 5 percent, respectively. Standard errors are in the parentheses. The control variables used in conditional convergence regression includes: initial values of institutional quality measure, real per capita GDP growth rate, education level (secondary school enrolment rate) and polity2 (political democracy), human capital, investment, R&D, governance index, religion in politics, ethnic fractionalization, geography (log of distance from the equator in KM), legal origin dummies (UK, France, Germany, Socialist).

Results of growth convergence based on panel regressions and OLS estimates are presented in *table 6.2*, which comprised of four panels, namely; sigma, unconditional beta, conditional beta and conditional beta (when only significant independent variables are included in the regression). We estimated simple OLS model I, II and III for sigma, unconditional beta and conditional beta convergence, respectively. The panel of six selected group of countries is used in the estimation, namely; Advanced, Developing, East Asian Tigers, European Union, G7 and Transition Economies. *Panel (a)* indicates results of sigma convergence (non-convergence) that whether the cross-sectional dispersion of real per capita GDP is decreased (increased) overtime. The result shows that there exist significant negative trend among all economies (except G7 and European Union), implies strong evidence of sigma convergence in the former case. However, G7 economies shows negative but insignificant trend, implies non-convergent behavior of the states. And lastly, European Union

economies show no negative trend implies non-convergent conclusion. Lastly, we can say that on average all economies are converging to the balanced growth path.

6.3 CROSS-SECTIONAL ANALYSIS

Table 6.4 *Results of Growth & Institutional Quality Convergence*

Panel (a): Growth Convergence

	Sigma	Unconditional	Conditional	Conditional (sig)
Trend/Initial Value	-0.0503	-0.5186	-1.7015	-2.0503
S.E	0.0202	0.1022	0.4747	0.3425
Constant	-3.9541	0.7102	1.2739	-6.6462
S.E	0.3646	0.4055	6.5882	4.0468
Prob. (F. Stat)	0.0136**	0.0010*	0.0001*	0.0000*
R. Squared	0.0316	0.1227	0.7387	0.7264

Panel (b): Institutional Quality Convergence

	---------	Unconditional	Conditional	--------------
Initial Value	-----	-0.6649	-1.1818	------
S.E	-----	0.0749	0.1288	------
Constant	-----	3.2496	3.1900	------
S.E	-----	0.3279	1.1591	------
Prob. (F. Stat)	-----	0.0000*	0.0001*	------
R. Squared	-----	0.4068	0.7609	------

*Notes: the dependent variable is the growth rate of real per capita GDP. Symbols * and ** stand for significant level at 1 and 5 percent, respectively. Standard errors are in the parentheses. The control variables used in the conditional growth convergence regression includes: initial value of per capita GDP growth rate, human capital, saving, investment, trade openness, R&D, expense, inflation rate, population growth rate, institutional quality, economic freedom, polity2, govt. stability, military in power and politics. And variables used in the conditional institutional quality convergence regression includes: initial values of institutional quality measure, real per capita GDP growth rate, education level (secondary school enrolment rate) and polity2 (political democracy), human capital, investment, R&D, governance index, religion in politics, ethnic fractionalization, geography (log of distance from the equator in KM), legal origin dummies (UK, France, Germany, Socialist).*

Panel (b) shows unconditional beta convergence that how the poor economies of the world are catching-up the advanced ones' in terms of real per capita GDP. The result suggest significant negative coefficient for all the economies, implies strong evidence of unconditional beta convergence. But developing and transition economies have less coefficient, implies slow speed of convergence. However, European Union economies also shows significant coefficient, implies strong evidence of

unconditional beta convergence. Therefore, their results also coincide with the theory of Sala-i-Martin (1993) which says that "beta convergence is necessary, but not sufficient condition for sigma convergence". And we see here that there exist beta convergence, but no evidence regarding sigma convergence is found for the European Union region. Normally the results of unconditional convergence tends to be slow due to the diverse structural characteristics of states e.g. law and order, culture, social, economic and political, religious and ethnic conflicts. Therefore, economists and policy makers suggest that by imposing conditions of homogenous structural characteristics, the speed of convergence can be enhanced, implies convergence in the long-run. *Panel (c)* show result of conditional beta convergence, which indicates the significant negative coefficient for all the economies, implies strong evidence of conditional beta convergence. But, now the speed of convergence is significantly enhanced by incorporating the role of control variables, and now the speed is enhanced more mainly in developing, European and transition groups. And also when compared with the coefficients of unconditional beta convergence. Hence, the results are compatible with the theory of conditional convergence. Finally, result of conditional beta convergence remains unchanged to that of *panel (c),* implies strong evidence of conditional beta convergence in *panel (d)* (by incorporating only significantly affecting variables). However, the speed of convergence has increased in all groups, but not in that ratio as it was of unconditional vs conditional beta.

Results of institutional quality convergence based on panel regressions and OLS estimates using model IV and V are presented in *table 6.3*, comprised of two panels, namely; unconditional and conditional beta convergence. *Panel (a)* represents unconditional beta convergence in institutional quality, that is how the poor quality institutes are catching-up the high quality institutes of advanced economies, in terms of rule of law, bureaucratic quality, legal system and property rights, economic and political structure, and other measures of political stability. Result shows significant negative value for all economies (except transition ones'), implies strong evidence of unconditional

convergence in institutional quality. However, the result of transition economies is negative but insignificant, implies non-convergent behavior of institutional quality. The results of conditional beta convergence are presented in *panel (b)*, which shows significant negative value of institutional quality measure, implies strong evidence of convergence. Also the speed of convergence is increased in the respective converging economies, which strongly correlates with the results of real per capita GDP and theory of conditional convergence.

Until now we have discussed our first two research questions;

I. Does there exist growth convergence in the selected countries? And,

II. Does there exist institutional quality convergence in the selected countries?

We have reached to the conclusion that there exist both types of convergence in the selected countries. And many results coincide with each other e.g. there is slow process of unconditional convergence for both types (growth, institutional quality). Also the speed of convergence has increased for both types, by incorporating the role of control variables, implies conditional convergence. One important thing is that, theoretically institutions matters to economic growth, but after incorporating separate set of control variables for both types, we see that major result coincides. For example, there exist sigma convergence, unconditional beta convergence and next conditional beta convergence with high speed in both types. And this shows that institutions had also an empirical role in the growth process of the economy. One more thing, this convergence exists mainly due to the same structural characteristics within that economy. But this doesn't ensure that the cross-country convergence around the world. We'll now proceed to check whether the institutional quality convergence leads to growth convergence?

Lastly, the results of cross-sectional analysis based on OLS estimates are presented in *table 6.4*. We classified our analysis in two panels, *(a) growth convergence,* and *(b) institutional quality*

convergence. Panel (a) consists of four types of results, namely; sigma, unconditional beta, conditional beta, and conditional beta (when only significant control variables are included in the regression). However, institutional quality convergence in *panel (b)* comprises of just unconditional and conditional beta convergence, because we already have done sigma convergence analysis of all institutional quality measures in the descriptive statistics. Results of sigma convergence in *panel (a)* shows significant value of coefficient around the world, implies strong evidence of convergence. And, hence shows that cross-sectional dispersion in real per capita GDP across the world is decreasing overtime, implies strong evidence of convergence. Results of unconditional, conditional beta, and conditional beta (when only significant control variables are included) shows significant value for all groups and estimates, implies strong evidence of respective growth convergence across the world. However, the coefficient of conditional beta convergence is higher than unconditional, implies higher speed of convergence if the relevant control variables are included in the regression. *Panel (b)* shows two types of convergence results, unconditional and conditional. The results of unconditional and conditional beta convergence show significant value of coefficient, implies strong evidence of convergence. And, hence the poor quality institutes are catching-up the higher quality institutes of advanced economies, decreasing gap across the world. The coefficient of conditional convergence is higher than unconditional, implies higher speed of convergence by incorporating the role of corresponding control variables. Finally, by comparing the result of *panel (a)* and *(b)* we conclude; theoretically institution encourages growth, then they should empirically support it. And, we have empirically found that there is sigma convergence in real per capita GDP and also in institutional quality. Next, result of unconditional and conditional beta convergence also shows that this prevails in both measures (real per capita GDP and institutional quality). Also the speed of convergence increases in both measures by incorporating the role of corresponding control variables. Finally, we concluded our 3rd research question; Does institutional quality convergence leads to growth convergence in the selected countries? We found that there exist positive correlation among

the institutional quality and real per capita GDP. And, thus institutional quality convergence leads to the real per capita GDP convergence. In-a-nutshell, we reach to the conclusion that institutions matter to growth and thus institutional quality is closely linked with convergence of real per capita GDP. Institutions play pivotal role in the growth process of economy in several ways e.g. R&D, human capital, governance, educational improvement, political stability, economic & political freedom, and lots more.

CHAPTER 7

CONCLUSIONS & POLICY IMPLICATIONS

Our study is concerned with the evolution and change of institutions across countries and over time, based on the per capita income levels. We ask whether contemporary differences in per capita income and institutional quality levels between countries have become wider or narrower. There is vast literature concerning convergence of per capita income levels across countries, but neither the theoretical nor the previous empirical literature provide clear guidance on whether we should expect the institutions of low-income countries to converge to those of high-income countries. So we let the data speak for themselves and address whether we observed institutional *'catch-up'* across the world by presenting cross-section and panel data tests of convergence on a wide array of institutional measures. And then compare the results of institutional quality convergence with that of growth convergence to check the empirical association of both (institution & growth), because theoretically institutions affect the growth of economy.

The result consists of three different estimation methods; two-stage least square (2SLS), panel data regression, cross-section analysis, based on OLS estimates for the period of 1984-2015. Firstly, we have used 2SLS due to endogeneity between institutions and growth. However, estimates presented in *table 6.1* clearly indicate negative and significant value of coefficient, implies strong convergence. Result of panel data analysis is presented in *table 6.2 and 6.3*, for growth convergence and institutional quality convergence, respectively. In *table 6.2* four panel of growth convergence indicates result of sigma, unconditional beta, conditional beta and conditional beta (by incorporating only significantly affecting variables). All panel shows significant improvement in per capita income levels and gap between advanced and poor economies is reducing, implies strong evidence of beta convergence. Cross-sectional dispersion of per capita GDP is diminishing overtime implies strong

evidence of sigma convergence. Developing and transition economies have less coefficient, implies slow speed of convergence. European Union economies show significant positive coefficient of sigma convergence and significant negative coefficient for beta convergence implies strong evidence of sigma dispersion and unconditional convergence, respectively, which coincide with the findings of Sala-i-Martin (1993) which says that *"beta convergence is necessary, but not sufficient condition for sigma convergence"*. Speed of convergence is significantly enhanced by incorporating the role of control variables; but with higher magnitude in developing, European Union and transition groups.

Next, results in *table 6.3* shows improvement in institutional quality, implies that gap between poor and advanced economies is diminishing over time because of significant negative values for all group of economies (except transition) implies strong evidence of convergence in institutional quality. However, the result of transition economies is negative but insignificant, implies non-convergent behavior of institutional quality. Significant negative coefficient of institutional quality measure implies strong evidence of convergence. And the speed of convergence has increased significantly, which strongly connects with the convergence result of per capita income level *(table 6.2)* and theory of conditional convergence.

We have reached to the conclusion that there exist both types of convergence in the selected countries. And many results coincide with each other e.g. there is slow process of unconditional convergence for both types (growth & institutional quality). Also the speed of convergence has increased for both types, by incorporating the role of control variables, implies conditional convergence. One important thing is that, theoretically institutions matters to economic growth, but after incorporating separate set of control variables for both types, we see that major result coincides. For example, there exist sigma convergence, unconditional beta convergence and next conditional beta convergence with high speed in both types. And this shows that institutions had also an empirical role in the growth process of the economy. One more thing, this convergence exists mainly due to the

same structural characteristics within that economy and doesn't ensure the convergence across countries.

Lastly, cross-sectional analysis result based on OLS estimates is presented in *table 6.4*. We categorized our analysis in two panels, *(a)* growth convergence, and *(b)* institutional quality convergence. Result of *panel (a)* indicate significant coefficient for all types of convergence which ensures the improvement in per capita income levels across countries, implies strong evidence of growth convergence. And again the speed of convergence has enhanced in all measure by incorporating the role of control variables (long-run determinant of growth). *Panel (b)* shows significant negative values of coefficient for both types and significant improvement in institutional quality which ensures strong evidence of convergence. Therefore, poor quality institutes are catching-up the higher quality institutes of advanced economies, decreasing gap across the world. Coefficient of conditional convergence is higher than unconditional, implies higher speed of convergence by incorporating the role of corresponding control variables.

Finally, by comparing the result of *panel (a)* and *(b)* we empirically found sigma convergence in real per capita income and institutional quality level, implies dispersion is decreasing across the world in both measures. Next, result of unconditional and conditional beta convergence also shows that this prevails in both measures (real per capita level and institutional quality) and indicates improvement in real per capita income and institutional quality level, implies that poor economies are catching-up the richer economies of the world. The speed of convergence increases in both measures by incorporating the role of corresponding control variables. Therefore, we concluded our 3rd research question *'Does institutional quality convergence lead to growth convergence in the selected countries'?* And we have found that there exists positive correlation among the institutional quality and real per capita level, which strongly follows that institutional quality convergence lead to real per capita GDP convergence.

Policy Recommendations & Future Research Scope

Our study concludes that institutions and economic growth are complements to spur the growth of an economy in an efficient manner. In-addition, institutional quality has been improving with the pace that of economic growth i.e. growth rate of real per capita GDP and institutional quality is improving day-by-day in poor economy, evident from convergence estimates. But in reality, why are the poor economies of the world still lagging behind than that of the rich nations? The logic is very simple. The poor country lacks bulk capital, political stability, education & health facilities, good-governance, non-corrupt government, rule of law, economic & political freedom, religion peace, and lots more. Therefore, policy-makers and other think tanks should focus on all these factors, especially education & health. Government should minimize the conditions imposed by aid donors at the time of aid, because these conditions don't constitute the true meaning of aid, in spite of other purposes. Lastly, government should focus on R&D and trade sector that how the trade openness enhances growth in multiple ways. One can make future research that how *The Global Competitiveness Report* pillars of growth are useful to identify the economy's prosperity level in different manners.

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