Human Capital, Institutions, Structural Change and Economic Growth: Evidence from Asian Countries

Umar Riaz
Reg. No. 125/SE/PhD/S14

Supervisor:
Dr. Babar Hussain
Assistant Professor, IIIE

Co-Supervisor:
Dr. Arshad Ali Bhatti
Assistant Professor, IIIE

SCHOOL OF ECONOMICS

INTERNATIONAL INSTITUTE OF ISLAMIC ECONOMICS

INTERNATIONAL ISLAMIC UNIVERSITY, ISLAMABAD

2022

Human capital - Asia

Institutional economics - "

Structural change (Economics) - "

Economic development - "

Asia - Economic conditions.

" - " Policy

Human capital, Institutions, Structural Change and Economic Growth: Evidence from Asian Countries

By

Umar Riaz

Reg. No. 125-SE/PhD/S14

Supervised by:

Dr. Babar Hussain

Assistant Professor, IIIE

Co-Supervised by:

Dr. Arshad Ali Bhatti

Assistant Professor, IIIE

A dissertation submitted to the School of Economics, International Institute of Islamic Economics in partial fulfillment for the award of Doctor of Philosophy degree in Economics of the International Islamic University Islamabad.

2022

Declaration of Authorship

I, **Umar Riaz** S/O **Naseer Khan**, Registration No. 125-SE/PhD/S14, student of PhD Economics at the School of Economics, IIIE, IIUI, do hereby solemnly declare that the thesis entitled **"Human Capital, Institutions, Structural Change and Economic Growth: Evidence from Asian Countries"**, submitted by me in partial fulfillment for the award of Ph.D. degree in Economics, is my original work, except where otherwise acknowledged in the text. I have carried it individually under the supervision and guidance of my supervisors. I further declare that this work has not been submitted to any institution for the award of a certificate, diploma, or degree. It is done in partial fulfillment for the Doctor of Philosophy in Economics of the International Islamic University Islamabad.

Date: June 27, 2022

Signature:_____

Umar Riaz

Registration No. 125-SE/PhD/S14

APPROVAL SHEET

Human Capital, Institutions, Structural Change and Economic Growth: Evidence from Asian Countries

By

Umar Riaz
Reg. No: 125-SE/PhD/S14

Accepted by the International Institute of Islamic Economics (IIIE), International Islamic University Islamabad (IIUI), as partial fulfillment of the requirements for the award of degree of **DOCTOR OF PHILOSOPHY** in **ECONOMICS**

Supervisor:
(Dr. Babar Hussain)
Assistant Professor, IIIE, IIUI

Co-Supervisor:
(Dr. Arshad Ali Bhatti)
Assistant Professor, IIIE, IIUI

Internal Examiner:
(Dr. Miraj ul Haq)
Assistant Professor, IIIE, IIUI

External Examiner I:
(Prof. Dr. Muhammad Idrees)
Dean, Faculty of Social Sciences, QAU, Islamabad

External Examiner II:
(Dr. Saud Ahmed Khan)
Assistant Professor, PIDE, Islamabad

Dr. Hamid Hasan
Head,
School of Economics,
International Institute of Islamic Economics
International Islamic University Islamabad

Prof. Dr. Abdul Rashid
Director General,
International Institute of Islamic Economics
International Islamic University Islamabad

Date of Viva Voce Examination: June 27, 2022

Disclaimer

The views in this publication are exclusive of the author. The author does not accept any responsibility for the validity of the evidence presented or costs resulting from its use by third parties.

Dedication

To my Parents!

Acknowledgements

Once looking merely a cherished dream of having a higher degree in Economics, has now become a concrete reality. The journey from this dream to reality was not only long but also challenging. However, the author was fortunate to receive insightful comments, useful pieces of advice, and positive motivations from many people throughout this journey. They all deserve profound appreciation as they partly define who I am now.

I am foremost, grateful to Allah (SWT); the Almighty, the most Merciful, the most Beneficent who directed and steered me in accomplishing this thesis. And after Almighty Allah to his Prophet Muhammad ﷺ *; the greatest of blessings of Allah, the most perfect and exalted, forever a source of guidance for humanity.*

After that my heartiest gratitude and appreciation go to my supervisor Dr. Babar Hussain and co-supervisor Dr. Arshad Ali Bhatti. The former was exceptional in his guidance, encouragement, and welcoming at every stage of my research work while the latter was tremendous in the empirical analysis and common technical aspects of the research work.

Due special thanks are to all the teaching and administrative staff, cla,ss fellows and friends in the economics department and at the university with whom I shared my time. Moreover, it is worth mentioning that the life of any graduate student in the economics department would be multiple times more challenging without the support of Dr. Tauqir Ahmad and Mr. Syed Niaz Ali Shah.

I am also thankful to my parents for their support and patience, and regret, not giving them proper time in the later stages of their age.

For any errors or inadequacies that may remain in this work, the responsibility, of course, is entirely mine.

Umar Riaz

List of Contents

List of Tables

List of Figures

List of Appendices

List of Abbreviations and Acronyms

ADB	Asian Development Bank
APO	Asian Productivity Organization
CPI	Corruption Perceptions Index
ECA	Europe and Central Asia
FE	Fixed Effects
GMM	Generalized Method of Moments
HC	Human Capital
HIC	High-Income Countries
INS	Institutions
IMF	International Monetary Fund
IVs	Instrumental Variables
ICRG	International Country Risk Guide
LAC	Latin America and Caribbean
M&LIC	Middle-and-Low-Income Countries
MENA	Middle East and North Africa
MLI	Modified Lilien Index
NAV	Norm of Absolute Value
NGOs	Non-Government Organizations
OECD	Organization for Economic Cooperation and Development
OIC	Organization of Islamic Cooperation
OLS	Ordinary Least Square
PRS	Political Risk Services

PWT	Penn World Table
R&D	Research and Development
SA&EAP	South Asia and East Asia Pacific
SC	Structural Change
SSA	Sub-Saharan Africa
SSA	Shift Share Analysis
2SLS	Two-Stage Least Squares
WB	World Bank
WDI	World Development Indicators
WGI	World Governance Indicators

ABSTRACT

Although being a major significant quest of all economies, economic growth is not an automatic phenomenon as stark diversity exists in the economic performance across the countries and regions. This has led to a burgeoning of literature seeking to explain the comparative economic growth whose extensive review brings into our limelight three most important narratives: human capital, institutions, and structural change. The study at hand synthesizes these three insights into a single coherent framework. Most of the prior empirical literature related to their growth effects is only fragmented and modeled separately. Specifically, this holistic approach provides us with an opportunity to fill the gap in the present literature by empirically showing their importance in economic growth. Also, the most noteworthy contribution is the exploration of the inner mechanism in which human capital and structural change as well as institutions and structural change, moderate each other's growth effects.

In connection to the above discussion, Asia's remarkable growth performance in the last couple of decades presents itself as a prime candidate to be studied as it is currently under the intense reign of global economic and policy academia. Depending on the availability of the data, we take a panel dataset of 21 countries covering the period of 1971 to 2017. The empirical strategy entails estimating a simple dynamic growth model where, in addition to conventional control, human capital, institutional quality, and structural change are included as explanatory variables. The estimation is carried out via the generalized method of moments technique which efficiently tackles the problem of potential endogeneity in the model. The study portrays four main results. First, all of our focused variables provide a positive incentive for growth. Second, there is substitutability between human capital and structural change, but this relationship weakens as both increase. Third, there is complementarity between institutions and structural change, but this relationship strengthens as both increase. Finally, our results are generally sensitive to alternative proxies of these variables and also to alternative econometric techniques. The encapsulated suggestions arising from the results taken together are that the concerned policy makers must chalk out a holistic development policy framework for promoting human capital, institutional quality, and structural change for long-run economic growth.

Chapter 1

INTRODUCTION

I.I Background

The quest for economic growth is one of the most important objectives of nations. It has been a core concern and fundamental issue of economics. It is an inextricable content of economics as a social science since it started as a discipline. It is essential as it is accompanied by economic progress and is also the main quantitative factor for economic development (Neamtu, 2015). Ali and Saif (2017) consider it the 'holy grail' for the economic policymakers as it matters a lot in reducing poverty, inequality, unemployment, budget deficit, and subsequent social miseries. Osipian (2008) considers it a quintessence of socio-economic development and a guarantor of sustainable development. It can be rightly called a pinnacle of the 20th century that insured high living standards and development of the Western world (Boldeanu & Constantinescu, 2015).

Although every country in the world desires to have high economic growth, but Nurkse (1953) asserted that it is not an automatic and spontaneous phenomenon. The core of the matter is that significant disproportions exist in the economic performance across the countries and regions. Bluhm and Szirmai (2012), note the disproportion in the economic growth and report that in 1820, the West was on average two times wealthier than all other regions of the world but in 2007, this difference reached twenty-one times. They attributed this to the differences in the long-run growth rates. Similarly, according to Greiner et al. (2016), marked variations in the growth patterns of countries can be observed over the past two hundred years. In the nineteenth century, the United Kingdom

was leading the economic world while Germany and France were in a catch-up phase, and at the turn of the twentieth century, the United States leapfrogged the European countries while after World War II, Germany and Japan saw an astonishing growth in their per capita incomes. Yet, during the same period, countries in other parts of the world were languishing in poverty. According to Constantine and Khemraj (2019), how some countries of the world got rich and headed forward on the growth ladder while others stay poor and lagged has been a core concern regarding economic change and persistent under-development. The diversity in economic performance across the countries and regions is a major challenge for economic theorists. Economists have been struggling for a long to comprehend this phenomenon. This is because the levers of economic growth vary across time not only within the countries but also across the countries. Likewise, the prescriptions and factors that were once utilized by a particular country for economic progress could not affect the other nations (Gabardo et al., 2019).

Over the past few decades, theoretical and empirical economic work has flourished exponentially. This has not only rejuvenated our interest in the field of economic growth but has also increased considerably our understating of this phenomenon. The theoretical perspective of economic growth has advanced in many dimensions. This includes, among other things, an investigation of endogenous technological change (Romer, 1986) and the relationship between technological spillovers, physical and human capital accumulation, institutions, population, and fertility. Furthermore, the increasing availability of reliable datasets like the Penn-World Table has opened the flood gates to empirical investigations (both cross-sections and time series), particularly after the seminal methodology of Barro (1991) (Sachs & Warner,

1997; Singh, 2012). However, despite the burgeoning of literature, concrete conclusions remain to be drawn, as studies are still rushing in this area. This current endeavor cannot, of course, encompass all the existing issues, but can take some of the key themes emerging from our literature review and put them in a new light. This study focuses on the three most important narratives: human capital, institutions, and structural change[1].

The above-selected concepts are loose terms and defined along with an extensive gamut. In lexicographical contexts and economic academia, each one reflects many dimensions and uses in many meanings. They have not a commonly accepted definitions as different studies have articulated them differently. For instance, human capital is often considered as the knowledge, expertise, and skills of individuals. It is the "invisible" potentialities of individuals that can be utilized for creating economic value. According to Mohanty and Sethi (2019), human capital involves the perception of a 'human as creator' who acquires and applies knowledge, skills, and competencies arising from his regular relationship with 'self and environment'. On the footings of Schultz (1961), and Becker (1964), Benos and Zotou (2014) define it as the "set of knowledge, skills, competencies, and abilities embodied in individuals and acquired, for example, through education, training, medical care, and migration". Recently, the notion of human capital has been enlarged to include non-market activities too. This can be observed in the Organization for Economic Cooperation and Development (OECD, 2001) definition of human capital, "the knowledge, skills, competencies, and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being". However, in the current study, because of the easy availability of data, our focus is on education only.

[1] Throughout this study, the terms human capital and education, institutions and institutional quality, and structural change and structural transformation are interchangeably used.

As far as the concept of institutions is concerned, it has also been defined by a wide array. Wako (2018b) argues that although, defining institutions is one of the most challenging tasks in the economics literature, yet different scholars have defined it differently. As a general perception, institutions are characterized as human-made regulations that govern their interaction in a society. According to Leftwich (2006), in all human societies, complex and overlapping economic, political, social, or cultural interactions and practices take place regularly. These interactions are based on a pre-defined set of rules and guidelines that constitute institutions. The most familiar definition of institutions in academia is given by North (1990), who defined institutions as the "rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction". The 'rules' embody both formal and informal rules. Formal rules represent constitutions, laws, rules, and regulations enforced by the state whereas informal rules include values, customs, norms of behaviors, protocols that are usually prescribed by the relevant members of society. In the current study, because of the easy availability of data, our focus is on the former: formal rules and laws related institutions.

Similar to human capital and institutions, the concept of structural change is also wide and extensive. It has been used in the economics literature in different meanings and interpretations (Aggarwal & Kumar, 2015). According to Stijepic (2011), the word 'structural change' can represent many aspects like; institutional changes, demographic changes, agent's behavioral changes, etc. in economics. The author further states that each of these aspects are different concepts and hence require completely different modeling, analysis and time horizons. Similarly, Matsuyama (2008) maintain that structural change is a multifarious phenomenon that entails various changes in the economy like, "sector compositions of output and employment, the organization of

industry, the financial system, income and wealth distribution, demography, political institutions, and even the society's value system". This study's focus is only on the changes in sectoral compositions, mainly in terms of employment. Our particular interest in labor lies in the assertion of Lavopa (2015) that labor is the strategic variable in all dual-economy models and also the heart of economic development means the reallocation of labor from subsistence towards absorption in the modern sector. In this context, structural change can be described as the reallocation of productive inputs like labor between sectors of the economy. Herrendorf et al. (2014) define structural change or transformation as "the reallocation of economic activity across the broad sectors; agriculture, manufacturing, and services". Vu (2017) states that structural change is the continual movement of labor from low productivity sectors towards ones. By United Nations (2016), structural transformation entails, "a shift in the use of factors of production, as labor is moved from low productivity (agriculture) to high productivity sectors (industry, including agro-industry)". A narrowed concept of structural change, according to Gabardo et al. (2017), is a shift in the relative worth of the three broad sectors: agriculture, manufacturing, and services during the course of economic expansion. In a broader perspective, structural change includes all variations in production employment occurring within and between sectors of the economy, the emergence of new sectors, and the effacement of existing ones.

This study empirically relates the above three concepts defined so far – human capital, institutions, and structural change to economic growth of selected Asian countries. Despite voluminous previous studies, separately documenting their importance in the growth processes of Asia as well as other countries/regions of the world, we

synthesized these three insights into a single coherent framework. Our effort shows their relative importance in economic growth. In addition, we studied the inner mechanism in which human capital-structural change as well as institutions-structural change moderate and augment each other's impact on economic growth. This also needed an important consideration because processes of moving forward or falling behind cannot be adequately explicated by looking at only one aspect of the issue. The recent economic performance of the South Korea, Singapore, and Hong Kong in the international arena, for example, has shown that these countries have not only changed their economic structures from agriculturally based economies to industrial and services based but also improved fundamentals like human capital, institutions, and infrastructures, amongst others.

1.2 Motivation

Economists, policymakers, and practitioners, all alike, are in constant strenuous search for how and why economic growth occurs. There is no dearth of theories related to comparative economic growth and development explanation (Constantine & Khemraj, 2019). There are theories and models ranging from classical to modern, explaining the driving forces of spearheading economic growth. According to Constantine (2017), there are four major traditions[2] that are considerable in economics to explain the differences in growth performance between countries or to answer the question "why are some countries rich and others poor?"

[2] McMillan et al. (2017)) divide it into two traditions, namely; dual economy models and neo classical models. He also takes human capital and institutions under one rubric called "fundamentals".

First, there are the theories of exogenous growth (Solow, 1956; Swan, 1956), which consider differences in capital accumulation and technical change as the main causes of the world countries' division into rich and poor. But what is causing these differences, or why are they happening? The theories are silent and therefore do not answer the questions about differences in growth performance between the countries. Second, it includes the endogenous or new growth theories (Romer, 1990; Grossman & Helpman, 1991; Aghion & Howitt, 1992), which attempt to overcome the weaknesses of exogenous theories. According to these theories, differences in innovations and human capital are the main causes of the divergence in technical change, growth rates, and capital accumulation. But the questions such as why there are marked variations in the literacy rate between nations or why some countries invest more in education than others, and why some countries are innovators while others are still imitators remain unanswered.

The third tradition, called 'new institutional economics' (North, 1990; Acemoglu & Robinson, 2013), considers variations in institutions across countries as the prime cause of their different economic performances. Rodrik et al. (2004) triumphantly claim that the quality of institutions trumps all the other factors regarded as factors of growth. The fourth tradition is based on the economic structure of the economy. It finds its roots in the dual economy model initially propagated by Lewis (1954) and popularized by Ranis and Fei (1961). Dual economy models bifurcate the economy into two sectors: the traditional (agricultural) sector and the modern (industrial) sector. The former is backward and technologically stagnant and has an unlimited labor supply at the subsistence wage level. Capital accumulation and research and development (R&D), and

innovation only occur in the latter sector and, therefore, has a greater possibility of expansion. According to McMillan et al. (2017), the growth of an economy depends on the structural change in which the resources, especially labor, leave the subsistence sector(s) and join the modern sector(s). Constantine (2017) contends that it is the economic structure that is the root cause of growth and not the institutions as propagated by the 'Institutionalists' (who believe that the theories of exogenous and endogenous growth ignore institutions). However, the 'Institutionalists' make the same mistake by overlooking the economic structure of countries. The study of Constantine (2017) underlines that variations in economic performance (variations over time and space) are due to economic structure and not the institutions. Basically, institutions are endogenous and shaped by the economic structure of the economy.

All of the above approaches cover a comprehensive and extensive intellectual pedigree. Each of them considers the primacy of one over the other, yet a concrete conclusion is far to be reached. McMillan et al. (2017) argue that while each of the traditions discussed above prescribes different recipes for productivity improvement and development, they are nonetheless complementary to each other, as each envisages economic convergence with rich countries. Indeed, each intends to explain why some countries are rich and growing while others are poor and lagging. Neoclassical and endogenous theories focus on the aggregates and assert that poor countries lag due to low levels of physical and human capital. For Institutionalists, establishing high-quality institutions is the only way for poor countries to climb the growth ladder. In the case of dual economy models, while showing marked stark differences in the productivity of the subsistence and modern sectors, the emphasis is on the flow of labor between sectors. For

Dualists, growth is about shifting labor from the traditional, less productive sector to the modern, highly productive sector. This means that with a high level of human capital, quality of institutions, and structural transformation, there should be ultimate convergence of developing countries with rich countries.

According to Ando and Nassar (2017), productivity gains, which are crucial drivers of economic growth, have been declining recently for many reasons. The most important of these is the slowing down of human capital accumulation, institutional rigidities, and structural change[3] in the form of resource shifts from high productivity sectors to low productivity sectors. Nguyen (2018), while making recommendations for Vietnam's long-term sustainable development, emphasized structural transformation and up-grading human capital and institutions, among others. In addition, McMillan et al. (2017) maintain that the failure of convergence between countries gives rise to two major challenges for the economic decision-makers, namely: "structural transformation challenge" and "fundamentals challenge". The structural transformation challenge is linked to the notion of how productive resources, especially labor, are moved out from the less productive to the more productive sectors. On the other hand, the fundamental challenge relates to the notion of how an accumulation of knowledge and skills as well as strengthening of institutions are achieved to generate sustainable productivity growth.

According to McMillan et al. (2017), a policy prescription may he helpful for hoth challenges at first glance. For example, boosting human capital and strengthening governance/institutions can be useful for the whole economy and for structural change in the form of manufacturing/industrial expansion. In addition, reducing industrial

[3] These three determinants come under the above mentioned four traditions. Human capital is the topic of exogenous and endogenous tradition; Institutional rigidities are related to Institutional Economics while structural change is the main theme of Dualists.

regulations and increasing foreign trade can be advantageous for the structural transformation as well as the whole economy. Despite this substantial overlap between the two sets of policies, for sustained and rapid growth, both processes are necessary. This is illustrated by a typology given in Appendix 1 in the Appendices. According to McMillan et al. (2017), the fundamentals (i.e., human capital and institutions) that require costly, broad-based and longer-term investment in the economy will only produce steady but slower growth if it is not backed up by rapid structural change. This implies that structural change will augment and amplify the growth effects of human capital and institutions and sustain it. Moreover, mere rapid structural change is not enough for economic progress. Once paired with equally improved fundamentals like human capital and institutions, only then can a country achieve rapid and sustained growth.

Likewise, Teixeira and Queirós (2016) argue that promoting economic growth cannot be seen only as the result of human capital, but that investments are also needed in technology-intensive sectors that help produce commodities with high added value. This means simply increasing human capital through investment in formal education is not enough for fostering economic growth, but it should be integrated with multifaceted policies involving structural change by creating technology-intensive industries so that the educated population can be properly absorbed.

Constantine (2017) argues that the fundamental drawback in the new institutional economics is that for institutional outcomes, there is a built-in assumption that capabilities of production are already intact. But the poor countries cannot stimulate growth by simply "downloading" institutions from advanced ones. Indeed, these countries do not have the necessary economic structure of increasing returns like high

technology manufacturing that produces high value-added commodities. Since enforcing institutions are not a "free lunch" and poor countries are characterized by diminishing returns, economic activities cannot generate sufficient revenues to cover the enforcement costs. The opposite can be found in rich countries where economic structures are generally based on increasing economic activities. This means that the country's economic structure plays a prime role in determining the performance of institutions (Constantine, 2017).

From the above discussion, we have inferred that human capital, institutions, and structural change are not only among the crucial determinants of economic growth but also there exist interrelationships between them. This was the main motivation for us to add to the prior stock of knowledge by investigating the relative importance of these three determinants and also their inner mechanism in improving economic growth. Thus, our current effort has been recognized in building a bridge between the different strands of literature like Neoclassicals, Institutionalists, and Dualists. We are curious not only to find the relative significance of human capital, institutions, and structural change in fostering economic growth but also the contingent impact of these variables. Specifically, we probe the joint moderating effect of human capital and structural change on economic growth. In the same vein, we also intend to study the joint moderating effect of institutions and structural change on economic growth.

Thus, in summary, on the one hand, the main contribution of this study has for sure pinned down the relative role of human capital, institutions, and structural change in economic growth. On the other hand, more importantly, it has added to our

comprehension of how joint changes in human capital and structural change as well as institutions and structural change impact economic growth.

1.3 Research Objectives

The aim of this study is to empirically explore the interplay between human capital, institutions, structural change and economic growth. The main objectives are:

1. To explore the role of human capital, institutions, and structural change in the growth process of selected Asian countries.
2. To explore the joint role of human capital and structural change in the growth process of selected Asian countries.
3. To explore the joint role of institutions and structural change in the growth process of selected Asian countries.

1.4 Research Questions

The main sorted questions to be answered by the study are as under:

1. Do the human capital, institutions, and structural change significantly impact the economic growth of the sampled countries?
2. Do both human capital and structural change jointly explain economic growth?
3. Do both institutions and structural change jointly explain economic growth?

1.5 Research Hypotheses

The main hypotheses to be tested empirically are as under:

1. Countries having more stock of human capital will observe higher economic growth.
2. Countries having a high quality of institutions will observe higher economic growth
3. Countries that experience more structural change will observe higher economic growth.
4. The human capital and structural change will amplify each other's growth impact.
5. The institutional quality and structural change will amplify each other's growth impact.

1.6 Significance of the Study

The debate in the above section gives us the notion that voluminous theoretical and empirical literature is available on the relationship between human capital, institutions, and structural change variables with economic growth. Although these three are the most potent factors to explain a country's growth and productivity performance, however, a firm conclusion cannot be drawn as their relationship to economic growth and productivity is contentious and disputable[4]. Due to this inconsistency in results, it stands

[4] For mix results, see e.g. Ahsan and Haque (2017) for human capital-growth nexus; Nawaz et al. (2014) for institutions-growth nexus; and Zulkhibri et al. (2015) and Vu (2017) for structural change-growth nexus.

out imperative to go for a more in-depth analysis of their respective roles as growth factors.

Our study argues, following McMillan et al. (2017) assertion, that to have a firm conclusion; it is necessary to have a single framework to study the impact of the fundamentals like; human capital, institutions, and structural change and their inner mechanical relationship in explaining country's economic performance. To this end, we have hypothesized the outline of the study wherein these variables and the channels through which these affect economic growth are considered.

From the above introductory discussion and review of literature in chapter-2, in most of the prior empirical literature, studies related to these three areas are mostly fragmented and modeled separately. In the previous cross-country empirical literature, a gap still exists as studies have paid surprisingly little attention to the complementarities between the variables of our interest (particularly human capital with structural change, and institutional quality with structural change) in their growth-related analysis. However, by combing the bulk of empirical literature, only a few exceptions to this generalization can be pinpointed, such as Teixeira and Queirós (2016); and Adabar and Sahoo (2018), who found only the interactive effect of human capital with structural change on economic growth while the institutional factors were used as additional control variables in their analysis. Thus, we follow these two studies as a pathway to move forward. However, we definitely extend their studies and deviate from them on certain points in order to make the current effort a novelty and to contribute significantly to the existing pool of literature.

Taking the case of Teixeira and Queirós (2016), it is focused only on relatively developed countries[5] and hence used the employment share in technology/knowledge-intensive sectors to measure the structural change term. However, our focus is on different Asian countries, including low, middle, and high-income countries; therefore, we cannot use this definition or measurement of the structural change mainly because of data limitations. Here we adopt the operational definition of structural change as labor reallocation across sectors and over time (Ahson, Muhammad & Sarwar, 2017; Ahson, Siddiqi & Mirza, 2017; and Vries et al., 2016). Regarding the study of Adabar and Sahoo (2018), although they have used the same definition of structural change as we intend, we are far variant and comprehensive than them in many aspects. In other words, their focus is on Indian cross-states, while our concern is on the selected Asian cross-countries. Their data covers the period 1993 to 2012 while ours is from 1971 onwards through 2017. Our used Generalized Method of Moments (GMM) technique for estimation purposes is more pronounced in tackling endogeneity in the model than theirs using fixed-effect models.

Moreover, our study also aims to find the joint impact of institutions and structural change on economic growth. It is well-established in the literature that both the variables weigh up each other's growth efficacy. The good quality of institutions and governance accelerates reallocation of labor from traditional/low productivity sector(s) to the modern/high productivity sector(s) and hence lead to more aggregate productivity and growth (Carraro & Karfakis, 2018). Also, according to Constantine (2017), the economic structure based on increasing returns activities (like high technology manufacturing that produce high value-added commodities) will spur the growth outcomes of institutions. Totouom et al. (2019) maintain that there exists a bi-causal link between institutions and

[5] They have selected 21 OECD countries Plus 7 of eastern Europe and 2 Mediterranean countries

structural change. On the one hand, if good quality institutions release resources from agriculture to manufacturing and will lay the basis for higher rates of productivity-induced growth structures, on the other hand, industrialization and the improvement of the living standard that it entails is likely to make people less corrupt, and in general, more willing to set up better institutions. However, no study has empirically investigated the joint role of institutions and structural change in growth analysis so far as per our knowledge. Therefore, our endeavor in finding the joint conditional impact of institutions and structural change on growth performance will be a phenomenal contribution to the existing pool of knowledge.

From the above discussion, it may be clear that the present study is unique in nature, diverse in content, and important in scope to apprehend the process of growth. While this study does not only shed more light on the effects of human capital, institutions, and structural change on economic growth, but it also provides a deep understanding of the complementarities that prevail amongst the factors to influence the process of economic growth. All in all, we can say that this study aims to provide some of the key answers regarding the direct effects of human capital, institutions, and structural change on economic growth. In addition, the study also delineates the joint effects of human capital and structural change as well as institutions and structural change on economic growth. The present study therefore definitely strengthens and adds much to the existing bulk of the growth-related literature. The study unveils empirical evidence which paves a guidance path for academicians and concerned policy makers.

1.7 Summary of the Chapter

The question of why some countries are racing forward in getting better economic conditions while others are lagging is the subject of intense debate in the growth and development literature. Human capital, institutions, and structural change are the three main considerable approaches to the development process. Each of these three considers primacy of one over the other, but a concrete conclusion is yet to be forthcoming. Strong complementarity is also expected between the human capital and structural change as well as institutions and structural change in their growth effects. Therefore, this study aims not only to empirically re-examine the direct growth effects of the above-mentioned three variables but also the most viable joint effects between the variables in selected Asian countries' contexts.

1.8 Scheme of the Study

This study as a whole is comprised of five inter-related chapters, and the outline is set out as follows. The first chapter explains the rationale behind the chosen issue and the area it covers as a scope. The objectives and hypotheses of the study are also part of this chapter. Chapter-02 reviews some of the major contributions from the past literature (theoretical as well as empirical) and attempts to extract the gap in existing studies for our current study. Chapter-03 comprises the model and detailed methodology to be adopted during the research. Details related to variables definitions and construction, data, and its sources can also be found there. Chapter-04 depicts the empirical findings and discussion. Chapter-05 concludes the dissertation and presents our limitations and also suggests avenues for further research. References and appendices are also given at the end of Chapter-05.

Chapter 2

LITERATURE REVIEW

After going through a brief overview of the literature in the introductory chapter, it became clear that growth matters for a country's economic progress and welfare. However, what actually causes growth still remains a challenging question as studies are still rushing into this field with different socio-eco-techno-politico prescriptions. However, it is well established that, among others, human capital, institutions, and structural change are essential in a country's growth process. Numerous theoretical and empirical studies related to these three elements exist in the literature, the most important efforts of which need to be examined in depth.

2.1 Theoretical Literature

The following sub-sections contain a deep theoretical and historical insight into human capital, institutions, and structural change and their nexuses with economic growth

2.1.1 Human Capital and Economic Growth

The idea of human capital is not new in economics. It is lingering right from the era of Classical economists. Le et al. (2005), citing Adam Smith (1776) argued that economists long recognized the importance of people in the wealth of nations. Devadas (2015) claimed that the notion of human capital was first illustrated by Adam Smith (1776) as an 'educated man' while Sweetland (1996) reported that Adam Smith (1776) had treated human efforts as the root of all wealth. Sovina (2000) argued that the origins of the subject of economics lie in the analysis of human behavior while exchanging goods

in the market. The author further notes that as most of the theories and models of economics make specific assumptions regarding human behavior, it becomes necessary to analyze the conditions that enable them to be more conducive in utilizing their capabilities, to be more competitive and productive. This requirement has led to the development of human capital theory, which has been incorporated into many micro and macro-economic models and has become an inseparable part of several theoretical approaches.

Most of the academic reviews agree to the point that human capital gained importance as a factor of growth in the 1960s, particularly after Mincer (1958), Fabricant (1959), Schultz (1960; 1961), Denison (1962), Becker (1960; 1964), Arrow (1962), Uzawa (1965), and Nelson and Phelps (1966). The decade of the 1960s has a seminal Neo-Classical growth model of Solow (1956) and Swan (1956). It has one of the most important predictions that poor countries will outpace the rich in their per capita growth rates. It means that, with time, poor countries would catch up with the rich countries. Actually, the Neo-classical models responded to the failure of the Malthusian model in that it is the exogenous technical population that determines the output-input ratios (Abbas, 2001).

However, Human capital was the prime focus of neither Malthus's nor the Neo-Classical's approach to growth, yet the case for a human capital role in spurring economic growth is quite strong. Since economic growth and development primarily depend on technology and scientific knowledge, human capital in the form of better skills and education can have a major role in it. In advanced counties, their higher levels of education and skilled labor force have a major role in their growth rates, while poor

countries face hurdles to escape the low capacity for growth due to their low and sluggish level of education.

The basic drawback of the neoclassical model is that it assumes technological progress exogenous, that is "manna from heaven" which is actually the main source of long-run economic growth. By this assumption, the model overlooks the inner peculiarities and abilities of the economies, which help them to grow on different economic paths over the time. This led to the emergence of new growth theories, also called endogenous growth models. Unlike Neoclassicals, these models consider technological progress as endogenous. It means the long-run growth of economies depends on their intrinsic characteristics. This suggests that endogenous models do not assume convergence of income in the economies but will diverge to different growth paths.

In particular, the endogenous specification explicitly models technological progress, which is usually related to educational expenditures (Wilson & Briscoe, 2004). The specification of technological change and knowledge in the neoclassical framework is difficult because of the presumed competitiveness, which hinders the possibility of increasing returns to scale. In contrast to exogenous models, returns to both physical and human capital investment will not diminish over time but will result in indefinite continuity in economic growth in endogenous models. The diminishing returns are offset by the spillover effects of education and skills as well as by foreign technology imitation via improved human capital (Wilson & Briscoe, 2004).

Different growth models can provide details of the theoretical foundation of a human capital relationship with economic growth. Aghion et al. (1998) categorized

growth models related to human capital into two distinct groups. In the first group, human capital accumulation sustains economic growth which implies that human capital is a direct factor of production, and its accumulation affects the process of growth in the economies. This role of human capital accumulation makes it a flow variable. These models are Lucas (1988) and Mankiw et al. (1992).

In the second group, the existing stock of human capital is considered a vital source of growth. This can help in producing new knowledge (Romer, 1986) or an adaptation and imitation of foreign technologies (Nelson & Phelps, 1966; Benhabib & Spiegel, 1994). By assuming more innovation as a result of higher stock of human capital, these models predict that rising stock of human capital will result in an increase in productivity and hence indirectly in growth.

2.1.2 Institutions and Economic Growth

Over the latter half of the 20th century, the exogenous and endogenous growth models and all their subsequent variants are in constant theoretical and empirical use to delineate and isolate the main determinants of sustained economic growth. In these models, differences in factors accumulation across the countries may be due to saving rate (Solow, 1956), preferences (Cass, 1965; Koopmans, 1965), or other exogenous modules like total factor productivity growth. Although institutions in the form of well-defined property rights for the exchange of goods and services in the market are part of these models, but variations in incomes are not explained by differences in institutions (Acemoglu et al., 2005).

The new growth theories of Romer (1986) and Lucas (1988) emphasize the externalities of physical and human capital for enhancing steady-state growth; while

Romer (1990), Grossman and Helpman (1991), and Aghion and Howitt (1992) endogenized the steady-state growth and technical progress (Acemoglu et al., 2005). But the questions like why there are considerable variations in the literacy rate across the countries or why some countries invest more in education relative to others, and why some countries are innovators while others are always imitators, are not answered by the exogenous as well as endogenous theorists (Constantine, 2017; Jilenga & Helian, 2017).

Although the exogenous and endogenous growth theories are still intact in economic literature and have provided many useful and interesting insights regarding the economic growth mechanism, they failed to put forward a *fundamental* explanation for economic growth (Acemoglu et al. 2005). According to North and Thoms (1973), factors like capital accumulation, innovation, economies of scale, education, etc., are growth itself, not the factors of it. Capital accumulation and innovation are the *proximate* causes, while it is the institutions that are *the fundamental* cause of the differences in growth performance among the countries. Acemoglu and Robinson (2010) argue that actually, the differences in the accumulation and efficiency of proximate causes like human capital, physical capital, and technology across the countries underlie the fundamental cause, which is institutions.

In essence, institutions are a comprehensive concept. It represents the social, political, and economic fabric of a society (Khan & Javid, 2015). The term 'institutions' is more simply defined by North (1990) as "rules of the game or more formally humanly devised constraints that shape human interactions, facilitate exchanges and allocation of resources".

Institutions are fundamental to a country's capacity to expand economically. According to Khan and Javid (2015), a well-established theoretical relationship exists between institutions and the growth performance of a country. They state that it can be confirmed in the early studies like Montesquieu (1748), Smith (1776), North and Thomas (1973), and Acemoglu et al. (2005). Mainstream economic theory has also emphasized on the security of property rights as being crucial to the efficient allocation of resources. The possibility of government expropriation could force people into less productive sectors (De Soto, 2000). Due to inadequate property rights, protection becomes more expensive and people tend to indulge in more predatory behaviours rather than constructive ones (Tullock, 1967; Grossman & Kim, 1995).

2.1.3 Structural Change and Economic Growth

The process of economic growth, in the long run, might seems stable at the aggregate level, still in a historical perspective; it has resulted in a massive contraction in agriculture sector and extension of industrial and service sectors in the economic landscape. Herrendorf et al. (2014) define structural change or transformation in this context as "the reallocation of economic activity across the broad sectors agriculture, manufacturing and services". According to Gabardo et al. (2017) while narrowly defining structural change implies the change in the relative importance of the three broadly defined sectors (agriculture, manufacturing, and services) with the economic growth process. In a broader perspective, all the production and employment changes occurring within and across the sectors of the economy, the emergence of new sectors, and the wiping out of older ones come under the rubric of structural change.

Exogenous and endogenous models are aggregate models, and their focus is only on the modern sector's growth process. Although used extensively by economists from all schools of thought because of their simplest structure, these models do not suit the initial phases of economic growth and structural change in the form of employment or production change (Gabardo et al., 2017). In the 1950s, economists like Lewis (1954), and Ranis and Fei (1961) developed alternative models best fit to illuminate the process of structural change. These are known as dual economy models in the development literature.

These models rest upon the notions of structural heterogeneity prevailing in the economy. This heterogeneity can be seen in the presence of two fundamentally distinct sectors in the economy. In the development economics literature, by Gabardo et al. (2017), these two sectors are termed with different names like advanced and backward sectors, capitalist and subsistence sectors, modern and traditional sectors, industrial and agricultural sectors, urban and rural sectors, and primary and secondary sectors. These two sectors are in clear contrast to each other not only in technological aspects but also in institutional, behavioral, and informational characteristics. They not only depart in techniques of production but also wage setting and employment decisions making. Usually, the traditional sector has the peculiarities of having an unlimited supply of labor with subsistence wages and low productivity. In this sector, labor-intensive techniques of production are used where no capital accumulation and technical progress can take place (Gabardo et al., 2017). While the modern sector, on the other hand, has the properties of utilizing capital-intensive production processes, technical progress, etc., and hence having higher wages and higher marginal productivity than the traditional sector. Capital

accumulation, innovation, and productivity are the peculiarities of the industrial sector (Mcmillan et al., 2017; Opoku & Yan, 2018). Due to these severe differences, the two sectors cannot be summed up in one aggregate final goods sector. Thus, growth in dual economy models depends on the flow of resources across sectors, particularly labor which moves out of traditional towards modern sectors (Gabardo et al., 2017).

Lewis (1954) came up with the initial dual economy model. This model, also known as the classical model in the development economics, comprises two sectors: the traditional subsistence sector and the modern sector. The traditional sector is defined as a sector having an unlimited supply of labor with no use of reproducible capital leading to zero or extremely negligible marginal productivity of labor. On the other hand, the modern sector uses reproducible capital, with the capitalists having much to save while workers having nothing to save. The model's central viewpoint is that labor being transferred from the traditional agriculture sector to the modern capitalist sector. Due to the infinite accessibility of labor at the subsistence wage level, there are significant possibilities for the modern sector to grow. This is because labor migration from the traditional agriculture sector to the modern industrial sector would not result in either a reduction in output in agricultural goods or an increase in wages in the modern sector. The expansion of the modern sector will increase the capitalists' profits, which will then be ploughed back into that sector. As a result, the modern sector will accumulate and sustain more capital, and therby require and absorb more labor that has been shifted from the traditional sector. It implies that the increase in modern sector output is the reason for the release of labor from the agricultural sector and the growth in modern sector employment. Thus, the traditional sector's limitless labor supply serves as a primary

source of structural change. It means the key attribute of Lewis-type models is the movement of resources from low to high productivity sectors during economic expansion.

From the above discussion related to the theoretical background of human capital, institutions, and structural change, we can summarize that each approach emphasizes its primacy in growth augmentation. For instance, exogenous and endogenous growth theorists propagate the prominence of human capital in spurring economic growth. Institutionalists consider institutions to be the prime factors of economic growth, while the dualists stress the reallocation of resources from stagnant to vibrant sectors to be the major factor of economic growth. However, the very recent study by McMillan et al. (2017) advocates considering different strands of literature simultaneously to have a close vision of the rapid and sustained growth process. Their study asserts that nonetheless improving the fundamentals, such as human capital and institutions, is good for economic growth, but these must be backed by structural change in the economy, failing which the countries will experience only slow and modest growth. Also, if the rapid structural change is not made coupled with a high level of human capital and institutions, the growth outcome will be sporadic in nature.

As suggested by the literature, human capital, institutions, and structural change have no conclusive impacts on economic growth. This unresolved contention calls for additional or deeper digging for providing more conclusive evidence relating human capital, institutions, and structural change to economic growth. The present endeavor (study at hand) is in that direction; to search for more concrete evidence regarding the

impact of human capital, institutions, and structural change on economic growth and also to find the inner mechanism through which they work.

2.2 Empirical Literature

The theoretical discussion in the bove sub-sections reveals that there exists strong theoretical background regarding human capital, institutions, and structural change relationship with the economic growth. In order to prove their empirical validations, plethora of studies exist in the literature. The below sub-sections, keeping an eye on the main objectives and hypotheses of our study, review some of the major empirical contributions from the prevailing literature. This endeavor certainly boosts our motivation for the current study and helps us in selecting variables and their parameters of construction, data, and methodology.

In a broad way, this section intends to review the literature on:

i. Nexus of human capital and economic growth

ii. Nexus of institutions and economic growth

iii. Nexus of structural change and economic growth

iv. Nexus of human capital, structural change, and economic growth

v. Nexus of institutions, structural change, and economic growth

2.2.1 Nexus of Human Capital and Economic Growth

As noted above, human capital has a critical role in pushing forward a country toward economic prosperity. The economic progress of today's developed countries is a reflection of their higher level of human capital accumulation. If developing countries

struggle to climb the growth ladder, it is because of their low and sluggish level of education.

In a relatively recent study, Glewwe et al. (2014) surveyed the literature on the link between human capital and growth. While reviewing the empirical literature, they mentioned studies by Barro (1991), Mankiw et al. (1992), and Levine and Renelt (1992) as the most prominent. Barro (1991), while assessing the factors important in determining economic growth, did not derive has econometric specification from any economic model but instead took the variables including the initial level of human capital, highlighted by the previous seminal theoretical models. In this study, most of the regressions results revealed a significantly positive impact of primary and secondary enrollment on the rate of economic growth. For robustness checks, it adds private investment and fertility rates that decrease the coefficients of primary and secondary enrollments rates. This is justified by the arguments that through education private investment becomes more productive and fertility decreases so that education impacts economic growth partly via these two channels.

Unlike Barro (1991), Mankiw et al. (1992) estimation of the empirical growth model is based on neoclassical growth theory. In fact, they modified Solow's model by dividing the total capital into physical and human. This was in fact prompted by their initial regressions estimations that do not divide capital and hence get an unreasonable high share of capital income. The results show a strongly positive coefficient of schooling, and entering this variable in the Solow model produces a reasonable estimate of the impact of physical capital on economic growth. Almost 80% of the variations in the growth rate of the countries in the sample are attributable to variables such as;

population, education, and physical capital. The authors claimed that their augmentation of the Solow model resulted in a very good fit to the data.

Glewwe et al. (2014) noted that although both Barro (1991) and Mankiw et al. (1992) found significantly positive human capital growth effects, but both studies may fall victim to an omitted variable bias problem because they use only a few regressors. This prompted Levine and Renelt (1992) to run numerous regressions to check for the robustness of various common factors of economic growth. The results reveal a substantial impact of only initial income and investment on economic growth. The study pointed out that both primary, secondary enrollment as well as literacy rates have insignificant impacts on economic growth. However, the study used strict criteria of statistical significance for variables in all the specifications of the model used (Glewwe et al., 2014). According to Ahsan (2015), the study by Mankiw et al. (1992), while by Glewwe et al. (2014), the studies of Barro (1991), Levine and Renelt (1992) as well as Mankiw et al. (1992) of the early 1990s were so seminal that they opened the floodgates to the empiricists of growth. This has geared hundreds and thousands of studies towards estimating the determinants of economic growth.

According to Aslam (2020), since the 1980s, abound macroeconomic research has been endeavored to distinguish among the determining factors of long-run economic growth. The emergence of a new growth theory at that time has established that human capital is an important determinant of economic growth. This relationship has been hotly debated both theoretically as well as empirically. Although, the theoretical grounds strongly establish the human capital-economic growth relationship as human capital is the main source of innovations and assimilation leading to productivity improvements

and economic growth, however, the empirical analysis does not always support this view and provides mixed results. Similarly, Bethencourt and Perera-Tallo (2020) argue that human capital as a determinant of growth is one of the most intriguing puzzles in the growth literature. They state that since the inspiring theoretical works of Lucas (1988) and Romer (1990), the importance of human capital in the process of economic growth of nations is well-recognized and clear, however, empirically the relationship between the two is not robust. Although high returns on education can be observed at the micro-level[6], the empirical macroeconomic literature is surprisingly fragile as contradictory to theoretical expectations, earlier empirical studies like Benhabib and Spiegel (1994), Nonneman and Vanhoudt (1996), Bloom et al. (1998), Temple (1999), Bils and Klenow, (2000), Hanushek and Kimko (2000), Krueger and Lindahl (2001), Pritchett (2001), and Barro and Sala-i-Martin (2004) contend that human capital is not related to growth. This presented a hazy and inconclusive picture of the human capital-growth relationship and gave rise to the puzzle which has enticed loads of studies concerned with gauging the impact of human capital on economic growth.

The above kind of conclusion has also been drawn recently by Benos and Zotou (2014). The study while surveying the literature regarding human capital-growth nexuses, performed a meta-regression analysis on 57 previous studies with more than 989 estimates and concludes that education-growth nexus is heterogeneous. The study attributes this heterogeneity in the findings of the literature to variations in education proxies, study features, data types, and model specification, amongst others. Their study

[6] Temple (2002) also indicates that usually there exist a robust positive association between schooling and earning, that is, private returns like wages but say nothing about social returns of education. By Hawkes and Ugur (2012), as educational externalities and social returns are core issues regarding growth, our focus in this study is on review of macro-level studies which are aimed at investigation of education-growth relationship.

further notes that albeit, with the use of diverse measurements for human capital as well as variant specifications of the growth model, the macroeconomic literature is comprised of either cross-sectional, panel or country-specific time-series studies and all the three threads of studies provide mixed findings. It means that positive, insignificant/no impact, or even negative impact of human capital on economic growth processes can be found in each group of the studies.

As the current study is a cross-country based study, so we restrict ourselves to the review of some of the recent past cross-country studies. A large bulk of cross-border (cross-sectional as well as panel) studies have been conducted investigating the association between human capital and economic growth for different regions and countries sets of the world. As the focus of the current study is only on the Asian region countries, and also to manage the review of the past empirical work in a compact way, we follow Uddin et al. (2020) for conducting a review of the most recent literature by different region-wise and/or group of countries based on their income levels as defined by World Bank[7]. Moreover, this practice identifies the heterogeneous growth effect of human capital across different groups of countries and regions as we have countries/regions with a high and low levels of human capital. The groups being considered by the study are as follows: High-Income Countries (HICs), Low and Middle-Income Countries (LMICs), both HICs and LMICs, Africa, Latin-America and Caribbean (LAC), and Asia.

[7] In HIC group, we review the studies which are based on developed and OCED like countries, in L&MIC we review those studies who are based on developing countries, we include, following Uddin et al. (2020) another group which is based on a blend of developed and developing countries and/or a comparison between various countries groups is made, studies based on Middle East and North Africa and Sub-Saharan African countries are grouped in Africa, and studies based on East Asia and Pacific and South Asia are grouped in Asia.

Studies whose focus is on developed, and like OECD countries include studies like Yardimcioglu et al. (2014), Pelinescu (2015), Teixeira and Queirós (2016), Barcenilla-Visús and López-Pueyo (2018), and Pegkas et al. (2020), amongst others. Yardimcioglu et al. (2014), for example, while investigating the causal link between education and economic growth in 25 OECD countries from 1980 to 2008, found a significant bi-causal as well as co-integrating link between human capital and economic growth. Pelinescu (2015) found that growth is positively associated with the number of workers with secondary education and the number of patents, while negatively related to education expenditure in 28 European countries for 2000-2012. Teixeira and Queirós (2016) show that average years of schooling is growth-enhancing in both 21 OECD countries and 30 OECD plus Eastern European and Mediterranean countries for the period 1960-2011 and 1990-2011 respectively. Barcenilla-Visús and López-Pueyo (2018), found that although, overall human capital has a significantly positive effect on total factor productivity, human capital in the form of skilled labor promotes innovation while unskilled can help in imitation in 28 European countries in 1950-2011. Pegkas et al. (2020) found a long-run relationship between the labor force with higher education and economic growth in 12 Eurozone countries in 1995-2016.

Studies whose focus is on less developed and developing countries include studies like Vinod and Kaushik (2007), Mehrara and Musai (2013), Slesman et al. (2017), Ahmad and Khan (2018), Uddin et al. (2020), and Sarwar and Hayat (2021), amongst others. Vinod and Kaushik (2007), for example, found that the adult literacy rate is positively related to the economic growth of 18 developing countries in 1982-2001. Mehrara and Musai (2013), while focusing on 101 developing countries for the period

1970-2010, found an insignificant effect of human capital proxied by a combination of gross enrollments and education expenditure on economic growth. Slesman et al. (2017) revealed that average years of secondary schooling has a growth-boosting effect in 83 developing and emerging countries in 1976-2010. Ahmad and Khan (2018), disaggregated the developing countries of the world by regions and income groups and found that average years of schooling exert a positive effect on the economic growth of all the disaggregated groups. However, the influence was more pronounced in relatively developed regions and high-income groups than in the less developed and low-income groups. Uddin et al. (2020) found human capital indicators like an average number of years of education, average years of schooling and returns to education, primary school enrolments, secondary school enrolments, and health spending have growth-boosting effects in 120 developing counties in 1996-2014. Sarwar and Hayat (2021) found that secondary and tertiary enrollment enhances growth while primary enrollment has no role in the growth processes of 66 developing countries in the period 1996-2017.

Studies that are based on a blend of both developed and developing countries or a comparison is made between the different income groups include studies like Dias and Tebaldi (2012), Qadri and Waheed (2013), Ahsan and Haque (2017), Awaworyi et al. (2017), Zhu and Li (2017), Ali et al. (2018), Ahumada and Villarreal (2020), Bentour and Fund (2020), and Tahir et al. (2020) amongst others. Dias and Tebaldi (2012), for example, took the case of 61 countries for the period 1965 to 2005 and show that it is the growth of schooling, not its level that affects economic growth. Qadri and Waheed (2013), for example, found a positive contribution of the gross enrolment rate for secondary education to the growth of 106 countries for the period 2002-2008. Also, the

study further compared the results of the full sample with countries groups of low-income, lower-middle-income, and low-, middle- and high-income non-OECD countries and founds that compare to other groups of countries, growth returns of human capital are high in low-income group countries. Ahsan and Haque (2017) found that average years of schooling has an insignificant growth effect in the case of developing countries and happened significant in the case of developed countries. Awaworyi et al. (2017) conducted a meta-regression analysis of 237 estimates drawn from 29 previous studies related to government education expenditure and economic growth. The study concludes that education expenditure has a positive effect on economic growth in developed countries but is statistically insignificant in the case of less developed countries. Zhu and Li (2017) found that the growth of 139 countries in 1995-2010 is positively associated with the educational attainment of secondary education as well as tertiary education. Ali et al. (2018), found a positive influence of average years of schooling on economic growth in 132 countries for the period 1996-2011.

Ahumada and Villarreal (2020) found that average years of schooling has a significant positive effect on the economic growth of 52 countries classified on the basis of the Inequality-adjusted Human Development Index (IHDI) in six different country groups (such as very high, high, medium, low, very high and high, and medium and low) in 2002-2014. The study also notices that the growth of the low-IHDI countries group is more responsive than the growth response of the high-IHDI countries group. Bentour and Fund (2020) observed a positive contribution of average years of schooling to the economic growth of 12 Arab countries, 6 Asian countries, and 12 Advanced OECD countries in 1970-2017. The study further reported that the schooling effect is

pronounced in advanced countries relative to Asian and Arab countries. The study also concluded that economic growth is significantly influenced by schooling in low-IHDI countries relative to high-IHDI countries. Tahir et al. (2020) observed that the growth of 24 developed counties as well as of 18 developing counties is negatively linked with average years of schooling while positively associated with average working hours.

Studies whose focus is on the African economies include studies like Bane (2018), Ibrahim (2018), Ogundari and Awokuse (2018), Donou-Adonsou (2019), Akinlo and Oyeleke (2020), Anetor (2020), Kurniawan et al. (2020), amongst others. Bane (2018), for example, found that total education spending has positive while primary school enrolment has no association with the economic growth of 52 African countries in 1985-2015. Ibrahim (2018) found that the economic growth of 29 sub-Saharan countries in 1980-2014 is positively associated with the primary pupil-teacher ratio and secondary school gross enrollment rate. Ogundari and Awokuse (2018), reported that growth is positively associated to enrolment at the primary, secondary level, and years of schooling and has no association with enrollment at the tertiary level and government education expenditure in 35 Sub-Saharan African countries in 1980-2008. Donou-Adonsou (2019) found that primary enrolment has an insignificant effect on the economic growth of 45 countries in 1993-2015. Anetor (2020), found that secondary school enrollment enhances the growth of the 28 Sub-Saharan African countries in 1999-2017. Akinlo and Oyeleke (2020) reported that the growth of 36 African countries in 1986-2018 is positively associated with primary enrollment and tertiary enrollment but secondary enrollment and total enrollment have no association with the growth. Kurniawan et al. (2020) found a

positive and significant impact of the human development index on the economic growth of 44 member countries of the Organization of Islamic Cooperation (OIC) in 2009-2018.

Studies whose focus is on Latin America and Caribbean (LAC) countries include studies like Ramirez and Nazmi (2003), Garcia-Fuentes and Kennedy (2009), Fernández-Torres et al. (2018), Osiobe (2020), amongst others. Ramirez and Nazmi (2003), for example, observed a positive effect of government expenditure on the economic growth of 9 LAC countries in 1983-93. Garcia-Fuentes and Kennedy (2009) report the positive effect of human capital on the economic growth of 14 LAC countries in 1975-2000. Fernández-Torres et al. (2018) found that the secondary education enrolment ratio has a positive association with the economic growth of 33 LAC countries in 2010-2014. Osiobe (2020) found a significant and positive relationship between government spending on education and economic growth of 8 LAC countries in 2000-2014.

Studies whose focus is on Asian countries include studies like Li and Liang (2010), Narayan et al. (2010), Shah et al. (2015), Behrooznia et al. (2016), Hanif and Arshed (2016), Mallick et al. (2016), Mustafa et al. (2017), Siddiqui and Rehman (2017), Fatmawati et al. (2018), Lenkei et al. (2018), amongst others. Li and Liang (2010), for example, found that average years of schooling has a significantly positive impact on the growth of 10 East Asian countries in the period 1961-2007 and sub-period 1998-2007. However, the impact of the student-to-teacher ratio for primary school on growth is fragile as it is insignificant for the whole-sample period but significant in the sub-sample period. Narayan et al. (2010) reported an insignificant impact of education expenditure for 5 Asian countries in 1974-2007. Shah et al. (2015), while examining the case of 16 Asian countries for the period 1990-20102, found that gross enrollment has an

insignificant impact on economic growth. Behrooznia et al. (2016), while focusing on 40 Asian countries found an insignificant effect of human capital proxied by a combination of gross enrollments and education expenditure on economic growth. Hanif and Arshed (2016) found that growth in 8 Asian developing countries is positively related to secondary and tertiary education but negatively associated with primary education. Mallick et al. (2016), found education expenditure as a significant factor in increasing economic growth in 14 Asian countries for the period 1973-2012. Mustafa et al. (2017), while examining the impact of human development on economic growth in twelve developing Asian countries for the period 1970-2011, found that human development boosts growth. Siddiqui and Rehman (2017) found that gross primary, secondary, tertiary, vocational educations, and government education expenditures have a significant positive role in economic growth in both 5 East and 5 South Asian countries in 1972-2014. Fatmawati et al. (2018), for the period 2003-2015 disaggregated Asian countries into developed and developing countries and found that the tertiary level enrollment ratio is insignificant in the case of the former group while in the latter group it is significant and positive. Lenkei et al. (2018) found that overall average years of schooling as well as at primary and secondary level has positive while at tertiary level hurts economic growth of 14 Asian countries for the period 1960-2013.

From the above review of empirical literature related to the direct impact of human capital on economic growth; we conceive that voluminous studies with proliferate proxies representing human capital and education are available on this topic. However, the conclusion from these studies is not only inconclusive but also frustratingly elusive. As suggested by Benos and Zotou (2014), this can be attributed to different factors like

differences in education proxies, study characteristics, data types and time-span, and model specification, among others[8]. We are therefore going to re-explore this relation and see its relative importance along with institutions and structural change in the economic growth of our selected sample countries.

2.2.2 Nexus of Institutions and Economic Growth

As noted in the introductory chapter, institutions play a crucial role in determining the economic expanstion and progress of a country. In today's world, we can see countries having the same geography and the same levels of physical and human capital, at different stages of economic growth and development. All of this can be accredited to their different levels of quality of institutions.

In general, the evolution of growth theory extends over the years. The emphasis was first on the accumulation of physical capital (Harrod, 1939; and Domar, 1946), then on technological progress (Solow, 1956) and then on the accumulation of human capital (Lucas, 1988; and Romer, 1990). The most contemporary approach, called 'new institutionalism', considers institutional quality as the engine of growth (North, 1990; Acemoglu et al., 2005). According to Tukur et al. (2016) theoretical studies on the links between institutions and growth could trace their origin in the work of North and Thomas (1973) and North (1990). Influential studies such as North (1981), Olson (1982), Choi (1983), and Jones (1987) have prompted major academia and policy makers to study the links between institutions and growth. Commander and Nikoloski (2010) claim that twenty-five years ago institutions in academia were barely linked to economic

[8] The much curious readers about human capital and its relationship with growth may recourse survey papers on the topic like, e.g., Wilson and Briscoe (2004); Škare and Lacmanović (2015); and Osiobe (2019).

performance, but today hardly a single study goes without mentioning their role. Sumanjeet (2015) opined that the thoughts of institutionalists like, Douglass C. North, Dani Rodrik, Daron Acemoglu, Simon Johnson, and James Robinson are gradually transformed into recognized concepts and analytical instruments that have now established a platform for empirical research.

Now, the literature is replete with cross-sectional, panel, and time series country-specific empirical studies that have sought to substantiate the expected growth effects of institutions. However, most of the early works are cross-country regression-based studies (Johnson et al., 2010; Murtaza & Faridi, 2016), and in which pioneers are Kormendi and Meguire (1985), and Scully (1988) (Vijayaraghavan & Ward, 2001). Kormendi and Meguire (1985) found that institutions represented by civil liberties affect growth only marginally. However, Scully (1988) reported a strong impact of civil liberties on economies' efficiencies and growth and observed that countries with strong institutions grow three times more than countries where institutions are abridged. Barro (1991) is also among the first to inspect the effects of institutional variables on economic growth (Johnson et al., 2010). The study used political instability to represent the institutions and proxied it with two variables: revolutions and coups per year, and political assassinations per year. The study found both the variables significantly hinder growth and investment and the results are interpreted as that coups and revolutions as well as political assassinations have an adverse effect on property rights thereby leading to negatively influencing growth. Similarly, other earlier representative cross-section studies in the context of corruption/institutional quality-growth nexuses are Helliwell (1992), Levine and Renelt (1992), Mauro (1995), Knack and Keefer (1995), Sachs and Warner (1997),

and Hall and Jones (1999). Helliwell (1992) concluded that democracy is irrelevant to growth. Levine and Renelt (1992) found that indices of civil liberties and revolutions and coups have no significant relationship with economic growth. Mauro (1995) examined the effect of 9 different institutional factors categorized in overall institutional inefficiency as well as three sub-indices like bureaucratic inefficiency, political instability, and corruption on economic growth in the case of 67 countries in 1980-1983. The results indicate that all the institutional inefficiencies and corruption have detrimental effects on growth. Knack and Keefer (1995), using contract enforceability and risk of expropriation indices as proxies of property rights found a significant influence of property rights on economic growth. Hall and Jones (1999) found output per worker is strongly influenced by the social infrastructure of the countries. Social infrastructure as represented by the combination of government anti-diversion policies and openness to foreign trade - the study means the prevailing institutions and government strategies that set the stage for economic transactions in which capital (physical as well as human) accumulates and productivity increases leading to higher per workers output.

The worth gained by good governance and institutions in explaining cross-country prosperity differences from the early theoretical and empirical literature has made it 21st-century economics (Lloyd & Lee, 2018). Also, recently empirical research in this area stimulated due to the availability of different measures of governance and institutional qualities data collected by different think tanks, multilateral agencies, and non-government organizations (NGOs) (Johnson et al., 2010). Like, our review of empirical

studies of human capital-growth nexuses, we review the recent past empirical studies of institutions-growth nexuses by different regions-wise and/or groups of countries.

Studies whose focus is on developed and advanced countries like OECD countries include studies like Haydaroglu (2015), Afonso (2020), Zhuo et al. (2020), amongst others. Haydaroglu (2015), for example, found that property rights have positive effects on the economic growth of OECD and European Union countries in 2007-2014. Afonso (2020) concluded that the number of triadic patents and economic freedom index is a growth stimulus in 28 OECD countries in 2001-2017. Zhuo et al. (2020) reported that out of six World Governance Indicators (WGI) indicators, three indicators: control over corruption, rule of law, and voice and accountability are significant and positive whereas three indicators: government effectiveness, political stability, and regulatory quality are significant and negative in the growth process of 31 developed countries in 2002-2018.

Studies whose focus is on developing countries include studies like Slesman et al. (2017), d'Agostino et al. (2016), Yıldırım and Gökalp (2016), Ahmad and Hall (2017), amongst others. Slesman et al. (2017), for example, revealed that economic freedom has growth-boosting effects in 83 developing and emerging countries in 1976-2010. d'Agostino et al. (2016) found corruption as detrimental while political stability and quality of government regulation as the booster of economic growth in 106 developing countries in 1996-2010. Yıldırım and Gökalp (2016) examined the impact of 23 different institutional variables on economic performance measured by GDP per capita in 38 developing countries in 2000-2011. Out of 23 indicators, 6 were found positive, 9 were negative and 7 were insignificant. Ahmad and Hall (2017) found property rights and political institutions growth promoting in 58 developing counties in 1984-2007.

Studies that are based on a blend of both developed and developing countries or a comparison is made between the different income groups include studies like Nawaz (2015), Bhattacharya et al. (2017), Siyakiya (2017), Acemoglu et al. (2019), Leite et al. (2019), Nawaz and Khawaja (2019), Sharma and Mitra (2019), amongst others. Nawaz (2015), for example, found a positive role of six different institutional indicators in the economic growth of 56 countries in 1981-2010. The study also established that the growth effects of institutional indicators are more predominant in the sub-group of 34 developed countries relative to the sub-group of 22 developing countries. Bhattacharya et al. (2017) provided positive evidence of institutional quality in the economic growth of 85 countries including both developed and developing countries in 1991-2012. However, heterogeneity is observed in the results when the countries are classified into different groups based on their income levels and regions. Institutions are significantly positively related to growth in case of high-income countries (HIC), middle-and-low-income countries (M&LIC), Sub-Saharan Africa (SSA), Europe and Central Asia (ECA), and Annex 1[9] countries while institutions are irrelevant to the growth processes in the Middle East and North Africa (MENA), South Asia and East Asia Pacific (SA&EAP) and Non-Annex 1 countries. Siyakiya (2017) found that in 1996-2014, an index of institutional quality has growth-boosting effects in 36 European countries but after grouping countries into developed and less developed countries, the effect is more prominent in the former compared to the latter group of countries. In the case of individual indicators of the index, government effectiveness, and voice and accountability are positively related to growth while control of corruption, political stability, and absence of violence have negative and

[9] Annex 1 and Non-Annex 1 countries are grouped by the United Nations Framework Convention on Climate Change (UNFCC).

regulatory quality, and rule of law have no association with growth. Acemoglu et al. (2019) [illegible] raises the economic growth of 175 countries in [illegible]. Leite et al. (2019) showed that control over corruption and more economic freedom has stimulus growth effects in 121 countries in 2002-2015. Nawaz and Khawaja (2019) found that institutional quality has a positive influence in 56 countries and also its sub-groups of 34 developed countries and 22 developing countries in 1981-2010. The study also reports that the contribution of institutional quality is greater in developing countries relative to developed countries. Sharma and Mitra (2019) revealed that low corruption and regulatory quality stimulate growth in 103 countries in 1996-2015. The study also found that the effects of the two mentioned indicators are prominent in the sub-group of less developed countries relative to a developed one.

Studies whose focus is on African countries include studies like Slesman et al. (2015), Iheonu et al. (2017), Kebede and Takyi (2017), Wanjuu and Roux (2017), Hashem (2019), Kane et al. (2019), Kurniawan et al. (2020), Ogbuabor et al. (2020), Yusuf et al. (2020), Raifu et al. (2021), amongst others. Slesman et al. (2015), for example, observed that economic and political institutions promote economic growth while conflict-preventing and democratic institutions have no role in the economic growth of 39 countries of the Organization of Islamic Cooperation (OIC) in 1983-2009. Iheonu et al. (2017) report that government effectiveness promotes growth whereas control of corruption, regulatory quality, and rule of law is irrelevant to the growth of 12 West African countries in 1996-2015. Kebede and Takyi (2017) observed a long-run relationship between institutional quality and economic growth and also a unidirectional causal link from economic growth to institutional quality in 27 Sub-Saharan African

countries in 1996-2014. Wanjuu and Roux (2017) found that property rights promotes growth whereas corruption is irrelevant to the growth of 13 African countries in 1990-2015. Hashem (2019) found no association between governance and economic growth in 20 MENA countries in 1996-2017. Kane et al. (2019) found that political institutions as well as economic institutions have deleterious effects on the economic growth of 10 central African countries in 1996-2013. Kurniawan et al. (2020) found an insignificant impact of corruption on the economic growth of 44 member countries of the Organization of Islamic Cooperation (OIC) in 2009-2018. Ogbuabor et al. (2020) observed negative effects of institutional variables like political stability, government effectiveness, rule of law, regulatory quality, control of corruption, voice and accountability, and absence of violence in the economic growth of 13 West African countries in 2009-2016. Yusuf et al. (2020) reported that political instability has negative and democracy has no association with the growth of 11 West African countries in 1996-2016. Raifu et al. (2021), in their selected six institutional indicators in 13 West African countries in 1984-2916, two indicators (government stability and democratic accountability) are positively associated with growth, three indicators (control over corruption, socio-economic conditions, and bureaucratic quality) are negatively associated while one indicator (rule of law) has no association with growth.

Studies whose focus is on Latin American and Caribbean countries include studies like Ramirez (2013), Porras and Vázquez (2015), Fernández-Torres et al. (2018), Vianna and Mollick (2018), Navarrete Gallo and Ritzen (2021), amongst others. Ramirez (2013), for example, found a positive and significant relationship between economic freedom and economic growth in 23 Latin American and Caribbean countries in 1990-

2007. Porras and Vázquez (2015) report that different indicators of governance have a different relationship with economic growth in 11 Latin American countries in 2001-2010. The indicators like voice and accountability, rule of law, and control of corruption have inverted U-shaped relationships whereas indicators like Political Stability, Government Effectiveness, and Regulatory Quality indicators have a linear and positive relationship with growth. Fernández-Torres et al. (2018) found that high control of corruption negatively affect growth in 33 Latin American and Caribbean countries in 2010-2014. Vianna and Mollick (2018) found that better institutions promote economic growth in 19 Latin American countries in 1996-2015. Navarrete Gallo and Ritzen (2021) found that institutional quality promote growth in 20 Latin American countries in 2002-2018.

Studies whose focus is on Asian countries include studies like Azam and Emirullah (2014), Nawaz et al. (2014), Asghar et al. (2015), Khan et al. (2019), Salman et al. (2019), Ngo and Nguyen (2020), Prasetyia (2020), Singh and Pradhan (2020), amongst others. Azam and Emirullah (2014), for example, found detrimental effects of corruption in economic growth of 9 Asia and Pacific countries in 1985-2012. Nawaz et al. (2014) reported that institutional quality has a growth spurring effect on the economic growth of 35 Asian countries as well as in the sub-groups of 19 developed and 16 developing countries in 1996-2013. However, the study also observed that the contribution of institutional quality is predominant in developed countries relative to developing countries. Asghar et al. (2015) found that strong institutions have a stimulus effect on the economic growth of 13 developing countries of Asia in 1990-2013 but in its sub-components, only legal institutions exert a positive effect while economic and

political institutions are insignificant. Khan et al (2019) observed a strong favourable impact of governance in the 5 South Asian countries in 2002-2017. Salman et al. (2019) found that institutional quality stimulates growth and also there is a causal linkage from institutional quality to economic growth in 3 East Asian countries in 1990-2016. Ngo and Nguyen (2020) found a negative effect of institutional quality on economic growth of 13 low-income Asian countries in 2000-2018. Prasetyia (2020), found that out of selected six measures of governance, only two: rule of law and government effectiveness Singh were found significantly positive while the remaining four: control of corruption, voice and accountability, political stability, regulatory quality were found insignificant in the growth of 10 ASEAN countries in 2014-2018. Singh and Pradhan (2020) reported a positive and significant influence of overall institutional quality on the economic growth of 6 South Asian countries in 2002-2016. In the case of growth effects of different institutional indicators, political stability, control of corruption, and government effectiveness have positive effects whereas rule of law, and voice and accountability have an insignificant effect, and regulatory quality has a negative effect.

From the above review of empirical literature related to the direct impact of institutions on economic growth, we conceive that abound of studies with proliferate proxies representing institutional quality and governance conducted on different regions and income-level countries[10]. However, the conclusion from these studies is not only inconclusive but also frustratingly elusive. As suggested by Jilenga and Helian (2017), this can be attributed to different factors like differences in proxies, study characteristics, data types and time-span, and model specification, among others. We are therefore going

[10] The much curious readers about institutional quality and its relationship with growth may recourse to survey papers on the topic like, e.g., Gagliardi (2008), Efendic et al. (2011), and Lloyd and Lee (2018).

to re-investigate this relationship and see the relative importance of institutions along with human capital and structural change in the economic growth of our selected sample countries.

2.2.3 Nexus of Structural Change and Economic Growth

Notwithstanding our other two variables such as human capital and institutions, structural change is also one of the important hallmarks that push forward the growth of economies. The old-fashioned question of why some countries are gearing forward in the course of economic growth while others are lagging can also be better answered by the prospect of structural change in the economy. Keeping an eye on the objectives of our study regarding the structural change-growth nexus, we review here the empirical literature focusing on the role of structural change in spurring productivity and economic growth.

Due to the sharp duality that prevails in developing countries, economic development necessitates the movement of labor from the lower and stagnant sector to the higher and rapidly growing sector of the economy. There is vast empirical literature devoted to investigating the worth of structural change in increasing productivity and economic growth. However, the empirical evidence has not yet come to conclusion because it is mixed and disputable (Hartwig, 2012; Zulkhibri et al., 2015; Vu, 2017).

According to Jena and Barua (2020), the empirical analysis of the patterns of structural transformation started from the work of Chenery as; Chenery (1960), Chenery and Taylor (1968), Chenery and Syrquin (1975), and Syrquin and Chenery (1989). To analyze the literature in a compact way, we follow Ahson, Muhammad and Sarwar (2017), and Ahson, Siddiqi and Mirza (2017) who broadly categorized it as two types of

studies, i.e. one type is based on productivity decompositions methodology and the second is based on regression analysis.

In the productivity decomposition methodology, capturing the significance of structural change in the aggregate productivity growth, shift-Share Analysis has been frequently used in the literature. This method is purely descriptive (Letsoela, 2017) and an accounting technique (Ahson, Muhammad & Sarwar, 2017; Ahson, Siddiqi & Mirza, 2017; Carmignani & Mandeville, 2014; Hartwig, 2012) that decomposes aggregate productivity changes into productivity changes within sectors (called within effects or intra effects) and changes in the productivity due to reallocation of labor between the sectors (called between effect, inter effect or structural change effect). There is another version of Shift-Share Analysis that decomposes changes in the aggregate productivity into three components, namely; the within-effect, the static-(or between) shift-effect, and the dynamic-shift-effect. The structural change effect can be used to refer to both the static shift effect and the dynamic shift effect (Timmer & Szirmai, 2000). In principle, the static shift effect and dynamic shift effect, which are separated in the three-component approach, are combined in the second component of the two-component approach, the between effect, as noted by De Vries et al (2015).

Studies that have used the labor productivity decompositions framework include amongst others, Fagerberg (2000), Hasan et al. (2013), Roncolato and Kucera (2013), McMillan and Harttgen (2014), McMillan et al. (2014), De Vries et al. (2015), Martins (2015), Elshamy (2016), Sen Gupta et al. (2016), Padilla-Pérez and Villarreal (2017), Ahson, Muhammad and Sarwar, (2017); Ahson, Siddiqi and Mirza, (2017), Nguyen (2018), Martins (2019), Rahman and Schmillen (2020), and Moussir and Chatri (2020).

Findings from these types of studies are mixed. Most of the studies report that along with the within-component, structural change is also an important component of labor productivity growth with varying levels of contributions.

The second body of empirical research, which is built on regression analysis, also produces mixed and inconclusive results. For example, Dietrich (2012), conducting a bi-causality analysis between structural change and economic growth in the case of seven developed OECD countries, observed that structural change accelerates economic growth while economic growth reduces the structural change in the very short run, but reinforces it over a period of time. In India, for the period 1951 to 2007 and also its two sub-periods 1951 to 1988 and 1988 to 2007, Cortuk and Singh (2011) found only a one-way link from structural change to growth for the latter sub-period. This was attributed to the strong policy changes and nature of the growth in terms of skill and service intensity in 1980s, which got special momentum in the late 80s. In one another study, Cortuk and Singh (2015) also found a one-way positive contribution from structural change to economic growth in 16 major states of India in 2000-2006. However, focusing on eight European transition economies, Olczyk and Kordalska (2018) assessed the same relationship and found that it is a heterogeneous process. While considering all the countries as one group, they found bilateral causation but mix-up causal relation in the case of making three subgroups of the countries. Sahadevan (2020) observed happening of structural change in the Indian states in the period 1980-81 to 2013-2014. The study also found unidirectional causality running from structural change to economic growth, and the country's growth after the 1980s is attributed to structural change. Agarwal and Gupta (2016) found no

association between structural change and economic growth in India, Nepal, and Sri Lanka.

Mahmood and Linden (2017) examined how the dynamics of industry, services, and agriculture relate to economic growth. The results of the study found no role of agriculture; industry accelerates growth while services decelerate it. Andriansyah et al. (2021) found that structural change occurred at the national level as well as across different provinces of Indonesia and also it has a significantly positive impact on the growth of the Indonesian economy. Ejigu (2020) also found that structural change increases total factor productivity in the 6 African countries.

Silva and Teixeira (2011) observed that structural change has favorable effect on productivity growth in the case of 20 OECD countries and Japan. In their analysis of selected countries of Asia, Africa, and Latin America and Caribbean, McMillan et al. (2014) found that structural change is growth enhancing in Asia while it is growth retarding in Africa and Latin America. In the case of African countries, Carmignani and Mandeville (2014) noted that shifting resources from agricultural to non-manufacturing (particularly mining) appeared to slow growth. Zulkhibri et al. (2015) studied the connection between structural change and economic growth in the case of four emerging economies, namely Turkey, Malaysia, Nigeria, and Indonesia. They found a long-run relationship between structural change and economic growth. Vu (2017) focused on 19 Asian countries and found that structural change positively contributes to economic growth of the selected countries. Ahson, Muhammad and Sarwar (2017) found an insignificant impact of structural change on economic growth in the case of five SAARC countries (Bangladesh, India, Maldives, Nepal, and Pakistan). However, Ahson, Siddiqi

and Mirza (2017) found a positive and significant contribution of structural change to the economic growth of the 11 selected Asian countries.

On a final note from the above review of the literature, we see that the empirical findings are yet to be conclusive, as some studies show positive while others show insignificant or even negative impacts of structural change and economic growth[11]. In practice, it appears that the model specifications and indicator selection, on the one hand, and the application of diverse estimation techniques, on the other hand, have strong consequences on the empirical results. So, we are therefore going to re-investigate this relationship and see the relative importance of structural change along with human capital and institutions in the economic growth of our selected sample countries.

2.2.4 Nexus of Human capital, Structural Change and Economic Growth

Growth is a cornerstone in the subject of economics. Its prospects are examined and explained equally by Neoclassicals and Structuralists approaches who consider human capital and structural change respectively as important factors of growth processes. As evident from the review of the literature regarding human-growth nexuses and structural change-growth nexuses, both human capital and structural change are key drivers of economic growth and development. However, McMillan et al. (2017) argue that although separately both the factors are important growth stimuli, yet for rapid and sustained growth, and convergence both the processes are needed simultaneously. The study state that those countries that focused primarily on structuralists policies like reallocating labor from low productivity sectors to high productivity ones while

[11] The much curious readers about structural change/transformation and its relationship with growth may recourse to survey papers on the topic like; e.g., Krüger (2008); Silva and Teixeira (2008); and Van Neuss (2019).

overlooked the improvement in fundamentals including human capital achieve growth, but usually unstable and sporadic (e.g., Vietnam). Similarly, those countries that emphasized primarily on improving human capital while neglecting on structucralists policies managed to achieve economic successes but failed to achieve high growth rates (e.g., Brazil). However, those who managed to maintain a balance between the two policies achieved rapid as well as sustained growth (e.g., recently South Korea, Singapore, Hong Kong, and previously Japan).

In the same vein, Lawanson and Evans (2019) contend that human capital has been hardly allied with structural change, especially in developing countries. Human capital is one of the basic factors of the nature and direction of reallocation of resources whereas the modern and emerging sectors need skilled and educated labor. This shows strong complementarities between the two variables in their growth effects and the mismatch between these two trapped the developing countries in low growth and underemployment. In their empirical analysis based on the Nigerian economy, Lawanson and Evans report an insignificant effect of human capital on economic growth. However, the study further found that the growth effects of human capital evolve as a country enters into structural change that requires an educated and skilled labor force. Structural change in the form of a low share of traditional activities in output and diversification of exports significantly influence the growth effects of human capital. The implication is that the shift from traditional agricultural activities to modern industrial activities enhances the growth contribution of human capital.

In structuralists' theories, economic growth is mainly caused by human capital because it promotes structural change (Justman & Teubal, 1991; Teixeira & Queirós,

2016). The evolution of a country's specialization depends mainly on human capital (Krishna & Levchenko, 2013). Teixeira and Queirós (2016) state that the effects of human capital on growth can occur through different channels, of which structural change may also be one of the most important channels. In their study, the authors further argue that simply increasing human capital will not be enough to stimulate economic growth. Multidimensional policies will be necessary to change the productive structure of the economy with a view of creating technology-intensive industries so that the educated workforce can be properly absorbed into the economy. The specialization of advanced countries in productive sectors like technology-intensive is due to their high stock of human capital (Teixeira & Queirós 2016). Moreover, Čadil et al. (2014) also found that human capital has a negative impact on the economic growth of agricultural regions like Spain and Cyprus in the EU due to their economic structure which does not absorb highly educated and skilled labor. The study recommends intermediation of economic structure to efficiently exploit human capital endowments. In the more recent studies of Ahmad and Khan (2019), and Zhou et al. (2021) also confirmed the findings of Čadil et al. (2014) and Teixeira and Queirós (2016). Ahmad and Khan (2019) also suggest that to realize the contribution of human capital, developing economies must have first enough job opportunities to accommodate the educated work force. Zhou et al. (2021), while assessing the role of industrial structure in moderating the effect of technological progress on the economic growth of the Chinese economy found a mismatch between the two and hence cannot improve economic growth.

Similarly, Ciccone and Papaioannou (2009) also stress on the productive association between education and structural changes in the form of increased

technological content in economic activities. The structural change in terms of the technological catch-up process in developing countries can be fostered by increased levels of education which contribute to their absorptive capacity (Nelson & Phelps, 1966; Benhabib & Spiegel, 1994). It means that this process can help developing countries to establish their economic structures with more intense technology via imitation, which itself depends mainly on the levels of education in the country (Teixeira & Fortuna, 2010). Akarçay Gürbüz (2011) divides the countries of the world into countries of the South and the North. The study states that the specialization of Southern countries in labor-intensive activities is due to a low level of human capital, while northern countries' specialization in technology-intensive activities is due to their highly educated and skilled workforce. This means that human capital is important to promote structural change. On the demand side, education modernizes and improves individuals who will seek more highly technical products that have a positive impact on structural change (Justman & Teubal, 1991). An entrepreneur can also promote structural change (Justman & Teubal, 1991; Saviotti & Pyka, 2012), as they invest in more modern manufacturing and services sectors that require certain high levels of education and skills (Teixeira & Queirós, 2016).

In the Sub-Saharan African region, Mensah et al. (2016) found that increasing the level of higher education leads to a reduction in the share of agriculture in output. These results are corroborated with the ideas of Lewis (1954) and Chenery (1960) that increased education results shift in the importance of agriculture in the economy toward industry and services. However, the study also found an insignificant impact of educational attainment on the shares of industries, manufacturing, and services in output, indicating the lack of skills match in these countries. The study attributes this to the slumping level

of education standard necessary for the growth of output in industries, manufacturing, and services.

Sacerdoti et al. (1998) argued that a positive correlation between education and output growth should not be contemplated that human capital is always vital for economic growth as school enrollment is weakly associated with human capital accumulation. They found an insignificant impact of human capital on the economic expansion of Western countries and attributed this to the non-availability of a complementary structural environment in these countries required for the better application of the individual's skills and expertise they are endowed with. The study points out that the policymakers in these countries should focus on creating an enabling environment for the productive applications of worker's skills. Similarly, according to Carraro and Karfakis (2018), if the governments in Sub-Saharan Africa are willing to move the economy to higher nodes of value-added and job-creating activities, they must improve not only their education standard but also its productive application in the growth processes. Ssozi and Bbaale (2019) also stress that Sub-Sahara African countries can only have a successful structural transformation and hence productivity and economic growth if these countries significantly boost their human capital level.

From the above discussion, we conceive that human capital and structural change have a close relationship. This relationship can alter the usually straightforward nexus between human capital and growth as well as the relationship between structural change and growth found in the previous literature. Therefore there is a dire need to study the moderating effects of human capital and structural change on growth.

2.2.5 Nexus of Institutions, Structural Change and Economic Growth

Institutions being the key theme of the institutionalists approach is also one of the key determinants of growth. As evident from the review of empirical literature regarding institutions-growth nexuses, they equally explain the prospects of growth along with the human capital and structural change. However, the McMillan et al. (2017) argument as discussed in the previous section that separately focusing on structural change or on fundamentals including institutions will either lead to episodic or slow growth. For example, Vietnam whose focus is on structural change at the cost of making institutions better is characterized by patchy and unstable growth. On the other hand, Brazil whose focus is on solely institutional development at the cost of the structural development of the economy is observing only slow and modest growth. However, recently countries like South Korea, Singapore, Hong Kong, and previously japan which maintained a balance between the two approaches and hence achieved high and sustained growth.

In the context of their growth effects, institutions and structural change in the form of labor moving out from low productivity sectors towards high productivity sectors which produce high value-added and innovative products, Acemoglu (2008) state that strong democratic societies characterized with easy entry and exit of entrepreneurs make technical progress and innovations which promote long-run growth. On the other hand, less democratic societies or oligarchic societies (where political power is in the hands of few political elites) are characterized with significant entry stoppages for new entrepreneurs, which may first make technical and economic progress but over time fall behind to democratic societies. Also, Acemolgu and Robinson (2013) relate technological innovation with inclusive institutions: institutions that provide incentives to citizens in

their economic activities participation, and extractive institutions: institutions that only protect the rights of political elites and do not provide incentives for citizens in their economic participation. The study cites South Korean and United States of America societies which are based on inclusive institutions make technological innovations and hence high growth while North Korea and Latin American countries which are based on extractive institutions make poor innovations and hence remain less developed and poor.

Similarly, Khan (2010) also states that institutional outcomes are different in developed and developing countries due to differences in the concentration of economic activities in these countries. In the developed countries having dominant modern structures with a large share of the private sector, institutions are enforced efficiently. Private entrepreneurs usually pay more taxes and hence demand efficient institutions. On the other hand, in developing countries which have meager modern production capabilities hardly enforce private property rights efficiently. Likewise, Gatti et al (2012) interpret the reasons of the recent Global Financial Crisis in terms of the connection between structural change and institutions. The current crisis was mainly caused by institutional rigidities, especially in the labor market which prevented labor from moving out of manufacturing toward services. These types of institutional barriers also caused earlier the problem Great Depression when the labor movement out of agriculture towards manufacturing was made stalled.

Constantine (2017), and Totouom et al. (2019) claim that there exists a bi-directional causal link between institutions and economic structures. Constantine (2017) states that, for example, the International Monetary Fund (IMF) and World Bank (WB) policies represent significant institutional reforms that review and modify the rules of

economic transactions. These reforms changed the structures of the many economies in Latin America and Africa and positively affected their economic performances. Conversely, structural transformation also induces institutional changes. For example, the discovery of gold in California brought changes in the sectoral composition of GDP and the type of production activities which necessitated a new institutional framework to regulate this newly discovered natural resource. Constantine's (2017) study also contends that both institutions and economic structures fortify each other in their effect on economic performance. The argument is made that enforcing institutions is not free of cost. Many poor and developing countries are based on an economic structure of diminishing returns activities that cannot produce sufficient funds to meet the expenses of enforcement of institutions, hence cannot ignite robust growth. The reverse is the case in developed and advanced countries. These countries are based on economic structures characterized by increasing returns activities that generate enough funds to efficiently enforce their institutions and hence get high growths in reward. Totouom et al. (2019) state that on the one hand, if good quality of institutions release resources from agriculture to manufacturing and will lay the groundwork for higher rates of productivity-induced growth structures, on the other hand, industrialization and the improvement of the living standard that it entails is likely to make people less corrupt, and in general, more willing to build better institutions.

Focusing on the Sub-Saharan African countries, Carraro and Karfakis (2018) studied how economic and political institutions impact structural transformation in the region. They found that institutions are significantly positive in affecting the structural transformation between sectors. The hypothesis of the positive link between Political

stability and growth is also found valid hence necessitates the political stability in the region to have productive employment. The study suggests that strong political and economic institutions will create high-productivity employment opportunities and help the workforce to move out of agriculture and avoid being trapped in vulnerable employment. According to ElFayoumi et al. (2018), the influence of better institutions, financial and trade openness, human capital, and more flexible labor and product markets strongly matter for the labor to move out of low productivity sectors towards the highest. Studies like Nawaz et al. (2014), and Iqbal and Daly (2014) argue that poor institutions can provide a resort to the rent-seekers who can divert the resources from productive to unproductive sectors and lead to low economic growth. Dunne and Tian (2014) state that political instability can negatively affect economic growth through its effect on the reallocation of resources from more productive sectors to lesser ones.

In many economies, the reallocation of workers between sectors or firms can be affected by strict regulations, which are a form of low institutional quality (Borrmann et al., 2006). According to Mijiyawa (2017), good governance in the form of reduced corruption can contribute to Africa's structural change in the form of manufacturing development. Mensah et al. (2016) reveal that good governance and strong institutions are among the key drivers of spurring structural change and the low score of the Sub-Saharan African region in terms of these factors are the main reason for their slow structural transformation, consequently, the low pace of the economic growth and development. Ssozi and Bbaale (2019) state that being a major source of productivity and growth, structural transformation is the utmost need for Sub-Saharan African countries. However, the study suggests that successful structural transformation in these countries

needs strong institutions. Hasan et al. (2013), in their study of India's different states, found that more competitive product markets and greater flexible labor markets faster structural transformation in the selected states.

From the above discussion, we conceive that institutions and structural change have a close relationship. This relationship can alter the usually straightforward nexus between institutions and growth as well as structural change and growth found in the previous literature. Therefore there is a dire need to assess the conditional effect of institutions and structural change on growth.

2.2.6 Summary of the Chapter

To sum up, the lessons drawn from the above reviewed theoretical as well as empirical literature, we found that fecund literature exists in the economics academia as well as public and policy domains on the relationship of human capital, institutions, and structural change with economic growth. Nonetheless, the results from these empirical studies are pervasively different, ambiguous, and still unsettled, making it hard to reach a definitive conclusion. This inspires us to ascertain the extent of economic growth response to changes in human capital, institutional quality, and structural change. Therefore, we reinvestigate and see the relative importance of each of these variables in explaining economic growth. Besides the above endeavor, this study also focuses on finding the reasons, which hinder the ability of the countries to improve and sustain growth performance after increasing the human capital, strengthening the institutions, and experiencing structural transformation in the economies. This is tried to be organized in the context of the above-reviewed research debates on the growth nexus with human capital, institutions, and structural change. In these debates, it is evident that there exists

complementarity between human capital and structural change as well as institutions and structural change in their effect on economic growth.

By combing the bulk of the empirical literature, only a few exceptions to this generalization can be pinpointed, such as Teixeira and Queirós (2016) and Adabar and Sahoo (2018), who found only the interactive effect of human capital with structural change on economic growth, while the institutional factors were used as additional control variables in their analysis. Taking the case of the study by Teixeira and Queirós (2016), it focuses only on the relatively developed countries of OECD plus a few other European transition economies, while the study of Adabar and Sahoo (2018) is based on different Indian states. Therefore, there is a strong case for our intended study to fill this lacuna in the literature by taking the case of selected Asian countries. Moreover, our study also intends to find the joint conditional impact of institutions and structural change on economic growth. It is well-recognized in the literature that both the variables weigh-up each other's effects on growth. However, as per our knowledge so far, no research endeavor has empirically investigated the joint role of institutions and structural change in the analysis of growth. Therefore, our endeavor in finding the joint conditional impact of institutions and structural change on growth performance constitutes a major contribution to the pool of existing literature.

On a priori grounds, countries that enjoy higher levels of human capital, better institutions, and more structural change are expected to grow faster. Further, the link of human capital and institutions with economic growth can then be strengthened once the role of structural change is taken into consideration in the scenario. Also, the growth efficacy of structural change is conditional on levels of human capital and institutional

quality. It is expected that, if coupled with higher levels of human capital and better institutions, structural change will be more effective in spurring economic growth.

Hence, despite the proliferation of research, there has been neither any explicit study focusing on the relative importance of human capital, institutions, and structural change in economic growth in a single framework nor the joint role of structural change with the human capital as well as institutions in the economic growth is explored. Therefore, our intended study is a novel one and will definitely add to the stream of research on the topic at hand.

Chapter 3

METHODOLOGY AND DATA

In the previous chapter, the theoretical and empirical exposition constitutes just the first step in the beginning of the complex mechanism prevailing in the relation of economic growth with human capital, institutions, and structural change. The next step is to design an empirical framework describing the required relationship, which is then used to reach definitive conclusions based on real data regarding our stated objectives and hypotheses. This chapter, therefore, focuses on the methodological context of the study and is comprised of five sub-sections. In the first sub-section, we lay forth the conceptual and theorrtical underpinnings for our argumens that human capital, institutions, and structural change matter for growth. The second section provides a specification of the econometric model to be estimated. The third one elucidates the methodology of the model estimation. The fourth sub-section describes variables, data, and its sources. The fifth one presents summary of the chapter.

3.1 Conceptual Foundations

In our search for examining the role of human capital, institutions and structural change in the economic growth processes, we recourse to the theoretical framworks linking economic growth with the above mentioned factors.

Taking specifically the case of human capital, it became the theme of the endogenous theories which were mainly motivated by the lack of evidence of convergence across the countries as predicted by the neoclassical theories. The neolassical predicted convergence to the steady state but modern economies are

characterized with high divergence in both absolute as well as relative per capita incomes. This divergence has enticed a wave of endogenous growth models seeking the nexus between human capital and economic growth. This include, Romer (1986) and Lucas (1988) that posits that accumulation of knowledge has positive external effects on other individuals and firms and hence increase their productivities. This will then driven the long-run growth of the economy. Similarly, education promote growth via making innovation (Romer, 1990) and/or through imitations and adaptation of foreign technologies (Nelson & Phelps, 1966; Benhabib & Spiegel, 1994).

Similarly, institutions which come under the domain of 'new institutional economics'(North, 1990; Acemoglu et al., 2005; Acemoglu & Robinson, 2013), have strong theoritcal relationship with the economic growth. According to North and Thoms (1973), factors like capital accumulation, innovation, economies of scale, education, etc., are growth itself, not the factors of it. Capital accumulation and innovation are the proximate causes, while it is the institutions that are the fundamental cause of the differences in growth performance among the countries. Acemoglu and Robinson (2010) argue that actually, the differences in the accumulation and efficiency of proximate causes like human capital, physical capital, and technology across the countries underlie the fundamental cause, which is institutions. Strong instititions reduce the tansactions costs involved in reaching a contarct and also then in enforcement of a contract among individual agents or groups (Chavance, 2008). Mainstream economic theory has also given a central role to the security of property rights for the optimal allocation of resources. This is because weak property rights usually raise the cost of protection and

divert an individual's behavior from productive to predatory ones (Tullock, 1967; and Grossman & Kim, 1995).

Likewise human capital and institutions, structural change is also one of the key drivers of economic growth. It finds its roots in the dual economy model initially propagated by Lewis (1954) and popularized by Ranis and Fei (1961). Dual economy models bifurcate the economy into two sectors: the traditional (agricultural) sector and the modern (industrial) sector. The traditional sector is backward and technologically stagnant and has an unlimited labor supply at the subsistence wage level. Capital accumulation and research and development (R&D), and innovation only occur in the modern sector and, therefore, a greater possibility of expansion. According to Gabardo et al. (2017), and McMillan et al. (2017), growth of an economy depends on the structural change in which the resources, especially labor, leave the subsistence sector(s) and join the modern sector(s). Thus, the resources transfer from low (agriculture) to high-productivity sectors (industry/services) ultimately result in economic growth, which is the main attribute of the Lewis-type models.

3.2 The Model

This study's prime objective is to empirically uncover the dynamic relationship between human capital, institutions, and structural change, and their interactions with economic growth. It means that besides looking at the direct impact of human capital, institutions, and structural change on economic growth, we also intend to find the conditional growth effects of these variables. In this regard, we try to answer whether the growth effects of human capital and structural change as well as institutions and structural change are conditional on each other. More generally, this will show us

whether human capital and structural change amplify each other's growth effects (or otherwise). Also, whether the quality of institutions and structural change magnify each other's growth effects (or otherwise).

To this end, keeping an eye on our stated hypothesis and reviewed literature we made recourse mainly to the relatively recent studies like Teixeira and Queirós (2016), and Adabar and Sahoo (2018) who in turn followed the standard traditional growth models like Barro (1991), Levine and Renelt (1992), Mankiw et al. (1992), Islam (1995), and Barro and Sala-i-Martin (2003)[12]. As a starting exercise, we aim at the direct effects of human capital, institutions, and structural change and specify the model as follows:

$$Y_{it} = \alpha Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \acute{\beta} X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.1)$$

where, Y, HC, INS, SC represent real per capita GDP, human capital, institutions, and structural change respectively. X is a vector of control variables, such as investment, public consumption, trade openness, and financial development. μ_i and ω_t are the country and period-specific effects respectively, while ε_{it} is the usual error term. The subscripts i and t symbolize country and time period respectively.

To have a more conventional depiction of the model in which growth acts as a dependent variable, we follow Dollar and Kraay (2003), and subtract lagged income from both sides of the equation (3.1), which can also be rewritten as follows:

$$Y_{it} - Y_{it-1} = \alpha Y_{it-1} - Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \acute{\beta} X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.2)$$

Or

[12] Further, to ensure specificity of the model and to avoid the problem of missing variables, we add a number of controls that are suggested by different growth related literature like e.g., Beck et al. (2000) and Levine et al. (2000); Carkovic and Levine (2002).

$$\text{Growth} = (\alpha - 1)Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \acute{\beta} X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.3)$$

Or

$$\text{Growth} = \beta_0 Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \acute{\beta} X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.4)$$

where

$\beta_0 = \alpha - 1$

Eq. (3.4) forms the basis for our estimation. Further, regarding our second objective related to the joint effect of human capital and structural change on economic growth, we introduce simple multiplicative interaction between human capital and structural change in the model (3.4). In essence, this term will show us whether both the variables strengthen or weaken each other's growth effects. The model (3.4) may be re-written as under:

$$\text{Growth} = \beta_0 Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \beta_4 (HC_{it} * SC_{it}) + \acute{\beta} X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.5)$$

Where $(HC * SC)$ represents the interaction between human capital and structural change.

To avoid the interaction term from acting as a proxy for human capital or structural change; both of the latter variables are retained in the model independently. The conditional effect of human capital (HC) on growth can be calculated by taking the partial derivative of equation (3.5) as follows:

$$\frac{\partial \text{Growth}}{\partial HC_{it}} = \beta_1 + \beta_4 SC_{it} \quad (3.6)$$

Since the equation (3.5) has a symmetric interactive model specification, the conditional effect of structural change (SC) on growth can be calculated by taking the partial derivative of equation (3.5) as follows:

$$\frac{\partial \text{Growth}}{\partial SC_{it}} = \beta_3 + \beta_4 HC_{it} \quad (3.7)$$

The signs of β_1 and β_4 in equation (3.6), and the signs of β_3 and β_4 in equation (3.7) above reflect whether there is a complementarity or substitutability effect between human capital and structural change. If in each case, both the coefficients have the same signs (positive or negative), there will be a complementarity effect otherwise substitutability effect.

Similarly, for our third objective related to the joint effect of institutions and structural change on economic growth, we introduce simple multiplicative interaction between institutions and structural change in the model (3.4). In essence, this term will show us whether both the variables strengthen or weaken each other's growth effects. The model (3.4) then assumes the following shape:

$$\text{Growth} = \beta_0 Y_{it-1} + \beta_1 HC_{it} + \beta_2 INS_{it} + \beta_3 SC_{it} + \beta_4 (INS_{it} * SC_{it}) + \beta X_{it} + \mu_i + \omega_t + \varepsilon_{it} \quad (3.8)$$

Where (INS * SC) represents the interaction between institutions and structural change.

To avoid the interaction term from acting as a proxy for institutions or structural change, both of the latter variables are retained in the model independently. Also, the conditional effect of institutions (INS) can be calculated by taking the partial derivative of equation (3.8) as follows:

$$\frac{\partial \text{Growth}}{\partial INS_{it}} = \beta_2 + \beta_4 SC_{it} \quad (3.9)$$

Also, since we have a symmetric interactive model specification in equation (3.8), the conditional effect of structural change (SC) on growth is also conditional on institutions (INS), that is,

$$\frac{\partial \text{Growth}}{\partial \text{SC}_{it}} = \beta_3 + \beta_4 \text{INS}_{it} \qquad (3.10)$$

Also, the signs of β_2 and β_4 in equation (3.9), and the signs of β_3 and β_4 in equation (3.10) above reflect whether there is a complementarity or substitutability effect between institutions and structural change. If in each case, both the coefficients have the same signs (positive or negative), there will be a complementarity effect otherwise substitutability effect.

So to find the direct impact of human capital, institutions, structural change, and other control variables we will estimate equation (3.4). For the joint/moderating effects of human capital and structural change, and institution and structural change, we will estimate equation (3.5) and equation (3.8) respectively. For the conditional effects of human capital at different levels of structural change, and for the conditional effects of structutral change at different levels of human capital, equation (3.6) and (3.7) will be estimated respectively. Similarly, for the conditional effects of institutions at different levels of structural change, and for the conditional effects of structutral change at different levels of institutions, equation (3.9) and (3.10) will be estimated respectively.

3.3 Estimation Strategy

After the mathematical modelling of the connections between the independent and dependent variables, the subsequent task is to use a proper econometric technique for its estimation. However, the growth empiricists usually confront with the problem of

endogeneity or simultaneity, among others. This arises when one of the explanatory variables is correlated with the error term. In Opoku and Yan (2018) opinion without fixing this problem, the estimates may be spurious.

Turning head to our present study, our main explanatory variables seem to be endogenous. This may make our model prey to the endogeneity problem. For example, human capital and economic growth can cause one another. This is because more human capital in the form of education, health, and skills will enhance an individual's productivity and hence economic growth, while more economic growth will enable individuals in getting more education and skills (Karaalp-Orhan, 2017; Sharma & Sahni, 2015; Awel, 2013; Cheng & Hsu, 1997; In & Doucouliagos, 1997). Institutions and economic growth also cause each other (Chong & Calderon, 2000). This is because better institutions can provide a conducive environment for countries to become rich, while rich economies may be capable of creating and also prefer sound institutions (Acemoglu et al., 2001; Dollar & Kraay, 2003). As far as structural change and economic growth nexus is concerned, both are the cause and effect of each other. Structural change generally implies shift of labor from lower to higher productivity sectors, which will raise economy's overall productivity, and hence increase per capita incomes. On the other hand, high economic growth increases life's standard of the people, which demands for high value added and complex products, hence leading to structural change in the economy (Dietrich, 2012; Teixeira & Queirós, 2016: Vu, 2017; Olczyk & Kordalska, 2018).

As outlined in the above paragraph, there is a real risk of potential endogeneity problem in our model. This problem usually renders the classical estimators like ordinary

least squares (OLS) and fixed effects (FE) biased and inconsistent. The existence of fixed unobservable heterogeneity will cause the OLS to produce spurious estimates. According to Opoku and Yan (2018), the use of the fixed effects or within estimator can surmount this weakness of the OLS. However, they asserted that the fixed effect itself is based upon certain stern assumptions. That is, the fixed effect will only produce consistent estimates if the current values of the explanatory variable have no relationship with the past values of the dependent variable (Wintoki et al., 2012).

Opoku and Yan (2018), and Bollmann (2019) both state that using the instrumental variable technique is a common strategy for dealing with the endogeneity issue. Opoku and Yan (2018) stat that, under the condition that the specified instruments do not directly affect growth but rather do so indirectly through the endogenous variable, estimation using this technique can be useful in identifying the causes of growth. They did note, though, that this approach has its limitations. This is due to the fact that the variables selected as instruments are often ineffective in affecting the endogenous variables (Bound et al., 1995). Therefore, the regression estimations relying on such instruments could be inconsistent (Durlauf et al., 2005).

In recent decades, the endogeneity and unobserved heterogeneity issues have been addressed by the researchers by using Generalized Method of Moments (GMM) technique. It uses the endogenous variables' own lags as instruments (Roodman, 2009). This was initially formalized by Holtz-Eakin et al. (1988) and then propagated by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The growth empiricists widely use it in their analysis (Soto, 2009). Therefore, in the current study, we use the GMM estimator to perform our estimation because similar

research in other studies (such as Teixeira & Queirós, 2016; Vu, 2017; Opoku & Yan, 2018) also utilised GMM estimation.

There are several reasons for relying on this approach. First, the GMM estimator is consistent with the panel data models (Alam et al., 2019). Second, it is useful in controlling the problem of endogeneity (Hillier et al., 2011). Third, economic growth follows the path-dependent hypothesis, that is, current year economic growth follows that of preceding year. Hence, risk of biased results may occur as one uses lagged values of dependent variables as instruments (Busse et al., 2019; Nickell, 1981). However, GMM estimations address this problem (David et al., 2006). Fourth, GMM estimations can tackle the problems of heteroscedasticity as well as autocorrelation (David et al., 2006). Fifth, Hansen (1982) states that GMM estimations is like a general technique in which OLS, 2SLS and IVs-like estimations are nested.

There are two common types of GMM estimators in the literature: "Difference GMM" and "System GMM". The difference GMM converts the equation into first differences to eliminate the country fixed effects. The lagged values of the endogenous variables are then utilized to instrument these "differences". The first difference equation is combined with a second equation by the system GMM to create a system of two equations. The first equation is in difference instrumented with lagged levels, while the second is in levels instrumented with lagged differences. Nonetheless, according to Bond et al. (2001), difference GMM estimates, particularly in the case of small-time series, may be vulnerable to the weak instruments problem. As a result, for the empirical analysis in the current work, we preferred system GMM over difference GMM.

There are one-step and two-step processes in System-GMM estimation. According to Zergawu et al. (2020), despite being consistent, one-step is inefficient and susceptible to heteroscedasticity. The two-step estimator, on the other hand, is efficient and robust to heteroscedasticity. Therefore, we opt for the two-step estimator for our analysis. However, the standard errors of two-step estimator are believed to be susceptible to downward biasedness (Blundell & Bond 1998). We handle this issue by employing the Windmeijer (2005) finite sample correction for standard errors, as it makes two-step robust estimations more efficient (Zergawu et al., 2020). Further, system GMM estimators frequently produce an excessive number of instruments, which can weaken the validity of the Hansen J test. However, we deal with this issue of instrument multiplicity by using Roodman's Stata function to collapse all of the internally created instruments (Roodman, 2009).

Furthermore, the non-existence of first-order autocorrelation and the existence of second-order autocorrelation are necessary for valid GMM estimations. The former are examined using the AR (1) test, and the latter using the AR (2) test. Additionally, valid instruments - which are determined by the Hansen J test—are required for GMM estimates.

3.4 Data Description

As stated above, the study at hand aims to uncover the growth effects of human capital, institutions, and structural change. However, one of the main challenges confronting empirical studies and especially the panel ones are obtaining good quality of data. In the below sub-sections, we give description of our data set. The selected variables, their construction, and their whereabouts of data availability are briefly debated

in the below sub-sections, and are also given in tabular form in Appendix 2 in appendices section.

3.4.1 Selection of Sample Countries

An important foremost step in the empirical analysis is the selection of an appropriate sample. In this study, we take the case of Asian countries. There are many reasons behind our selection of this group of countries. First: according to Briones and Felipe (2013), within the coming few decades, an economic transition is expected globally; in which Asia will be a major player. Due to its rapid economic transformation over the recent past, Asia will eclipse Europe and North America. Second, in 2020 Asia's GDP is expected to surpass the world combined GDP, and by 2030 the region's contribution to global growth is expected to reach around 60%. The global economy is expected to get 2.4 billion new people of the middle class with major share (about 90%) of Asian region (World Economic Forum, 2019)[13]. Third, for Asia's future development and transformation, some highlight the economy-wide factors e.g. technology and entrepreneurship (ADB, 2011); and institutions, investment, and finance (Hill & Gochoco-Bautista, 2013), while others emphasize on the structural aspects like manufacturing (ADB, 2013), or services (ADB, 2012) but not agriculture (Briones & Felipe, 2013). Fourth, the process of structural transformation in Asia, both in its scale and speed, has been unprecedented (Aizenman et al., 2012; Paul, 2018). According to McMillan et al. (2014), over the last 20 years, it has created enormous potential for growth in Asia. Moreover, they find that structural change contributes positively to labor productivity only in Asia against negative in the case of Africa and Latin America.

[13] In 2020 Asia will have the world's largest GDP. Here's what that means | World Economic Forum (weforum.org)

Nonetheless, focusing on the relationship of human capital, institutions, and structural change with economic growth, the Asian region is studied in the prior literature, however, not in a single study frame. Also, the question pricking the mind is whether human capital (structural change) will be one of the important factors in enhancing the growth effect of structural change (human capital). In the same vein, whether institutions (structural change) will be one of the important factors in enhancing the growth effect of structural change (institutions). These questions need to be answered because we conceive from the above chapters of introduction and review of literature that human capital and structural change as well as institutions and structural change weigh up each other's impacts on economic growth.

3.4.2 Number of Sample Countries and Data period

Although data stoppage applies otherwise an econometric analysis always favors more time periods and sample countries. We employ an unbalanced panel dataset of 21 countries over the period 1971-2017. List of the selected sample countries is given in Appendix 3 in Appendices. The selection of both the periodicity of data and the number of countries are dictated by data availability issues, especially in terms of structural change variable.

Despite the availability of yearly data, we prefer to use non-overlapping 5-year averages data creating 10 time periods[14], leaving ten data points for each country for each variable in the sample. Most probably, this transformation will reduce the influence of business cycle effects on error term and will also be less serially correlated in contrast to

[14] The ten time periods are: 1971-1975, 1976-1980, 1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010, 2011-2015, 2016-2017. The last (tenth) time period is average of two years i.e. 2016-2017 because of data non-availability beyond 2017 particularly related to structural change.

the annual data (Islam, 1995). Also, a larger sample size than the time period is required by GMM estimators (Opoku & Yan, 2018).

3.4.3 Selection of Variables, their Definition and Construction

This sub-section describes the rationale behind the selection of variables in the study. We have one dependent variable and many independent variables comprised of 3 core and 5 control variables[15].

(a) Dependent Variable

Economic growth acts as our dependent variable. Consistent with the previous literature, it is the log difference of real per capita GDP multiplied by 100. The per capita GDP is measured at $ 2010 prices and data is extracted from the World Bank Development Indicators database (World Bank, 2019).

(b) Explanatory Variables

Our explanatory variables comprise a set of core variables and control variables. We discuss these variables in some detail in the following.

(1) The Core Variables

We have three core variables: human capital, institutions and structural change.

- **Human Capital**

Despite its conceptual clarity, measurement of human capital is a difficult task. This is because judging individuals' skills and health and then devising a metric to account for these differences in individuals across time and space is practically impossible (Son, 2010). Usually, the selection of a measure of human capital by

[15] Variables definition and their respective data sources are also given in the Appendix 2.

academics is based on data availability rather than its worthiness in the policy purpose (Hawkes & Ugur, 2012). In the empirical growth literature, human capital is usually measured by education but education itself has many different dimensions and aspects (Maneejuk & Yamaka, 2021). According to Holland et al. (2013), education used as a measure of human capital can have four different forms: (1) average years of schooling usually used as a proxy for stock of human capital, (ii) enrollment ratio usually used as a proxy for human capital flows, (iii) public education expenditure as a share of GDP or public education expenditure per student as a share of GDP usually used as a measure of investment in human capital, (iv) cognitive skills or international test scores, particularly in science and mathematics usually used as a proxy for education quality.

However, Son (2010) asserted that the different proxies used as a measure of human capital are not perfect and each one has some problems in either in its measurement or limitations in usage but years of schooling is relatively most consistent and comparable across countries. Most recently, Maneejuk and Yamaka (2021) also argued that among the four groups of proxies for human capital suggested by Holland et al. (2013), years of schooling is widely used in the empirical literature. Therefore, in the present study, an index of human capital based on average years of schooling is used. There are two sources that provide the desired data, namely the Barro-and-Lee and Penn-World (PW) table. The former provides data only on average years of schooling but the latter also includes returns to education along with the average years of schooling. The second difference is that Barro-and-Lee data is available after each 5-years interval while PW table provide data on annual basis. As PW table's data seems more comprehensive

than the Barro-and-Lee and also its yearly availability, therefore we preferred to use the PW table's measure for human capital.

- **Institutions**

In institutions-growth empirics, the most challenging task is the measurement of institutional characteristics. This is because; institutions represent the multi-dimensional features of an economy and quantifying each dimension is inherently difficult (Dawson, 1998). Acemoglu et al. (2001), among others, debate that institutional development involves covering both economic and political institutions development including improvement in bureaucracy, civil administeration, judiciary, law and order, democracy, level of corruption, etc. Even though, currently numerous measures of institutions exist, however, these are either imperfect, interrelated or do not purport to the underlying conceptual dimensions of the institutions (Slesman et al., 2015). Aidis et al. (2009) state that a consensus has not been reached yet among the researchers for a single proxy to represent institutional quality.

According to Uddin et al. (2017), since the classical work of Alesina et al. (1996), different studies have used different variables and proxies for institutional development. Commander and Nikoloski (2010) state that twenty-five years ago institutions would be hardly found in the academia related to economic performance but now barely a single study goes without mentioning their role. They contend that among others, proliferation of sources aiming to measure a wide range of institutional forms is also a reason of it.

In the relatively recent literature, a host of proxies produced by different organizations/databases have been used. The most important encompasses polity2 of the PolityIV database (Gerring et al., 2004; Dias & Tebaldi, 2012; Carraro & Karfakis, 2018;

Zergawu et al., 2020), Corruption Perceptions Index (CPI) by Transparency International (Catrinescu et al., 2009; d'Agostino et al., 2016; Uddin et al., 2017), Worldwide Governance Indicators (WGI) by the World Bank database (Brunnschweiler, 2008; Kanyama, 2014; Wu et al., 2016; Aluko & Ibrahim, 2020), an index of Economic Freedom reported by Heritage Foundation (Dzansi, 2013; Sarwar et al., 2013, Uddin et al., 2017), an Economic Freedom of the World by Fraser Institute (Lee; 2010; Alguacil et al, 2011; Dutta & Williamson, 2016; Slesman et al., 2017; Uddin et al., 2019), an index of Political Rights, and an Index of Civil Liberties by Freedom House (Valeriani & Peluso, 2011; Zouhaier & Kefi, 2012; Teixeira & Queirós, 2016; Uddin et al., 2019), and country risk ratings consists of political risk, economic risk and financial risk from International Country Risk Guide (ICRG) provided by the Political Risk Services (PRS) Group (Demir, 2016; Chiu & Lee, 2017; Aluko & Ibrahim, 2020; Zergawu et al., 2020) and etc.

The above-mentioned (and also those not mentioned here) proxies of institutions differ from each other. The difference among them is due to their method/s of construction, the conception they embody and the purpose they intend to achieve. According to Valeriani and Peluso (2011), nonetheless, a plethora of institutional quality indicators exists but these are strongly intermingled with one another. They further argue that the separate proxies actually represent the same institutional phenomenon which is an interwoven network where every thread contributes to it and is simultaneously affected by it.

Turning to our present case, we preferred the use of political rights and civil liberties indices of Freedom House database as it gives not only relatively longer

coverage in terms of years (available since 1972 on yearly basis)[16] but also encapsulates most of the different characteristics of institutional development. According to Jones and Tarp (2016) and Wako (2018a) some studies have used these indices as proxy for democracy, but are actually based on diverse indicators that show the overall institutional soundness of a country. They are made of elements like property rights, rule of law, and democracy which are referred to in the literature as institutional inputs along with corruption policy making, accountability, transparency, and bureaucratic quality which referred to as institutional outputs. The database measures the indices on a one-to-seven scale, with one representing the best while seven is the worst quality of institutions. To have easy and straightforward interpretation of the results, we rescaled the ranges with one now representing the lowest while seven the highest quality of institutions. Some studies like Valeriani and Peluso, (2011), Zouhaier and Kefi (2012), Sarwar et al. (2013), and Teixeira and Queirós (2016) have used separately the two indices, but following Jones and Tarp (2016) and Wako (2018a), we used the average of the two indices so as to have a blend of both the characteristics of the indices.

- **Structural Change**

In this study, by the structural transformation we mean the reallocation of labor across the sectors of economy. To quantify this process, we are in need of some indices to summarize the changes in the share of labor in different sectors of the economy. There exist wide ranges of measures of structural change that are used interchangeably in the

[16] The other sources like WGI start from 1996, ICRG from 1984, and also markedly reduced our already small sample of countries. Although the Fraser Institute data start from 1970 but up to 2000 it is generally available in five-year intervals, and is available on annual basis since 2000 – with many missing observations for our sampled countries.

literature (Van Neuss, 2019). However, Herrendorf et al. (2014) argue that this practice may be problematic as the use of different indicators can reflect somewhat a different aspect of structural change and lead to differing conclusions regarding its importance.

There are various methods of measuring structural change, ranging from simple ones that just concentrate on changes in the sectoral shares of labor to more comprehensive ones that integrate changes in labor allocation across sectors with productivity levels. (Sen Gupta et al., 2016). According to the definition and conception of structural change in our study, we found three relevant indices namely, Norm of Absolute Value (NAV), Modified Lilien Index (MLI), and Shift Share Analysis (SSA). These three indices are widely used in the structural change related literature (see Cortuk & Singh, 2011; Dietrich, 2012; Zulkhibri et al., 2015; Adabar & Sahoo, 2018; Olczyk & Kordalska, 2018 for NAV and MLI methods, and McMillan et al., 2014; De Vries et al., 2015; McMillan et al., 2017; Adahar & Sahoo, 2018, for SSA method). The details of all these methods are given below.

The NAV index, also named Michaely Index (1962) or Stoikov Index (1966) in the literature, is one of the simplest methods of measuring structural change. It is given as:

$$\text{NAV} = \frac{1}{2}\sum_{i=1}^{n} |x_{it} - x_{is}|, t = 2, \ldots, T, s = 1, \ldots, T-1 \qquad (3.11)$$

Where 'x' represents the proportion of workers employed in sector 'i' for periods 't' and 's'. It may be calculated by differencing the sector's share between the two time periods. After obtaining the absolute values of these differences, they are then added together. Finally, since each changes is made twice, we divide these values by 2. The index can range in value from 0 to 1. A number of zero indicates that the sectorial shares

are unchanged, whereas a value of one indicates that the economy has undergone a total structural transformation.

MLI, which is a modified version of the Lilien index (1982), can be expressed as follows:

$$MLI = \sqrt{\sum_{i=1}^{n} x_{i,s} \cdot x_{i,t} \cdot \left(\ln \frac{x_{i,t}}{x_{i,s}}\right)^2}, x_{i,s} > 0, x_{i,t} > 0 \quad (3.12)$$

The symbols used in MLI have the same meanings as those used in NAV. A lower value of the index indicates a slow rate of structural change, while a higher value of the index indicates a rapid rate of structural change.

We think these two alternative measures of structural change are relevant as they show changing picture of the economies' structures, though say nothing about its impact on productivity growth (Sen Gupta et al., 2016; Adabar & Sahoo, 2018). As, alterations in the structure of the economy have significant implications for labor productivity (Sen Gupta et al., 2016), and hence the economic growth of a country, researchers typically resorted to Fabricant (1942) canonical decomposition method called shift-share analysis (SSA). This method is widely used in the literature, albeit with different version, for measuring the contribution of within industry/sector improvements/changes and reallocation of resources across sectors of the economy.

Following the most recent version propagated by the De Vries et al. (2015), Shift-Share-Analysis (SSA) method has the form as follows:

$$\Delta P = \sum_{i}^{n} \Delta p_i \, e_{i0} + \sum_{i}^{n} \Delta e_i \, p_{i0} + \sum_{i}^{n} \Delta p_i \, \Delta e_i \quad (3.13)$$

Where 'P' stands for total labour productivity, which is equal to total value added divided by total employment, 'i' stands for the number of sectors, 'pi' stands for sectoral

labor productivity, which is equal to sectoral value added shares divided by sectoral employment shares, 'ei' stands for sectoral employment shares, and 'Δ' denotes the change in current and previous time periods.

The first term in equation (3.13)'s right side is the changes in productivity within each sector (called within effect or intra effect). It can be found as the change in sectoral productivities weighted by the respective sectoral employment shares. This effect relates to growth in overall labor productivity provided that no change occurs in the sectoral shares of employment. This happens usually positive as majority of the sector's labor productivity grows over time. This form of growth might take place, for instance, as a result of capital accumulation, advancements in technology, or improvements in institutional quality.

The second term describes productivity growth which results due to structural changes in the economy (called between-effect or inter-effect or static-shift-effect). It is determined by the changes in sectoral employment shares that are weighed by the respective sectors productivity level. It can be positive when sectors with greater levels of productivity absorb more labor and thereby enhance their proportion in overall employment. Similarly, it can be negative when sectors with greater levels of productivity absorb fewer labor and thereby reduce their proportion in overall employment. The third term is the combined effect of changes in sectoral labor proportions and changes in sectoral labor productivities. It is called between-dynamic-effect. It is positive, if sectors are characterized by a simultaneous increase or decrease in both their labor shares and productivity growth. To put it another way, the interaction term is high, the more labor are channeled into sectors that are experiencing rapid

productivity growth. The interaction effect, however, is negative when sectors with rapidly rising labor productivity are unable to sustain their proportions of overall employment. The negative effect is severe, the more industries with rapid productivity growth are confronted with decreased employment proportions.

As suggested by the Micmillan et al. (2017), Ahson, Muhammad and Sarwar (2017), Ahson, Siddiqi and Mirza (2017), and Timmer and Szirmai (2000), we combined the second and third terms of the equation (3.13) to obtain the structural change variable. The data for sectoral value added and employment are taken from Asian Productivity Organization (APO)[17], which divides the economy into nine sectors. Although more disaggregated sectoral level data is more plausible for observing the degree of structural change (Zulkhibri et al., 2015; Üngör, 2017), however, data availability issues stand in our way and compel us for using nine-sector disaggregation of the economy.

(ii) The Control Variables

As inspired by the previous related literature, along with our main independent variables, we also have a bunch of control variables in our model. Generally, selection of the control variables is mostly study-specific as empirical literature does not establish a uniform pattern for their inclusion (Siddiqui & Ahmed, 2013). Levine and Renelt (1992) tested about 50 control variables in their regression analysis. However, the variables they identified having close connection with economic growth include investment, initial income level, trade, human capital, and inflation.

[17] The nine sectors are: 1) Agriculture; (2) Mining; (3) Manufacturing; (4) Utility; (5) Construction; (6) Trade and hotels; (7) Transport and communications; (8) Finance, real estate, and business services; and (9) Government and community services. The details of the nine sectors and the selected countries can be found at https://www.apo-tokyo.org/apo-search/?q=APO-Productivity-Database-2019v2

The present study considers some of the traditional covariates of economic growth like log of initial GDP per capita, physical capital, government expenditure, trade openness, and financial development. The first control variable is log of initial GDP per capita measured at $ 2010 prices. The inclusion of this variable not only makes our model dynamic in nature but also sheds light on the presence of any convergence or divergence in our sampled countries growth processes. The second control variable is physical capital, measured by gross fixed capital formation as a percentage of GDP. Almost all growth models stress on physical capital role in economic growth processes (Barro, 1991; Mankiw et al., 1992; Iyke, 2018).

The third control variable is government expenditure, measured by general government final consumption expenditure as a percentage of GDP. Generally, government consumption expenditure distorts private sector decisions and hence lowers the economic growth (Barro, 2003). Fourth is trade openness, gauged by exports plus imports as a percentage of GDP. Trade openness helps in the adoption of foreign advanced technology and an improving allocative and productive efficiency hence reaching the economy at higher point on a growth ladder. The fifth and final control variable is financial development, measured by domestic credit to the private sector as a percentage of GDP. Financial development is believed to have boosting effects on economic growth as evident from the previous literature like Levine et al. (2000), and Zergawu et al. (2020). The data for the entire set of control variables are retrieved from the World Development Indicators (World Bank, 2019).

All variables have a natural logarithm transformation, and all monetary variables are expressed in constant 2010 US dollars.

3.5 Summary of the Chapter

This chapter is about methodological framework mainly comprising the theoretical relationship between the variables, specification of the model to be estimated via an appropriate econometric technique and description of the data. In case of theoretical background relevant to our focused variables, a discussion is made on exogenous and endogenous growth models, institutional economics and structuralists growth perspectives.

A simple dynamic growth model is specified where, along with traditional growth co-variates (e.g., investment, public expenditure, trade openness and financial development), our focused variables: human capital, institutional quality, and structural change are included as independent variables. The data are retrieved from different sources depending on availability and appropriateness. For estimation purposes, system GMM technique is adopted because of its effectiveness in tackling the endogeneity and reverse causality issues arising in the models.

Chapter 4

RESULTS AND DISCUSSION

With the final data in hand, we used several econometric techniques to get the estimated results. These are portrayed in the following sections. The discussion takes place largely in two ways: first, we discuss the decomposition of aggregate productivity; second, we discuss our main empirical results.

4.1 Decomposition of Aggregate Productivity Growth

Here, aggregate productivity growth is decomposed into within effect, static effect, and dynamic effect. These are shown in the Table 4.1 given below where each number refers to the average of the respective measure indicated in each column.

Table 4.1 Decomposition of Aggregate Labor Productivity Growth Rates by Year

Years	Total Growth (%)	Within Effect (%)	Static Effect (%)	Dynamic Effect (%)
1971-2017	1.16	0.52	1.03	-0.39
1971-1975	1.28	0.48	1.35	-0.55
1976-1980	1.28	0.81	0.80	-0.33
1981-1985	-3.21	-3.71	1.00	-0.50
1986-1990	-1.61	-2.03	0.81	-0.39
1991-1995	-1.99	-3.27	1.69	-0.41
1996-2000	-3.31	-3.88	0.92	-0.35
2001-2005	1.56	0.55	1.34	-0.33
2006-2010	4.14	3.41	0.82	-0.09
2011-2015	0.87	0.84	0.71	-0.68
2016-2017	0.49	0.04	0.54	-0.09

Notes: Author's own computations based on equation (3.13). Data source: Asian Productivity Organization (APO).

First, to know the behavior of the aggregate productivity growth and its different components contributions, we focus on the full sample period (1971-2017). The required details can be found in the first row of the above table. It can be seen that on average, aggregate productivity grows at the rate of 1.16 percent, which is the sum of the growth

rates of within effect (0.52 percent), static effect (1.03 percent), and dynamic effect (-0.39 percent). This decomposition exercise demonstrates that structural change effect (i.e., sum of static effect and dynamic effect) contributes about 55 percent, while within effect contributes about 45 percent. This suggests that structural change is growth-inducing in the case of our selected Asian countries. These findings are in the same fashion as of Roncolato and Kucera (2013), and De Vries et al. (2015). Our results are especially in line with the findings of McMillan et al. (2014) that structural change, unlike in Africa and Latin America, has significant contribution in Asia's productivity growth.

Next, we consider the dynamics in the aggregate productivity growth and its different components over different groups of time periods. The contribution of different components and hence aggregate productivity growth rates vary widely across time periods. The average aggregate productivity growth rate is maximum, that is, 4.14 percent in 2006-2010 while minimum in 1996-2000, that is, -3.31 percent. Also, a sharp variability can be witnessed in the growth rates of different components of aggregate productivity growth. The most notable is the negative total growth in the decades of 1980s and 1990s which is mainly because of the negative within-effect in these time periods. This all may be attributed to the sluggishness of Asian economics due to the Vietnam's War and Asian Financial Crisis. However, after 2000 the region recovered from the above like problems and flourished as evident from the greater positive within-effect and hence the total growth.

It is also noteworthy that in almost all the different periods, structural change effect (i.e., sum of both the static and dynamic effects) is positive implying growth enhancing capability of it. It can therefore be established that the key contributors of our

sampled countries productivity surge is within sector productivity growth, whereas structural change is also being significant part of it.

4.2 Empirical Association of the Core Variables with Economic Growth

This section contains our empirical examination of the association of human capital, institutions, and structural change with economic growth. This section is further divided into two segments. The first one shows the preliminary analysis of the link between the variables, whereas the second one depicts the main empirical results of the study.

4.2.1 Preliminary Analysis

Prior to go for proper estimation of the proposed model through regression technique, it is customary important to perform a preliminary analysis of the relationships between the variables at hand[18]. This cursory look then helps in interpreting and discussing the estimated results. This effort takes place in two ways. First one is graphical analysis while the second one presents summary statistics and correlation analysis.

4.2.1.1 Graphical Analysis

Graphs also show the first glimpse of the association between dependent and independent variables. Therefore, for the first look of the likely connections between economic growth and our focused independent variables: human capital, institutions, and structural change, figures 4.1 to 4.3 are presented below.

[18] All the empirical estimations were processed through STATA software version 14.0.

Figure 4.1 shows the relationship between human capital and economic growth. The scatter plot shows a somewhat non-linear relationship between the two variables. It is positive for the low levels of human capital, but wanes or possibly becomes negative at higher levels.

Figure 4.1 Relationship between Human Capital and Economic Growth

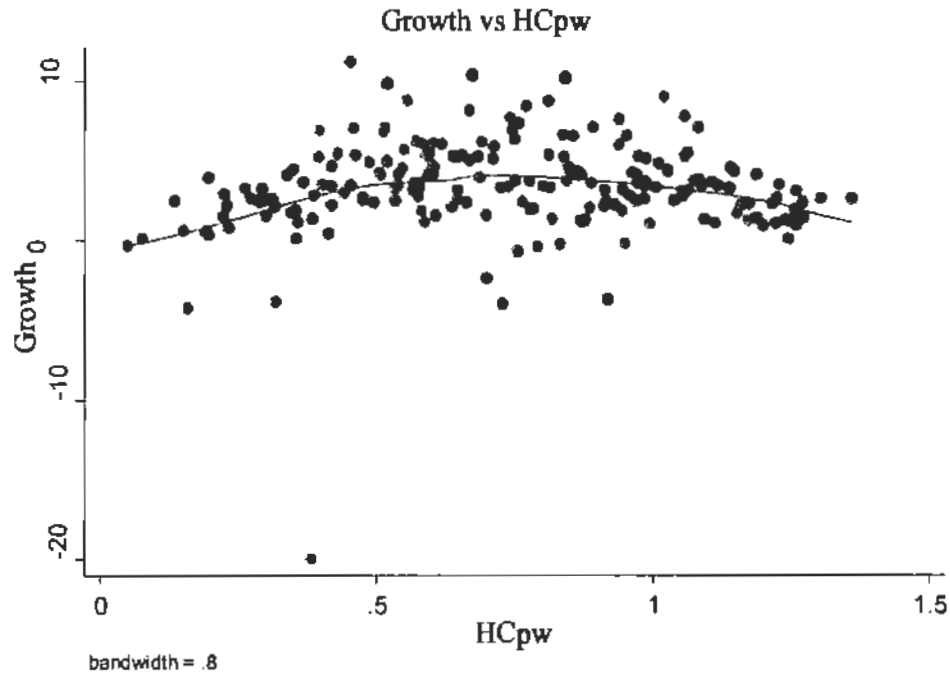


Figure 4.2 shows the relationship between institutions and economic growth. The scatter plot shows a positive relationship between the two variables.

Figure 4.2 Relationship between Institutions and Economic Growth

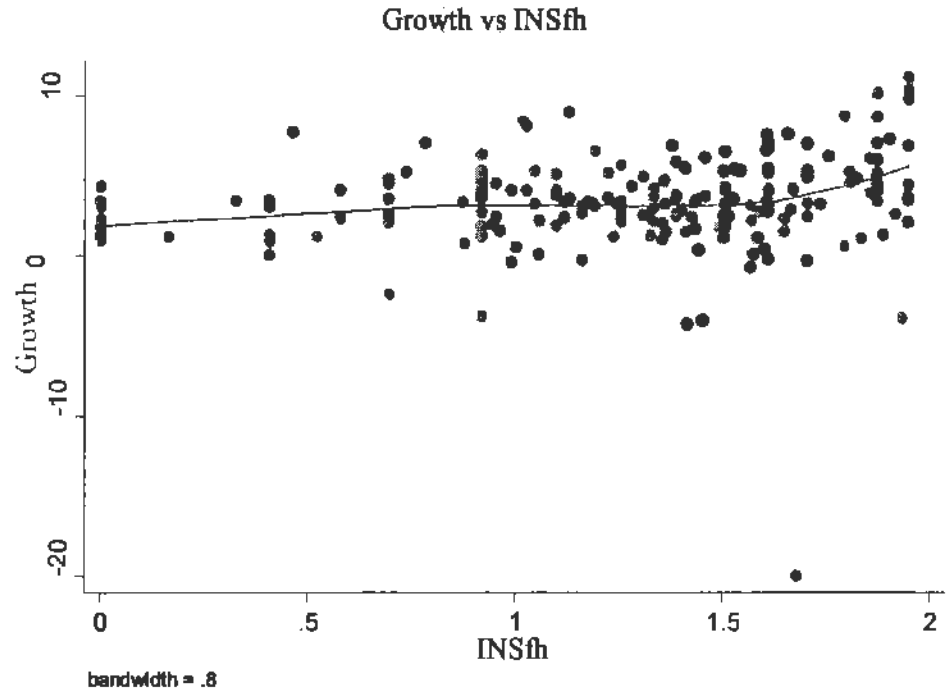
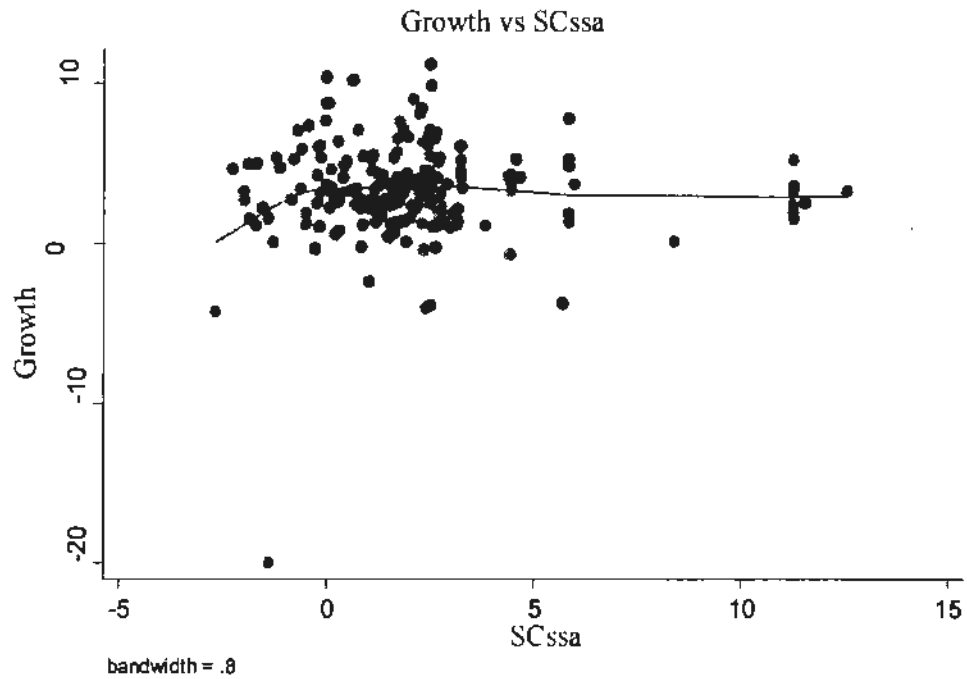


Figure 4.3 shows the relationship between structural change and economic growth. The scatter plot shows a positive relationship between the two variables.

Figure 4.3 Relationship between Structural Change and Economic Growth



4.2.1.2 Summary Statistics and Correlation Analysis

The summary statistics of the variables and correlation between them is presented in Table 4.2. Generally, while specifying the model, it is expected that independent variables would be strongly related to dependent variable. Significant variation can be noted in the different correlation coefficients. Among them, the highest correlation of growth is with the domestic investment, while the lowest is with log of initial GDP per capita. These indicate that investment leads to enhance growth while growth convergence between the countries is expected. Further, among our core variables, institutional quality is more closely related to growth than human capital and structural change as both the latter variables have very small relationship with the growth. Financial development is

also positively related to growth. Surprisingly, though with expected signs, government expenditures and trade openness have very low relationship with the growth.

Also, strong relationship can be observed between the independent variables themselves as the highest of about 83 percent coefficient of correlation is there between human capital and log of initial GDP per capita. This can create problem of multicollinearity in the model which can hamper the goodness of estimated results. Therefore, we check the severity of this problem by finding the Variance Inflation Factor (VIF). Its values, also reported in the Table 4.2, are in the acceptable range, that is, less than 5 (Hair et al., 2016) hence indicating no chronic problem of multicollinearity.

Table 4.2 Summary Statistics and Correlation Matrix

	VIF	Growth	Y0	HCpw	INSfh	SCssa	Dom. Invest.	Govt. Exp.	Open-ness	Fin. Deve.
Panel A: Summary Statistics										
No. of Observations		202	199	210	210	202	183	183	187	192
Mean		3.32	7.858	0.722	1.275	2.062	3.196	2.372	3.97	3.606
SD		2.975	1.559	0.316	0.516	2.656	0.298	0.354	1.014	1.049
Minimum		-19.99	5.101	0.049	0	-2.695	1.887	1.353	-0.835	0.009
Maximum		11.17	10.92	1.359	1.946	12.54	4.083	3.224	6.044	5.387
Panel B: Correlation Matrix										
Growth		1								
Y0	4.41	-0.12	1							
HCpw	4.03	-0.02	0.83	1						
INSfh	2.07	0.34	-0.55	-0.56	1					
SCssa	1.58	-0.11	0.33	0.14	-0.13	1				
Dom. Invest.	1.76	0.47	0.45	0.5	-0.17	0.04	1			
Govt. Exp.	1.79	-0.04	0.52	0.49	-0.47	0.29	0.36	1		
Openness	1.7	0.07	0.38	0.37	0.13	0.04	0.27	-0.05	1	
Fin. Deve.	3.53	0.13	0.71	0.68	-0.31	-0.06	0.63	0.43	0.42	1

Notes: Author's own calculations. N refers to number of observations and SD refers to the within-standard deviation. VIF is variance inflation factor. Growth is the dependent variable in all the estimated models. Y0 is the log of initial GDP per capita, HCpw is the human capital, INSfh is the institutional quality, SSssa is the structural change, Dom. Invest. is the domestic investment, Govt. Exp. Is the government expenditure, Openness is the trade openness, Fin. Deve. is the financial development.

However, it is important to mention that simple correlations and scatter plots have little power to show the factual picture of the relationships among the variables as it is usually multifarious and complex. Therefore, to unearth the true inter-linkages, more systematic empirical analysis is required. The following sections explain this effort.

4.2.2 Results from Regression Analysis

This section unveils and discuss the main empirical results of the study. To have a fruitful discussion on the estimated results, this section is further divided into three sub-sections. These are sequenced according to our study main three objectives. The first present's baseline results while the second and third discloses the moderating role of human capital and structural change, and institutions and structural change in growth, respectively.

4.2.2.1 Baseline Empirical Results

In this sub-section, we report and explain the direct empirical association between the variables by utilizing our baseline model, that is, equation (3.4). In this regard, two estimators-fixed effect and two-step system GMM[19] are used. The two-step system GMM estimates are generally considered more robust and reliable than the fixed effect estimates. Therefore, our main focus is on the explanation of the two-step system GMM estimates while the estimates of fixed effect are used for benchmarks purposes. Further, it deems necessary to mention that applying both the estimators, we fix the problem of heteroscedasticity and autocorrelation by using robust standard errors as suggested by Newey and West (1987).

The results of fixed effects are given in the Appendices section where Appendix 4 reports the direct growth effects of human capital, institutions, and structural change while Appendix 5 and Appendix 6 report moderating growth effects of human capital and structural change, and institutions and structural change respectively. It can be evident from these results that in case of direct effects, only structural change occurs significantly

[19] GMM estimation was carried out by using STATA rotine-xtabond2-developed by Roodman (2009).

positive in all the estimated models while human capital and institutions happen in overwhelming majority of cases, positive but insignificant. The moderating growth effects of human capital and structural change, and institutions and structural change are positive but insignificant. However, as reported by Caselli et al. (1996), dynamic panel model usually renders the fixed effect estimates to biasedness. Also, due to the lack of the exact exogeneity in the independent variables, fixed effect estimates are more susceptible to biasedness (Opoku & Yan, 2018). Hence, we make resort to two-step system GMM estimator which accommodates most of the above stated problems.

The estimates of two-step system GMM are presented in Table 4.3. We have estimated 6 specifications. To retain our main focused variables and also the dynamic nature of the model; all the specifications include human capital, institutions, structural change and log of initial GDP per capita. Among the six models, first is simple base line model comprising log of initial GDP per capita along with our three focused variables. Second to fifth is estimated by adding one variable separately to the model one from our conditioning set that includes physical capital, government expenditure, trade openness and financial development. The last is based on adding only those control variables to the model one which happened to be significant in at least one of the second to fifth models. We followed this procedure as we were not able to put all the control variables in the model due to limitation as well as to comply with the Roodman (2009) rule for number of instruments[20].

Before going into the explanation of the two-step system GMM estimates, it is necessary to satisfy the three conditions, that are; AR (1), AR (2) and Hansen J-test. In

[20] The general rule is that there should not be more instruments than the number of groups or countries.

essence all of our models meet the above mentioned conditions and hence the estimates can be reasonable and reliable.

Regarding the empirical results, our core variables, in overwhelming majority of cases, happened statistically significant with their expected theoretical signs. Human capital, for instance, occurs significantly positive in all models other than model 5, where it is insignificant. This implies that human capital has the ability to have potential meaningful growth effects and that nations with higher levels of education experience faster economic growth. It validates the theories of exogenous and endogenous perception regarding education's contribution in the economic expansion of a country. Importantly, this is also consistent with the majority of groundbreaking empirical investigations conducted in this area, like Barro (1991), Levine and Renelt (1992), Mankiw et al. (1992), Easterly and Levine (1997), Temple and Wößmann (2006), and Iqbal and Daly (2014), and particularly in case of Asian countries, like; Fatmawati et al. (2018), Lenkei et al. (2018), and Abdillah et al. (2020).

With the exception of model 5, where it comes out negative but insignificant, our second targeted variable, institutional quality, also comes out positive and significant in all models. This suggests that good qualities of institutions are important in boosting economic growth. This supports the theoretical juncture of the Institutionalists regarding institutions-growth nexus and is in line with general important empirical studies like Barro (1991), Levine and Renelt (1992); Easterly and Levine (1997), Acemoglu et al. (2001), Dreher (2006), and Iqbal and Daly (2014), and particularly in case of Asian countries, like; Khan et al (2019), Salman et al. (2019), and Ngo and Nguyen (2020).

Like the first two core variables, our third core variable--structural change also comes out as an important booster of economic growth as it stands out to be positive and significant in four out of six models. This confirms the theoretical predictions of Lewis (1954), Kuznets (1957), Kaldor (1961), and Chenery (1960). This is also in concordance with many empirical studies such as Silva and Teixeira (2011), Dietrich (2012), Zulkhibri et al. (2015), Teixeira and Queirós (2016), Olczyk and Kordalska (2018), and particularly in case of Asian countries, like; Cortuk and Singh (2011), Vu (2017), Ahson, Siddiqi and Mirza (2017), McMillan et al. (2014), and Adabar and Sahoo (2018).

Table 4.3 Growth Effects of Human Capital, Institutions and Structural Change

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Y0	-2.310**	-2.454*	-0.771	-2.428**	-2.778***	-0.869***
	(0.833)	(1.185)	(0.614)	(1.066)	(0.920)	(0.270)
HCpw	16.114**	15.440***	12.142***	19.609**	4.670	2.600**
	(5.691)	(5.032)	(3.461)	(7.426)	(3.103)	(1.237)
INSfh	1.996**	5.438***	7.160***	4.443**	-2.212	1.372***
	(0.750)	(1.753)	(1.580)	(1.599)	(1.406)	(0.375)
SCssa	0.272*	0.209*	0.744**	0.220	0.681***	0.080
	(0.145)	(0.138)	(0.351)	(0.196)	(0.206)	(0.086)
Dom. Invest.		3.158**				5.033***
		(1.217)				(0.995)
Govt. Exp.			0.509			
			(1.540)			
Openness				-0.435		
				(0.550)		
Fin. Deve.					2.232***	0.217
					(0.499)	(0.477)
Constant	9.122**	-3.548	-8.743	6.958*	15.512**	-9.433***
	(4.141)	(5.795)	(6.542)	(3.706)	(5.479)	(2.839)
Model Diagnostics						
No. of observations	199	180	180	184	191	171
No. of Groups	21	20	20	20	21	20
No. of instruments	19	19	19	19	19	19
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-test (overall) /	11.14 /	86.66 /	14.45 /	3.48 /	12.56 /	144.04 /
p-value	0.000	0.000	0.000	0.006	0.000	0.000
AR(1) /	-2.53 /	-2.11 /	-2.30 /	-2.15 /	-2.63 /	-2.65 /
p-value	0.011	0.035	0.021	0.032	0.009	0.008
AR(2) /	-0.37 /	0.07 /	-0.50 /	0.28 /	-0.82 /	-0.24 /
p-value	0.708	0.945	0.614	0.779	0.413	0.812
Hansen-J /	4.37 /	0.90 /	4.09 /	4.02 /	3.16 /	2.70 /
p-value	0.358	0.825	0.252	0.259	0.367	0.259

Notes: Growth is the dependent variable in all the estimated models. Y0 is log of initial GDP per capita, HCpw is the human capital, INSfh is the institutional quality, SSssa is the structural change, Dom. Invest. is the domestic investment, Govt. Exp. Is the government expenditure, Openness is the trade openness, Fin. Deve. is the financial development. Time dummies are part of each model estimation. Windmeijer robust standard errors in parentheses. Furthermore, our estimates incorporate the Bun and Windmeijer (2010) correction for small data.

*** p<0.01, ** p<0.05, * p<0.1

Concerning our selected control variables, most of them carried their expected theoretical signs with significance. The log of initial GDP per capita appeared negative and significant in five out of six models, confirming conditional convergence among the selected countries (Zulfiqar, 2018; Chowdhary et al., 2011). The variable of physical

capital formation (domestic investment) variable, as was anticipated, showed positive and significant impact which is in line with the results of the previous seminal study like that of Barro (1991), and more recent like Rahman et al. (2019).

The relationship between government consumption and economic growth is disputable and inconclusive in the literature (Nyasha & Odhiambo, 2019). Some studies claim that it has adverse effects on economic growth as it brings inefficiencies, imbalances and more importantly crowds out private investment, while equally by others, it paves the economic ground for the economic actors and hence has crowding in effects. In the present case, it turned out insignificant suggesting no prime effect in the growth process of our selected countries sample. The trade openness variable turned out insignificant. This finding is contrary to our priori expectation as more outward orientation of the economies is usually believed to be helpful in bringing economic prosperity especially in the Asian region of the world. However, in a recent study conducted by Keho (2017), the effect of trade openness on growth is mixed, largely depends on countries under consideration, type and span of the data, and methodology undertaken. Therefore, this result may not be considered susceptible as we have heterogeneous group of sampled countries. Our financial development variable in model (5) is found positive and significant which supports the majority of literature findings that it affects growth positively. However, in the model (6) which also includes physical capital, it loses its significance. This may be due to inter-relationship between the variables especially with the physical capital.

4.2.2.2 The Moderating Effects of Human Capital and Structural Change on Growth

As discussed in the above sections of introduction and literature review that human capital and structural change are interrelated and hence reinforce each other in exerting effect on growth. In this sub-section, therefore, our focus is on their moderating effects on economic growth. For this purpose, we use an interaction term between the two varaibles as given in the equation (3.5). We estimate it with two-step system GMM[21] and the results are reported in Table 4.4. We have estimated two specifications of the equation (3.5). The first specification includes human capital, structural change and log of initial GDP per capita and interaction between human capital and structural change. The second specification adds institutional quality and two more control variables: investment and financial development[22] to the first specification. Both the models are in the conformity with the condition of AR (1), AR (2) and Hansen J-test necessary for the reliability of the GMM results.

The results in both the models of Table 4.4 show that, though both human capital and structural change are separately positive and significant but their interaction is negative and significant. The negative interaction effect suggests that both the variables adversely affect each other's impact on economic growth. Prior to go for a detailed discussion on the above results, it is notable here that the coefficient estimates for human capital and structural change represent the partial effect of one of the variables on economic growth when the other variable takes on a value of zero (Zergawu et al., 2020). Therefore, we abstain from discussing these coefficients and instead compute the

[21] The corresponding fixed effect estimations of equation (3.5) for benchmark are given appendix-A5.
[22] These two control variables were significant in our baseline model estimation as evident from Table 4.3.

conditional effects of one variable at the different levels of other. This will enhance our economic insight of the association between the two variables in affecting the dependent variable. These are also reported in Table 4.4.

Table 4.4 Moderating Effects of Human Capital and Structural Change on Growth

VARIABLES	(1)	(2)
Y0	-3.626***	-0.719**
	(1.247)	(0.280)
HCpw	22.604**	2.701**
	(8.405)	(1.765)
INSfh		1.192***
		(0.416)
SCssa	0.641**	0.365**
	(0.304)	(0.128)
Dom. Invest.		4.610***
		(0.646)
Fin. Dev.		-0.061
		(0.369)
SCssa*HCpw	-0.761*	-0.490***
	(0.369)	(0.153)
Constant	17.538***	-8.486***
	(4.893)	(2.050)
Model Diagnostics		
No. of observations	199	172
No. of groups	21	20
No. of instruments	16	19
Time dummies	Yes	Yes
F-test / p-value	6.46 / 0.000	323.89 / 0.000
AR(1) / p-value	-2.44 / 0.015	-2.68 / 0.007
AR(2) / p-value	-0.25 / 0.802	-0.18 / 0.861
Hansen-J / p-value	0.05 / 0.816	0.12 / 0.734
Conditional Effects of Human Capital		
SCssa at 25th percentile	22.087***	2.369
	(8.254)	(1.704)
SCssa at 50th percentile	21.287***	1.853
	(8.031)	(1.617)
SCssa at 75th percentile	20.601***	1.411
	(7.850)	(1.552)
Conditional Effects of Structural Change		
HCpw at 25th percentile	0.281	0.133**
	(0.237)	(0.076)
HCpw at 50th percentile	0.096	0.014
	(0.247)	(0.065)
HCpw at 75th percentile	-0.098	-0.111
	(0.289)	(0.076)

Notes: Same as Table 4.3 except SCssa*HCpw is the interaction between human capital and structural change.

We estimate the conditional effects of human capital on growth by $\frac{\partial \text{Growth}}{\partial \text{HC}_{it}} = \beta_1 + \beta_4 \text{SC}_{it}$ at three different levels, that is, 25th, 50th and 75th percentile of structural change. We can notice that the conditional effects diminish as the level of structural change increases. At the same vein, we estimate the conditional effects of structural change on growth by $\frac{\partial \text{Growth}}{\partial \text{SC}_{it}} = \beta_3 + \beta_4 \text{HC}_{it}$ at three different levels, that is, 25th, 50th and 75th percentile of human capital. These also decrease as the level of human capital rises. These results show that the conditional effects of both human capital and structural change diminish as both the variables increases. It seems that the matching between getting more education by the population and more structural change in the form of reallocation of labor in the economy does not add to higher growth. Hence, we can infer that the variables (human capital and structural change) used in the interaction can be treated as substitutes of each other.

Despite the strong theoretical consideration and conventional wisdom that more human capital will relocate factors of production especially labor from low to high productivity sectors in the economy and hence will amplify growth effects, our above empirical results are against it. Our results also do not comply with the assertion of McMillan et al. (2017) that both high structural change and high fundamental in the form of human capital will strengthen each other and hence produce rapid and sustained growth. In comparison to the previous relevant empirical studies, our findings are in contrast to the relatively recent study by Adabar and Sahoo (2018) for fourteen Indian states while partially in accordance with the findings of Teixeira and Queirós (2016) for European countries. Teixeira and Queirós (2016) took the case of two sets of countries, in

which one is composed of only twenty-one highly developed OECD countries while the other one is comprised of first group countries along with nine transition countries of Eastern Europe and the Mediterranean. They found positive interaction between human capital and structural change only in case of first group while in the second group it turned out as negative. They justified this contrasting result between the two groups that unlike the first group, the second group countries are not highly developed but are in the transition trajectory of development. They have yet to develop their industrial and scientific base so that to absorb the highly educated pool of the population, hence structural change does not strengthen the impact of human capital on economic growth.

So, the odd scenario in our case should not be contemplated as susceptible once we take into account our set of countries as suggested by Teixeira and Queirós (2016). As major chunk of our countries are developing and in transition phase of their development, labors are usually stuck in sectors where education and skills requirements are low. In most of our countries, major share of labor force participation is either in primary sectors (agricultural) or is moving/moved to the tertiary sectors (services) characterized by low requirements of human capital and bypassing the crucial secondary sectors (industrial/manufacturing) which can absorb highly educated and skilled lot of the population. This type of mismatch between education and labor glueyness to the low productivity sector/s or relocating to it, usually affect labor productivity and job satisfaction negatively, and hence decelerates growth (Teixeira and Queirós, 2016).

4.2.2.3 The Moderating Effects of Institutions and Structural Change on Economic Growth

As discussed in the above sections of introduction and literature review that institutions and structural change are interrelated and hence reinforce each other in exerting their effect on growth. In this sub-section, therefore, our focus is on the conditional impact of institutions and structural change on economic growth. To this end, we use the interaction term between institutions times structural change as given in the equation (3.8). We estimate it with two-step system GMM[23] and the results are reported in Table 4.5. We have estimated two specifications of the equation (3.8). The first specification includes institutions, structural change and log of initial GDP per capita and interaction between institutions and structural change. The second specification adds human capital and two more control variables: investment and financial development to the first specification. Both the models are in the conformity with the condition of AR(1), AR(2) and Hansen J-test necessary for the reliability of the GMM results.

It is noteworthy here that, unlike the interaction term between human capital and structural change provided in Table 4.4, the interaction between institutions and structural change turned out positive and significant in both the models in Table 4.5. This suggests that both the variables favorably affect each other in their effect on growth. The implication is that the variables are complement of each other and hence strengthen the effect of each other's on economic growth.

[23] The corresponding fixed effect estimation of equation (3.8) for benchmark is given appendix-A6.

Table 4.5 Moderating effects of Institutions and Structural Change on Growth

VARIABLES	(1)	(2)
Y0	-1.454*	-0.753***
	(0.820)	(0.253)
HCpw		2.163
		(1.293)
INSfh	9.861**	0.443**
	(4.224)	(0.571)
SCssa	2.895**	0.525*
	(1.190)	(0.292)
Dom. Invest.		5.361***
		(0.672)
Fin. Dev.		-0.080
		(0.379)
SCssa*INSfh	2.349**	0.410*
	(0.931)	(0.208)
Constant	25.948**	-8.865***
	(11.000)	(1.976)
Model Diagnostics		
No. of observations	199	172
No. of groups	21	20
No. of instruments	17	19
Time dummies	Yes	Yes
F-test (overall) / p-value	3.63 / 0.004	68.62 / 0.000
AR(1) / p-value	-3.09 / 0.002	-2.59 / 0.010
AR(2) / p-value	-1.84 / 0.266	-0.16 / 0.872
Hansen-J / p-value	0.67 / 0.716	1.95 / 0.163
Conditional Effects of Institutions		
SCssa at 25th percentile	-8.267**	0.721
	(3.626)	(0.469)
SCssa at 50th percentile	-5.797**	1.152***
	(2.730)	(0.365)
SCssa at 75th percentile	-3.679*	1.522***
	(2.024)	(0.367)
Conditional Effects of Structural Change		
INSfh at 25th percentile	-0.545*	-0.115
	(0.300)	(0.099)
INSfh at 50th percentile	0.351*	0.042
	(0.202)	(0.061)
INSfh at 75th percentile	0.975**	0.150*
	(0.394)	(0.083)

Notes: Same as Table 4.3 except SCssa*INSfh is the interaction between institutional quality and structural change.

Like the previous case, for detailed and better understanding, we compute the conditional effects of one variable at different levels of the other in affecting the dependent variable. These are also reported in Table 4.5. We estimate the conditional effect of institutions on economic growth by $\frac{\partial \text{Growth}}{\partial \text{INS}_{it}} = \beta_2 + \beta_4 \text{SC}_{it}$ at three different levels, that is, 25th, 50th and 75th percentile of structural change. We can notice that the conditional effects increase as the level of structural change increases. At the same vein, the conditional effect of structural change on economic growth is estimated by $\frac{\partial \text{Growth}}{\partial \text{SC}_{it}} = \beta_3 + \beta_4 INS_{it}$ at three different levels, that is, 25th, 50th and 75th percentile of institutions. These also increase as the level of institutional quality rises. These results show that the conditional effects of both institutions and structural change rise as both the variables increases. This shows that better institutions and more structural change back each other and hence profound each other's effects on growth process in our sampled countries.

There are solid theoretical argumentations in the literature that strong institutions will essentially lead to more productive structural change in the form of labor movements from low towards high productivity sectors and hence will result in more growth. However, as per best of our knowledge, previously no empirical study has used the interactive term between institutions and structural change and gauged its impact on growth. Therefore, our results are not directly comparable to any other study. However, we are in compliance with many arguments raised in the literature e.g.; about the possible relationship between institutions quality and structural change in exerting their effects on growth. The most important in this regard is the assertion of McMillan et al. (2017), that both high structural change and high fundamentals in the form of good quality of

institutions will strengthen each other and hence produce rapid and sustained growth. Our present results empirically support this argument. This is because most of our sample countries have made progress in strengthening their institutions like giving more political rights and civil liberties to their citizens which make easier for the labor to move from low productivity sectors towards high ones. Thus more strong institutions strengthen structural change and hence amplify its impact on growth.

Our findings also support the argument of Constantine (2017), that institutions growth efficacy depend on the prevailing economic structure of the economy. They claim that economic structure of the country has a major role in determining institutional outcomes. They further said that, if most of the economic activities are in the increasing returns sectors like manufacturing and technology based, institutions will produce positive growth outcomes, otherwise not. Based on our findings, we argue that structural change in the form of labor movement from low to high productivity sectors (i.e., from agriculture towards manufacturing and services) augments the impact of institutions in our sampled countries.

Constantine (2017) states that the basic drawback in the 'new institutional economics' is that for institutional outcomes, there is built-in assumption that capabilities of production are already intact. But the poor countries cannot spur robust growth by simply "downloading" institutions from advanced countries (Constantine, 2017). This is because these countries lack the necessary economic structure of increasing returns like high technology manufacturing that produce high value added commodities. Since enforcing institutions are not "free lunch" and poor countries characterized by diminishing returns economic activities cannot generates sufficient revenues to cover the

costs of enforcement. The opposite can be found in rich countries where economic structures are usually based on increasing economic activities. It means that economic structure of the country has a major role in determining institutions outcomes (Constantine, 2017) and structural change in the form of migration of resources like labor from low towards high productivity sectors will moderate and amplify the impact of institutions on economic growth.

4.2.3 Robustness Check

Despite our endeavors in keeping our previous results as reasonable as possible, we delve one layer deeper to ascertain the consistency of our results. This also forms a significant fragment of our empirical exercise besides our benchmark findings. This is usually necessary in the empirical studies as results are very sensitive to estimation strategies, countries sample sets, data periods and measures of variables. Therefore, we deemed this step important to check validity of our results. As evident from the data discussion section, there is no agreement in the literature on which would be the most suitable measure for human capital, institutional quality and structural change. Therefore, in order to verify robustness of our results, we change the proxies of human capital, institutional quality and structural change.

This robustness check is carried out as we change the proxy of one variable while retaining same the measures of other variables and estimation technique. This process is done in three ways. In the first instance, we replace the proxy of human capital while on second and third occasions, the proxy of institutional quality and structural change are changed respectively.

4.2.3.1 Changing the proxy of Human Capital

In this sub-section, robustness of the findings is gauged by using an alternative proxy of human capital. The proxy used in the baseline estimation, that is, 'average years of schooling and returns to education' measure of Penn-World (PW) table, is replaced with gross tertiary school enrolment of the WDI dataset. Despite others measures in the slot, we preferred it not only because of its yearly basis availability but its wide usage in the literature.

The results are shown in the Table 4.6 by re-following the same estimation procedures used in the Table 4.3 nonetheless this time using gross tertiary school enrolment as the measure of human capital. The human capital appeared insignificant across the models demonstrating its non-robustness/sensitivity to its different measures. Ours this finding supports the previous studies like, Benos and Zotou (2014), and Osiobe (2019) that human capital efficacy in its effect on growth depends on the measure used as proxy for human capital. The remaining estimates in Table 4.6 are largely qualitatively similar to the earlier estimates given in Table 4.3 except that log of initial GDP per capita loses its statistical significance but retained its negative sign in most of the estimated models. All the estimated models satisfy the condition of AR (1), AR (2) and Hansen J-test necessary for the reliability of the GMM results.

Table 4.6 Growth Effects of Human Capital (Tertiary School Enrolment), Institutions and Structural Change

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Y0	-1.919	-5.209	-0.127	-0.396	-1.359**	2.677
	(2.343)	(3.443)	(1.175)	(1.513)	(0.580)	(2.369)
HCwdi	2.475	2.637	0.894	2.025	0.168	-2.429
	(1.709)	(2.733)	(1.550)	(1.574)	(0.773)	(1.416)
INSfh	7.032**	-1.922	7.236**	7.694***	1.081	2.466**
	(3.236)	(1.670)	(2.693)	(2.439)	(0.785)	(1.148)
SCssa	0.787*	0.513**	0.834*	0.859*	0.285***	-0.334
	(0.388)	(0.234)	(0.408)	(0.444)	(0.085)	(0.305)
Dom. Invest.		14.772***				8.895***
		(3.574)				(1.707)
Govt. Exp.			0.272			
			(2.396)			
Openness				-0.473		
				(0.940)		
Fin. Deve.					2.210**	-2.288*
					(1.055)	(1.214)
Constant	2.561	-5.725	-9.370	-7.351	3.610	-33.722**
	(16.122)	(15.835)	(10.109)	(7.620)	(2.105)	(12.047)
Model Diagnostics						
No. of observations	159	144	145	148	151	136
No. of groups	20	19	19	19	20	19
No. of instrument	16	17	18	18	19	19
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-test (overall) /	10.34 /	15.02 /	35.15 /	35.17 /	17.02 /	111.98 /
p-value	0.000	0.000	0.000	0.000	0.000	0.000
AR(1) /	-2.03 /	-1.81 /	-2.22 /	-2.12 /	-2.56 /	-2.34 /
p-value	0.042	0.071	0.026	0.034	0.011	0.019
AR(2) /	-0.31 /	-0.71 /	-0.29 /	-0.39 /	-0.70 /	0.59 /
p-value	0.759	0.478	0.773	0.694	0.484	0.552
Hansen-J /	0.96 /	0.81 /	1.75 /	1.25 /	2.32 /	3.50 /
p-value	0.326	0.367	0.418	0.534	0.509	0.174

Notes: Same as Table 4.3 except that HCwdi is the proxy of human capital.

Next, we also check the moderating effects of this new proxy of human capital and structural change on economic growth. The results are provided in the Table 4.7. The interaction coefficient turns out negative and significant revealing substitutability between the two variables. This finding is in support of estimates in the Table 4.4.

Table 4.7 Moderating Effects of Human Capital (Tertiary School Enrolment) and Structural Change on Growth

VARIABLES	(1)	(2)
Y0	-0.361	0.912
	(0.262)	(0.667)
HCwdi	0.501	0.779
	(0.627)	(0.825)
INSth		2.252**
		(0.793)
SCssa	0.721**	0.374*
	(0.337)	(0.206)
Dom. Invest.		9.590***
		(2.422)
Fin. Deve.		-1.113*
		(0.606)
SCssa* HCwdi	-0.268*	-0.188**
	(0.137)	(0.073)
Constant	2.901	-31.246***
	(1.836)	(10.297)
Model Diagnostics		
No. of observations	159	136
No. of groups	20	19
No. of instrument	18	19
Time dummies	Yes	Yes
F-test (overall) / p-value	20.36 / 0.000	39.53 / 0.000
AR(1) / p-value	-2.89 / 0.004	-2.38 / 0.017
AR(2) / p-value	-0.46 / 0.645	0.71 / 0.475
Hansen-J / p-value	8.35 / 0.139	0.08 / 0.959
Conditional Effects of Human Capital		
SCssa at 25th percentile	0.319	-0.907
	(0.618)	(0.797)
SCssa at 50th percentile	0.037	-1.104
	(0.629)	(0.757)
SCssa at 75th percentile	-0.205	-1.274*
	(0.664)	(0.727)
Conditional Effects of Structural Change		
HCwdi at 25th percentile	0.319**	0.092
	(0.144)	(0.127)
HCwdi at 50th percentile	0.069	-0.083
	(0.069)	(0.108)
HCwdi at 75th percentile	-0.157	-0.243*
	(0.136)	(0.125)

Notes: Same as Table 4.3 except that HCwdi is the proxy of human capital.

4.2.3.2 Changing the proxy of Institutional Quality

In this sub-section, robustness of the results is gauged by employing an alternative proxy of institutional quality. The proxy used in the baseline estimation i.e., 'average of political rights and civil liberties' of the Freedom House database, is replaced with the Economic Freedom of the World (EFW) index of the Fraser institute. Although, it is available at five years interval up to 2000 and only available yearly beyond 2000, we think it is more relevant than the other available indices from the year 70s like Polity2 of the PolityIV database.

The results are shown in the Table 4.8, by re-following the same estimation procedures used in the Table 4.3 nonetheless this time using Economic Freedom of the World (EFW) index as the measure of institutional quality. Akin to using the average of political rights and civil liberties as an index for institutional quality, the new proxy of institutional quality also shows a positive and statistically significant impact on growth. This shows that the growth effect of institutions is robust to its different measures. The remaining estimates in Table 4.8 are largely qualitatively similar to the earlier estimates given in the Table 4.3 except that human capital loses its statistical significance but retained its positive sign. All the estimated models are in the conformity with the condition of AR (1), AR (2) and Hansen J-test necessary for the reliability of the GMM results.

Table 4.8 Growth Effects of Human Capital, Institutions (Economic Freedom) and Structural Change

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Y0	-1.673***	-1.150***	-1.554**	-1.768*	-1.983***	-1.383**
	(0.499)	(0.309)	(0.642)	(1.004)	(0.438)	(0.535)
HCpw	2.011	0.502	2.835	2.077	4.004	1.276
	(3.300)	(2.014)	(3.888)	(5.730)	(2.686)	(2.153)
INSfi	11.309***	5.221**	9.259***	18.648***	6.365**	5.029***
	(3.692)	(2.282)	(2.120)	(6.468)	(2.357)	(1.594)
SCssa	0.204**	0.154**	0.254**	0.302*	0.273***	0.177*
	(0.086)	(0.069)	(0.094)	(0.151)	(0.073)	(0.102)
Dom. Invest.		4.739***				5.255**
		(1.259)				(2.443)
Govt. Exp.			-0.387			
			(1.029)			
Openness				-2.958*		
				(1.557)		
Fin. Deve.					1.074***	0.347
					(0.322)	(0.898)
Constant	-4.465	-12.027***	-2.055	-5.829	1.731	-12.628*
	(5.240)	(3.067)	(5.467)	(9.029)	(4.656)	(6.810)
Model Diagnostics						
No. of observations	185	168	168	171	179	162
No. of groups	21	20	20	20	20	19
No. of instrument	17	19	19	19	19	19
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-test (overall) /	22.05 /	83.35 /	681.47	10.63 /	71.49 /	16.77 /
p-value	0.000	0.000	/0.000	0.000	0.000	0.000
AR(1) /	-2.87 /	-2.89 /	-3.00 /	-2.73 /	-2.55/	-2.45 /
p-value	0.004	0.004	0.003	0.006	0.011	0.014
AR(2) /	-0.07 /	0.28 /	0.26 /	0.32 /	-0.35 /	-0.04 /
p-value	0.941	0.777	0.796	0.747	0.723	0.972
Hansen-J /	3.96 /	5.38 /	5.74 /	5.78 /	3.13 /	3.58 /
p-value	0.138	0.146	0.125	0.123	0.372	0.167

Notes: Same as Table 4.3 except that INSfi is the proxy of institutional quality.

Next, we also check the moderating effects of this new proxy of institutional quality and structural change on growth. The results are given in table 4.9. The interaction coefficient turns out negative and significant revealing substitutability between the two variables. This finding is against our previous estimate in the table 4.5. This shows that the result is sensitive to the alternative measure of institutional quality. Both the models are in the conformity with the condition of AR (1), AR (2) and Hansen J-test necessary for the reliability of the GMM results.

Table 4.9 Moderating Effects of Institutions (Economic Freedom) and Structural Change on Growth

VARIABLES	(1)	(2)
Y0	-1.559***	-1.830***
	(0.494)	(0.439)
HCpw		0.414
		(1.435)
INSfi	13.182***	18.664***
	(4.496)	(5.934)
SCssa	1.285*	2.807**
	(0.661)	(0.999)
Dom. Invest		3.711***
		(1.049)
Fin. Deve.		-0.496
		(0.737)
SCssa* INSfi	-0.597	-1.490**
	(0.386)	(0.589)
Constant	-7.725	-24.703***
	(4.533)	(5.656)
Model Diagnostics		
No. of observations	185	162
No. of groups	21	19
No. of instruments	18	19
Time dummies	Yes	Yes
F-test (overall) / p-value	6.60 / 0.000	85.50 / 0.000
AR(1) / p-value	-2.98 / 0.003	-2.48 / 0.013
AR(2) / p-value	-0.05 / 0.963	0.48 / 0.633
Hansen-J / p-value	5.89 / 0.117	5.78 / 0.116
Conditional Effects of Institutions		
SCssa at 25th percentile	12.777***	17.653***
	(4.278)	(5.870)
SCssa at 50th percentile	12.149***	16.086***
	(3.950)	(5.824)
SCssa at 75th percentile	11.611***	14.743**
	(3.682)	(5.836)
Conditional Effects of Structural Change		
INSfi at 25th percentile	0.249	0.222
	(0.155)	(0.098)
INSfi at 50th percentile	0.165	0.011
	(0.173)	(0.145)
INSfi at 75th percentile	0.105	-0.137
	(0.194)	(0.194)

Notes: Same as Table 4.3 except that INSfi is the proxy of institutional quality.

4.2.3.3 Changing the proxy of Structural Change

In this sub-section, robustness of the results regarding structural change variable is gauged by employing an alternative proxy of it. Its measure used in the baseline estimation was from productivity decomposition framework by utilizing the Shift-Share-Analysis (SSA) framework. Here, we re-assess its impact on growth by measuring it with the Norm of Absolute Values (NAV) method. Despite, giving no information about productivity growth, it is simple and also widely used in the structural change focused literature[24].

The results are shown in the Table 4.10 by re-following the same estimation procedures used in the Table 4.3 nonetheless this time using Norm of Absolute Values (NAV) index as the measure of structural change.

The results of this new measure of structural change demonstrate a positive and significant impact on growth, similar to the results of the Shift-Share-Analysis (SSA) approach used to construct the measure of structural change. This demonstrates that the growth effect of structural change is robust to its various measures. The remaining estimations in Table 4.10 are mainly qualitatively similar to the earlier estimates give in Table 4.3. All the models are also in the conformity with the condition of AR (1), AR (2) and Hansen J-test necessary for the reliability of the GMM results, except model 3 which does not satisfy only the AR (1) condition.

[24] For more details about NAV, see the discussion on varaious methods used for measuring structural change in the data description section of chapter 3 of the thesis.

Table 4.10 Growth Effects of Human Capital, Institutions and Structural Change (Norm of Absolute Values)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Y0	-2.919*	-0.113	0.053	-1.527**	-0.962***	-0.725***
	(1.685)	(0.254)	(0.387)	(0.638)	(0.321)	(0.196)
HCpw	20.071*	4.939**	5.608*	12.759**	3.774*	2.356*
	(11.604)	(2.065)	(2.941)	(4.745)	(1.938)	(1.187)
INSfh	2.130*	5.181***	6.454***	3.644**	1.611***	1.407***
	(1.116)	(1.372)	(1.074)	(1.495)	(0.455)	(0.354)
SCnav	0.007	0.265	2.967**	1.306	0.032*	0.072*
	(0.073)	(0.189)	(1.216)	(0.984)	(0.102)	(0.036)
Dom. Invest.		2.845**				5.067***
		(0.995)				(0.728)
Govt. Exp.			0.354			
			(1.276)			
Openness				-0.477		
				(0.471)		
Fin. Deve.					0.973***	0.073
					(0.275)	(0.273)
Constant	11.499*	-12.217***	5.182	11.319*	3.314*	-9.549***
	(6.626)	(1.951)	(9.588)	(6.103)	(1.624)	(1.901)
Model Diagnostics						
No. of observations	199	180	180	184	191	171
No. of groups	21	20	20	20	21	20
No. of instruments	18	19	19	19	19	19
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
F-test (overall) /	8.13 /	113.15 /	268.34 /	9.28 /	11.38 /	83.36 /
p-value	0.000	0.000	0.000	0.000	0.000	0.000
AR(1) /	-2.12 /	-2.43 /	-1.44 /	-2.20 /	-2.82 /	-2.66 /
p-value	0.034	0.015	0.150	0.028	0.005	0.008
AR(2) /	-0.31 /	-0.29 /	-0.41 /	-0.55 /	-0.90 /	-0.25 /
p-value	0.757	0.770	0.683	0.583	0.368	0.803
Hansen-J /	4.70 /	4.53 /	1.12 /	4.15 /	3.98 /	2.71 /
p-value	0.195	0.210	0.773	0.246	0.264	0.258

Notes: Same as Table 4.3 except that SCnav is the proxy structural change.

Next, we also check the moderating effects of this new proxy of structural change and human capital on growth. The estimtes are reported in the Table 4.11. The interaction coefficient turns out negative and significant revealing substitutability between the two variables. This finding is in support our previous estimate in the Table 4.4. Both the models are in the conformity with the condition of AR (1), AR (2) and Hansen J-test

necessary for the reliability of the GMM results, except model 1 which does not satisfy the AR (1) condition.

Table 4.11 Moderating Effects of Human Capital and Structural Change (Norm of Absolute Values) on Growth

VARIABLES	(1)	(2)
Y0	-1.244	-0.865***
	(2.500)	(0.226)
HCpw	74.110**	38.720**
	(28.600)	(14.638)
INSfh		2.499***
		(0.608)
SCnav	-7.574*	5.217***
	(4.268)	(1.805)
Dom. Invest.		5.952***
		(1.288)
Fin. Deve.		-0.713
		(0.575)
SCnav*HCpw	14.262*	-9.592**
	(7.523)	(3.391)
Constant	-27.658	13.297
	(27.434)	(8.211)
Model Diagnostics		
No. of observations	199	172
No. of groups	21	20
No. of instruments	17	19
Time dummies	Yes	Yes
F-test (overall) / p-value	4.40 / 0.001	21.71 / 0.000
AR(1) / p-value	-1.28 / 0.199	-2.38 / 0.017
AR(2) / p-value	-0.69 / 0.488	0.09 / 0.927
Hansen-J / p-value	2.92 / 0.232	1.92 / 0.166
Conditional Effects of Human Capital		
SCnav at 25th percentile	6.351	6.853***
	(15.440)	(2.325)
SCnav at 50th percentile	12.191	2.925*
	(13.702)	(1.719)
SCnav at 75th percentile	16.950	-0.276
	(12.669)	(1.953)
Conditional Effects of Structural Change		
HCpw at 25th percentile	-0.824	0.6774***
	(0.759)	(0.232)
HCpw at 50th percentile	2.649**	-1.658**
	(1.173)	(0.642)
HCpw at 75th percentile	6.275**	-4.097***
	3.061	(1.498)

Notes: Same as Table 4.3 except that SCnav is the proxy of structural change and SCnav* HCpw is the interaction between human capital and structural change.

Finally, we also check the moderating effects of this new proxy of structural change and institutional quality on growth. The results are provided in the Table 4.12. The interaction coefficient turns out positive and significant revealing complementarity between the two variables. This finding is in support of our previous estimate in the Table 4.5. Both the models are in the conformity with the condition of AR (1), and Hansen J-test necessary for the reliability of the GMM results but not with the AR (2). However, the same are also in conformity, if the significance is considered at 10 percent level.

Table 4.12 Moderating Effects of Institutions and Structural Change (Norm of Absolute Values) on Growth

VARIABLES	(1)	(2)
Y0	0.597	-1.032**
	(0.460)	(0.430)
HCpw		4.506*
		(2.571)
INSfh	14.015*	40.447*
	(7.154)	(21.306)
SCnav	6.761**	11.908*
	(2.930)	(6.158)
Dom. Invest.		4.556**
		(2.008)
Fin. Deve.		-0.539
		(0.510)
SCnav*INSfh	4.115**	8.520*
	(1.697)	(4.789)
Constant	24.622	-64.013**
	(14.336)	(28.461)
Model Diagnostics		
No. of observations	199	172
No. of groups	21	20
No. of instruments	19	20
Time dummies	Yes	Yes
F-test (overall) / p-value	3.01 / 0.012	98.65 / 0.000
AR(1) / p-value	-2.35 / 0.019	-1.63 / 0.012
AR(2) / p-value	-1.66 / 0.096	1.68 / 0.094
Hansen-J / p-value	6.25 / 0.181	0.55 / 0.760
Conditional effects of Institutions		
SCnav at 25th percentile	5.538***	-0.033
	(2.164)	(1.554)
SCnav at 50th percentile	3.852**	3.456***
	(1.889)	(0.749)
SCnav at 75th percentile	2.479	6.299***
	(1.837)	(2.177)
Conditional effects of Structural Change		
INSfh at 25th percentile	2.644**	-3.384*
	(1.260)	(1.910)
INSfh at 50th percentile	1.074	-.1340
	(0.662)	(1.632)
INSfh at 75th percentile	-0.020	2.129
	(0.365)	(2.434)

Notes: Same as Table 4.3 except that SCnav is the proxy of structural change, and SCnav*INSfh is the interaction between structural change and institutions.

4.3 Summary of the Chapter

This chapter contains the empirical results and discussion; and proceeds in many layers. First, it shows the decomposition of aggregate labor productivity growth where structural change is an important part of it. Second, preliminary analysis between the variables is made through simple correlation and scatter plots. This gives an indication of relationship between the variables. Third, however, as the relationship is complex, results based on formal estimation procedure are presented and discussed. All of our three focused variables: human capital, institutional quality, and structural change happen to be positive and significant in their growth effects. Regarding the moderating growth effects of structural change with human capital and institutions, findings show substitutability and complementarity respectively. The results are also tested for robustness checks by utilizing alternative proxies of the core variables and generally found sensitive.

Chapter 5

CONCLUSION AND POLICY IMPLICATIONS

If economic growth is essential for human well-being, ascertaining what factors can affect to it is critical. During the recent past decades, an ample advancement has been made in our understating of the economic growth phenomenon. If, on the theoretical perspective, it has made progress in many dimensions, then on the empirical fronts, the increasing availability of reliable datasets and estimation techniques have opened the flood gates for empirical literature. However, a concrete conclusion about what actually causes the growth is yet forthcoming as the studies are still rushing in this field. This present research endeavor cannot, of course, encompass all the existing issues, but take some of the key growth themes like human capital, institutions and structural change and put them in a new light. Specifically, on the one hand, we revisit in chasing the roles of human capital, institutions and structural change in the long-run growth performance, while, on the other hand, we seek to understand the complementarity of human capital as well as institutions with the structural change in their growth effects. The previous literature exploring the growth effects of human capital, institutional quality and structural change has found wildly mixed results while the above stated complementary relationship between the variables is still nascent in the empirical arena. Our hypotheses are that human capital, institutions and structural change are positively related to growth, and also human capital and structural change as well as institutions and structural change are complementary to each other.

In connection to the above discussion, this study provides an empirical validation to our stated hypotheses in case of 21 selected countries in Asia. The selection of this

region has become imperative as it is under the intense focus of global academia, policymakers, and economic managers. Also, as conceived by Briones and Felipe (2013), within the coming few decades, an economic transition is expected globally; in which Asia will be a major player. Due to its rapid economic transformation over the recent past, Asia will eclipse Europe and North America. For Asia's future development and transformation, some authors highlight economy-wide factors e.g. technology and entrepreneurship (ADB, 2011); and institutions, investment, and finance (Hill & Gochoco-Bautista, 2013) while others emphasize on the structural aspects like manufacturing (ADB, 2013), or services (ADB, 2012) but not agriculture (Briones & Felipe, 2013). Also, the process of structural transformation in Asia, both in its scale and speed, has been unprecedented (Aizenman et al., 2012; and Paul, 2018). According to McMillan et al. (2014), over the last 20 years, it has created enormous potential for growth in Asia. Moreover, they found that structural change contributes positively to labor productivity only in Asia against negative impacts in case of Africa and Latin America.

Nonetheless, focusing on the link between human capital, institutions, and structural change with economic growth, the Asian region is studied in the prior literature, albeit not in a single study frame. Also, the question pricking the mind is whether human capital (structural change) will he one of the important channels in enhancing the growth effects of structural change (human capital). In the same vein, whether institutions (structural change) will be one of the important channels in enhancing the growth effects of structural change (institutions). These questions are answered by considering 21 countries with the data period spanning from 1971-2017. In

order to tackle potential econometric issues particularly regarding endogeneity and simultaneity, we estimate our specified growth model by employing system-GMM technique.

5.1 Main Findings

The study portrays four main results. First, all of the three focused variables, that is, human capital, institutions and structural change positively incentivize growth of our selected sampled countries. Second, there is substitutability between human capital and structural change, but this relationship weakens as each of the two increases. Third, there is complementarity between institutions and structural change, but this relationship strengthens as each of the two increases. Finally, our results are generally sensitive to alternative proxies of these variables and also to alternative econometric technique.

In the backdrop of the above results, we have some potential explanations. First, human capital, measured by "average years of schooling and returns to education" plays an important role in increasing economic growth, which supports the current study's first hypothesis that "countries having more stock of human capital will observe higher economic growth". This finding also resonates with the relatively recent previous work (see Ogundari & Awokuse, 2018; Ahmed et al., 2020; Pegkas et al., 2020; and Uddin et al., 2020) that more educated lot of the population causes the countries to grow fast. This is because human capital helps in making technological progress, innovation, adaptation of foreign technology and has strong positive spillover effects in the economy of a country. These all then lead the economy to higher levels of economic progress. Second, the institutional quality proxied by the "average of political rights and civil liberties" spurs economic growth, which supports the second hypothesis of the study that

"countries having a high quality of institutions will observe higher economic growth". This result is also in line with the recent prior studies (see Asghar et al., 2015; Salman et al., 2019; Singh et al., 2020; and Uddin et al., 2020) that strong institutions is the fundamental determinant of economic growth. Well-established institutions lower the transaction costs in the form time, efforts, and resources to define, protect and enforce agreements and property rights. This then pave the economic ground for all the economic players to engage in productive activities, hence boost economic growth. Third, structural change in the form of reallocation of labor between different sectors of the economy measured by the shift-share-analysis method is also a significant positive factor of economic growth, which supports the third hypothesis of the study that "countries that experience more structural change will observe higher economic growth". This result outcome also corroborates the previous studies' findings (see Cortuk & Singh, 2011; Dietrich, 2012; Zulkhibri et al., 2015; Ahson, Muhammad & Sarwar, 2017; Ahson, Siddiqi & Mirza, 2017; Vu, 2017; Olczyk & Kordalska, 2018) that labor shift from the low to high productivity sectors is a boosting factor of productivity and growth.

Fourth, the joint negative effect of human capital and structural change on economic growth reflects the substitutability between the two variables and this weakens as each of the two increases evident from their conditional effects. This is against our priori expectations of complementarity and hence contradicts the fourth hypothesis of the study that "the human capital and structural change will amplify each other's growth impact". This is also in contrast to the previous studies findings like Adabar and Sahoo (2018) for different Indian states and Teixeira and Queirós (2016) for OECD while validates their result for OECD plus other European transitions and Mediterranean

countries. Following Teixeira and Queirós (2016), this can be justified as major chunk of our countries are developing and in transition phase of their development, labors are usually stuck in sectors where education and skills requirements are low. In most of our countries, major share of labor force participation is either in primary sectors (agricultural) or is moving/moved to the tertiary sectors (services) characterized by low requirements of human capital and bypassing the crucial secondary sectors (industrial/manufacturing) which can absorb highly educated and skilled lot of the population. This type of mismatch between education and labor glueyness to the low productivity sector/s or relocating to it, usually affect labor productivity and job satisfaction negatively, and hence decelerates growth (Teixeira and Queirós, 2016). Fifth, the joint positive effect of institutional quality and structural change on economic growth reflects the complementarity between the two variables and this strengthens as each of the two increases evident from their conditional effects. This finding is in support of the fifth hypothesis of the study that "the institutional quality and structural change will amplify each other's growth impact". Although, this result is not directly comparable to any previous empirical study yet well-established arguments exist in the literature that both the variables weigh up each other's growth efficacy. For example, McMillan et al. (2017) argue that jointly both strong institutions and structural change in the economy will lead to rapid and sustained growth. Totouom et al. (2019) state that there exist bi-causal link between institutions and structural change. On the one hand, if good quality of institutions releases resources from agriculture to manufacturing and will lay the basis for higher rates of productivity-induced growth structures, on the other hand, industrialization and the improvement of the living standard that it entails is likely to

make people less corrupt, and in general, more willing to set up better institutions. According to Carraro and Karfakis (2018), good quality of institutions accelerate the release of labor from low productivity sector/s to high productivity sector, while Constantine (2017) contention is that economic structure based on increasing returns activities like high technology manufacturing that produce high value added commodities will spur the growth outcome of institutions. Sixth, the robustness of the findings to alternate measures of human capital, institutions and structural change further gives surety to the reliability and validity of our findings.

5.2 Policy Implications

The above findings present that the research endeavor definitely strengthens and adds much to the existing body of literature on the topic. The study unveils empirical evidence which paves a guidance path for the academicians and concerned policymakers. Although our main findings are, in major, consistent with the previous research work, yet they portray some important prescriptions for the policymakers and economic managers. The region and the period we analyzed, a notable change is expected to be occurred in their human capital levels, institutional settings, and economic structures as evident from the positive contribution to their economic progress. If taken into account both the direct and moderating effects of human capital, institutions, and structural change, a remarkable growth performance may be the ultimate outcome. In this connection, we provide a variety of policy prescriptions that can spur economic growth in Asia (in other regions like Africa and Latin America may be alike) by revitalizing human capital, institutions and structural change. Taking into account the potential direct positive growth effects of human capital, institutions, and structural change, policy implication is clear and

straightforward: for the long-run economic growth, the concerned policymakers must chalk out a holistic co-development policy framework for promoting the above-mentioned factors. The countries must prioritize them on equal footing for the promotion of economic growth and development. Considering specifically the human capital development, the governments ought to allocate more resources for enriching the education and skills of its people. A particular focus and impetus is required in the area of creation and adoption of advanced technologies. Similarly, countries eager to progress must emphasis on their institutional improvements. They should try to make sound legal systems, well-protected property rights, and uncorrupt governments. Also, the focus should be on promoting industrialization and tertiarization instead of agriculture as claimed by Opoku and Yan (2018) that only Australia, New Zealand, and Canada in the world have made progress based on agriculture. The well-established industry and services sectors will enlarge the employment opportunities hence attract the labor (particularly the disguised ones) from agriculture which is mostly labelled as low productivity sector. This will expand the aggregate demand with eventual result of more economic growth.

Also, the moderating results advocate that increase in economic growth should not contemplate merely focusing on the separate effect of human capital, institutions and structural change but their joint effects specifically that of human capital-structural change and institutions-structural change is also worth-noting. The significant negative interactive effect between human capital and structural change highlights the skill-mismatch in the sampled countries. This necessitates for the reassessment of the existing policies regarding education and demand of the industries and services sectors. In this

scenario, a more coherent and integrated policy is to be persuaded involving education-science-industries (Teixeira & Queirós, 2016) and services. The significant positive interactive effect between institutions and structural change means both weighs up each other effect in the growth process. This suggests for the simultaneous focus on the promotion of institutional quality and structural transformation of the economy.

5.3 Limitations and Guidelines for Future Research

In summary, on the one hand, the main contribution of this study has for sure pinned down the relative role of human capital, institutions, and structural change in economic growth. On the other hand, more importantly, it has added to our comprehension of how joint changes in human capital and structural change as well as institutions and structural change impact economic growth. Nonetheless, almost all or most of the research endeavors are not completely perfect but characterized by some limitations which keep the door left ajar for future researchers and hence ours has no exception. We conclude this research effort by acknowledging our limitations and bring some further research lacunas into the limelight of future researchers with the interest in chasing growth and development determinants particularly human capital, institutions, and structural change.

Although our results happened to be consistent for different measures of human capital, institutional quality, and structural changes, yet these are far from to be prefect as these have different dimensions and facets. For instance, human capital proxied by "Average years of schooling and returns to education" is an entirely education-based indicator. According to Yao et al. (2020), despite their easy accessibility they are merely focused on formal education and do not take into account other forms of the education

like training, work experience and learning-by-doing. Hanushek (2013), and Teixeira and Queirós (2016) stress on the quality of education along with the numbers of schooling. Although, long enough to estimate able panel (cross-sectional as well as time-series) data on human capital adjusted for the above characteristics is hard and challenging (Teixeira & Queirós, 2016; Yao et al., 2020). However, once becomes available, would be worth promising research endeavor. Institutions reflect many legal, political, economic, social and religious spheres and dimensions of the country's institutional framework which cannot be encapsulated in a single indicator. We preferred the institutional quality index of Freedom House because of its longer data period and countries coverage otherwise an index made of ICRG and WGI databases are more comprehensive than it. So, future research attempts can be made with data from ICRG and/or WGI databases albeit would be at the cost of less coverage of data period and also sampled countries unless taken into account countries of other regions too. As far as structural change is concerned, it has also many facets and definitions. We used its concept in the form of reallocation of labor from low to high productivity sectors. The economy was divided into nine different sectors. Depending on the availability of employment and value-added data, more disaggregation of the economy will give a deep and thorough investigation of structural change and hence its relationship with the economic growth.

Lastly, if the data permits, the current study can be overly improved upon by making a larger set of countries than ours 21 selected countries. Also, a comparison among different regions of the world like Asia, Africa, Latin America and OECD countries.

Hence, future research endeavors addressing the above issues would be a phenomenal addition to the relevant literature.

REFERENCES

Abbas, Q. (2001). Endogenous growth and human capital: A comparative study of Pakistan and Sri Lanka. *The Pakistan Development Review*, 987-1007.

Abdillah, K., Handoyo, R. D., & Wasiaturrahma, W. (2020). The Effect of Control Corruption, Political Stability, Macroeconomic Variables on Asian Economic Growth. *Ekuilibrium: Jurnal Ilmiah Bidang Ilmu Ekonomi*, *15*(2), 161-169.

Acemoglu, D. (2008). Oligarchic versus democratic societies. *Journal of the European Economic Association*, *6*(1), 1-44.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American economic review*, *91*(5), 1369-1401.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of economic growth*, *1*, 385-472.

Acemoglu, D., Naidu, S., Restrepo, P., & Robinson, J. A. (2019). Democracy does cause growth. *Journal of Political Economy*, *127*(1), 47-100.

Acemoglu, D., & Robinson, J. (2010). The role of institutions in growth and development. *Leadership and growth*, *135*.

Acemoglu, D., & Robinson, J. A. (2013). Economics versus politics: Pitfalls of policy advice. *Journal of Economic perspectives*, *27*(2), 173-92.

Adabar, K., & Sahoo, T. M. (2018). Structural Change and Economic Growth in India—A State-Wise Analysis. In *International Conference on Economics and Finance* (pp. 153-170). Springer, Cham.

Afonso, O. (2020). The impact of institutions on economic growth in OECD countries. *Applied Economics Letters*, 1-5.

Agarwal, M. K., & Gupta, R. (2016). Growth and Structural Changes in the South Asian Economies of India, Nepal and Sri Lanka. *Journal of Development and Administrative Studies*, *24*(1-2), 39-62.

Aggarwal, A., & Kumar, N. (2015). Structural change, industrialization, and poverty reduction. In *Structural change and industrial development in the BRICS* (p. 199). Oxford University Press.

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, *60*(2), 323-351.

Aghion, P., Howitt, P., Howitt, P. W., Brant-Collett, M., & García-Peñalosa, C. (1998). *Endogenous growth theory*. MIT press.

Ahmad, M., & Hall, S. G. (2017). Economic growth and convergence: Do institutional proximity and spillovers matter?. *Journal of Policy Modeling*, *39*(6), 1065-1085.

Ahmad, M., & Khan, R. E. A. (2018). Age-structure, human capital and economic growth in developing economies: A disaggregated analysis. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *12*(1), 229-252.

Ahmad, M., & Khan, R. E. A. (2019). Does demographic transition with human capital dynamics matter for economic growth? A dynamic panel data approach to GMM. *Social Indicators Research*, *142*(2), 753-772.

Ahsan, H. (2015). *Essays on Human Capital and Economic Development*. The University of Manchester (United Kingdom).

Ahsan, H., & Haque, M. E. (2017). Threshold effects of human capital: Schooling and economic growth. *Economics Letters*, *156*, 48-52.

Ahson, U. S., Muhammad, W., & Sarwar, S. (2017). Structural Transformation and Economic Growth: A Fresh Empirical Assessment of SAARC Countries. *The Pakistan Journal of Social Issues*, *8*, 21-31.

Ahson, U., Siddiqi, M. W., & Mirza, F. (2017). Structural change and economic progress: Empirical evidence from selected Asian countries. *Pakistan Journal of Social Sciences (PJSS)*, *37*(2), 549-565.

Ahumada, V. M. C., & Villarreal, C. C. (2020). Human capital formation and economic growth across the world: a panel data econometric approach. *Economía Sociedad y Territorio*, *20*(62), 25-54.

Aidis, R., Estrin, S., & Mickiewicz, T. (2009). Entrepreneurial entry: which institutions matter?.

Aizenman, J., Lee, M., & Park, D. (2012). The relationship between structural change and inequality: A conceptual overview with special reference to developing Asia.

Akarçay Gürbüz, A. (2011). Comparing trajectories of structural change. *Cambridge Journal of Economics*, *35*(6), 1061-1085.

Akinlo, T., & Oyeleke, O. J. (2020). Human Capital Formation and Economic Growth in Sub-Saharan African Countries: An Empirical Investigation. *The Indian Economic Journal*, 0019466220972848.

Alam, A., Uddin, M., & Yazdifar, H. (2019). Institutional determinants of R&D investment: Evidence from emerging markets. *Technological Forecasting and Social Change*, *138*, 34-44.

Alesina, A., Özler, S., Roubini, N., & Swagel, P. (1996). Political instability and economic growth. *Journal of Economic growth*, *1*(2), 189-211.

Alguacil, M., Cuadros, A., & Orts, V. (2011). Inward FDI and growth: The role of macroeconomic and institutional environment. *Journal of Policy Modeling*, *33*(3), 481-496.

Ali, M., Egbetokun, A., & Memon, M. H. (2018). Human capital, social capabilities and economic growth. *Economies*, *6*(1), 2.

Ali, A., & Saif, S. (2017). Determinants of Economic Growth in Pakistan: A Time Series Analysis. *European Online Journal of Natural and Social Sciences*, *6*(4), pp-686.

Aluko, O. A., & Ibrahim, M. (2020). Institutions and the financial development–economic growth nexus in sub-Saharan Africa. *Economic Notes*, e12163.

Ando, S., & Nassar, K. B. (2017). *Indexing Structural Distortion: Sectoral Productivity, Structural Change and Growth*. International Monetary Fund.

Andriansyah, A., Nurwanda, A., & Rifai, B. (2021). Structural Change and Regional Economic Growth in Indonesia. *Bulletin of Indonesian Economic Studies*, (just-accepted), 1-34.

Anetor, F. O. (2020). Human capital threshold, foreign direct investment and economic growth: evidence from Sub-Saharan Africa. *International Journal of Development Issues*.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), 29-51.

Arrow, K. (1962). Economic welfare and the allocation of resources for invention. In *The rate and direction of inventive activity: Economic and social factors* (pp. 609-626). Princeton University Press.

Asghar, N., Qureshi, D. S., & Nadeem, M. (2015). Institutional quality and economic growth: Panel ARDL analysis for selected developing economies of Asia. *South Asian Studies*, *30*(2).

Aslam, A. (2020). The hotly debate of human capital and economic growth: why institutions may matter?. *Quality & Quantity*, *54*(4), 1351-1362.

Asian Development Bank. (2011). *Asia 2050: Realizing the Asian Century*. Asian Development Bank.

_____. (2012). *Asian Development Outlook 2012 Update: Services and Asia's Future Growth*. Asian Development Bank.

_____. (2013). *Beyond Factory Asia: Fuelling Growth in a Changing World*. Asian Development Bank.

Awaworyi, C. S., Ugur, M., & Yew, S. L. (2017). Government education expenditures and economic growth: a meta-analysis. *The BE Journal of Macroeconomics*, *17*(2), 1-17.

Awel, A. M. (2013). The long-run relationship between human capital and economic growth in Sweden. MRPA paper no. (2013), p. 45183

Azam, M., & Emirullah, C. (2014). The role of governance in economic development. *International Journal of Social Economics*.

Bane, J. (2018). Human Capital and Economic Growth in Developing Countries: Evidences from Low and Middle Income African Countries. In *Determinants of Economic Growth in Africa* (pp. 237-258). Palgrave Macmillan, Cham.

Barcenilla-Visús, S., & López-Pueyo, C. (2018). Inside Europe: human capital and economic growth revisited. *Empirica*, *45*(4), 821-847.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The quarterly journal of economics*, *106*(2), 407-443.

Barro, R., Sala-i-Martin, X., 2003. Economic Growth, 2nd edn. McGraw-Hill, New York.

Barro, R. J., & Sala-i-Martin, X. (2004). Economic Growth: MIT Press. *Cambridge, Massachusettes*.

Beck, T., Levine, R., & Loayza, N. (2000). Finance and the Sources of Growth. *Journal of financial economics*, *58*(1-2), 261-300.

Becker, G. S. (1960). Underinvestment in college education?. *The American Economic Review*, *50*(2), 346-354.

Becker, G. S. (1964). Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education. National Bureau of Economic Research, General Series, nr 80. New York and London.

Behrooznia, A., Shafizadeh, R., Laalbar, A., & Karsalari, A. R. (2016). Human Capital and Economic Growth in Asian Countries. *International journal of academic research in accounting, finance and management sciences*, *6*(1), 1-6.

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European journal of political economy*, *19*(3), 529-545.

Benos, N., & Zotou, S. (2014). Education and economic growth: A meta-regression analysis. *World Development*, *64*, 669-689.

Benhabib, J., & Spiegel, M. M. (1994). The role of human capital in economic development evidence from aggregate cross-country data. *Journal of Monetary economics*, *34*(2), 143-173.

Bentour, E. M., & Fund, A. M. (2020). *The effects of human capital on economic growth in the Arab countries compared to some Asian and OECD countries* (No. halshs-03007760).

Bethencourt, C., & Perera-Tallo, F. (2020). Human capital, economic growth, and public expenditure.

Bhattacharya, M., Churchill, S. A., & Paramati, S. R. (2017). The dynamic impact of renewable energy and institutions on economic output and CO2 emissions across regions. *Renewable Energy*, *111*, 157-167.

Bils, M., & Klenow, P. J. (2000). Does schooling cause growth?. *American economic review*, *90*(5), 1160-1183.

Bluhm, R., & Szirmai, A. (2012). Institutions and long-run growth performance: An analytic literature review of the institutional determinants of economic growth.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), 115-143.

Bloom, D. E., Sachs, J. D., Collier, P., & Udry, C. (1998). Geography, demography, and economic growth in Africa. *Brookings papers on economic activity*, *1998*(2), 207-295.

Boldeanu, F. T., & Constantinescu, L. (2015). The main determinants affecting economic growth. *Bulletin of the Transilvania University of Brasov. Economic Sciences. Series V*, *8*(2), 329.

Bollmann, G., Rouzinov, S., Berchtold, A., & Rossier, J. (2019). Illustrating Instrumental Variable Regressions Using the Career Adaptability-Job Satisfaction Relationship. *Frontiers in psychology*, *10*, 1481.

Bond, S. R., Hoeffler, A., & Temple, J. (2001). GMM estimation of empirical growth models (No. 3048). *CEPR Discussion Papers*.

Borrmann, A., Busse, M., & Neuhaus, S. (2006). Institutional quality and the gains from trade. *Kyklos*, *59*(3), 345-368.

Bound, J., Jaeger, D. A., & Baker, R. M. (1995). Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak. *Journal of the American statistical association*, *90*(430), 443-450.

Briones, R., & Felipe, J. (2013). Agriculture and structural transformation in developing Asia: review and outlook. *Asian Development Bank Economics Working Paper Series*, (363).

Brunnschweiler, C. N. (2008). Cursing the blessings? Natural resource abundance, institutions, and economic growth. *World development*, *36*(3), 399-419.

Bun, M. J., & Windmeijer, F. (2010). The weak instrument problem of the system GMM estimator in dynamic panel data models. *The Econometrics Journal*, *13*(1), 95-126.

Busse, M., Erdogan, C., & Mühlen, H. (2019). Structural transformation and its relevance for economic growth in Sub-Saharan Africa. *Review of Development Economics*, *23*(1), 33-53.

Čadil, J., Petkovová, L., & Blatná, D. (2014). Human capital, economic structure and growth. *Procedia Economics and Finance*, *12*, 85-92.

Carkovic, M., & Levine, R. E. (2002). Does Foreign Direct Investment Accelerate Economic Growth? *SSRN Electronic Journal*, 1. https://doi.org/10.2139/ssrn.314924

Carmignani, F., & Mandeville, T. (2014). Never been industrialized: A tale of African structural change. *Structural change and economic dynamics*, *31*, 124-137.

Carraro, A. & Karfakis, P. (2018). Institutions, economic freedom and structural transformation in 11 sub-Saharan African countries. *FAO Agricultural Development Economics Working Paper 18-01. Rome, FAO.*

Caselli, F., Esquivel, G., & Lefort, F. (1996). Reopening the convergence debate: a new look at cross-country growth empirics. *Journal of economic growth*, *1*(3), 363-389.

Cass, D. (1965). Optimum growth in an aggregative model of capital accumulation. *The Review of economic studies*, *32*(3), 233-240.

Catrinescu, N., Leon-Ledesma, M., Piracha, M., & Quillin, B. (2009). Remittances, institutions, and economic growth. *World Development*, *37*(1), 81-92.

Chavance, B. (2008). Institutional economics. Routledge.

Chenery, H. B. (1960). Patterns of industrial growth. *The American Economic Review*, *50*(4), 624-654.

Chenery, H. B., & Taylor, L. (1968). Development patterns: among countries and over time. *The Review of Economics and Statistics*, 391-416.

Chenery, H., & Syrquin, M. (1975). Patterns of development 1950-1970 (No. 11913). *The World Bank.*

Cheng, B. S., & Hsu, R. C. (1997). Human capital and economic growth in Japan: an application of time series analysis. *Applied Economics Letters*, *4*(6), 393-395.

Chiu, Y. B., & Lee, C. C. (2017). On the impact of public debt on economic growth: does country risk matter?. *Contemporary Economic Policy*, *35*(4), 751-766.

Choi, K. (1983). A statistical test of Olson's model. *The political economy of growth*, *57*, 78.

Chong, A., & Calderon, C. (2000). Causality and feedback between institutional measures and economic growth. *Economics & Politics*, *12*(1), 69-81.

Ciccone, A., & Papaioannou, E. (2009). Human capital, the structure of production, and growth. *The Review of Economics and Statistics*, *91*(1), 66-82.

Chowdhary, R., Jore, S., Thakur, R., Agrawal, K., & Geete, V. (2011). Convergence of GDP per capita in ASEAN countries. *Prestige International Journal of Management and Research*, *3*(2), 1-9.

Cohen, D., & Soto, M. (2007). Growth and human capital: good data, good results. *Journal of economic growth*, *12*(1), 51-76.

Collins, S. M., Bosworth, B. P., & Rodrik, D. (1996). Economic growth in East Asia: accumulation versus assimilation. *Brookings papers on economic activity*, *1996*(2), 135-203.

Commander, S. J., & Nikoloski, Z. (2010). Institutions and economic performance: What can be explained?.

Constantine, C. (2017). Economic structures, institutions and economic performance. *Journal of Economic Structures*, *6*(1), 2.

Constantine, C., & Khemraj, T. (2019). Geography, economic structures and institutions: A synthesis. *Structural Change and Economic Dynamics*.

Cortuk, O., & Singh, N. (2011). Structural change and growth in India. *Economics Letters*, *110*(3), 178-181.

Cortuk, O., & Singh, N. (2015). Analysing the structural change and growth relationship in India. *Economic and Political Weekly*, *50*(24), 91-98.

d'Agostino, G., Dunne, J. P., & Pieroni, L. (2016). Government spending, corruption and economic growth. *World Development*, *84*, 190-205.

David, P., Yoshikawa, T., Chari, M. D., & Rasheed, A. A. (2006). Strategic investments in Japanese corporations: Do foreign portfolio owners foster

underinvestment or appropriate investment?. *Strategic Management Journal, 27*(6), 591-600.

Dawson, J. W. (1998). Institutions, investment, and growth: New Cross-country and panel data evidence. *Economic inquiry, 36*(4), 603-619.

De la Fuente, A., & Doménech, R. (2006). Human capital in growth regressions: how much difference does data quality make? *Journal of the European Economic Association, 4*(1), 1-36.

De Montesquieu, B. (1900). The spirit of the laws [1748]. *New York: Colonial.*

Denison, E. F. (1962). Sources of economic growth in the United States and the alternatives before us.

Devadas, U. (2015). Comprehensive Literature Review on Human Capital Investments Theory: What's in it?. *Kelaniya Journal of Human Resource Management, 10*(1-2).

Demir, F. (2016). Effects of FDI flows on institutional development: does it matter where the investors are from?. *World Development, 78*, 341-359.

De Soto, H. (2000). *The mystery of capital: Why capitalism triumphs in the West and fails everywhere else*. Civitas Books.

De Vries, G., Timmer, M., & De Vries, K. (2015). Structural transformation in Africa: Static gains, dynamic losses. *The Journal of Development Studies, 51*(6), 674-688.

Dias, J., & Tebaldi, E. (2012). Institutions, human capital, and growth: The institutional mechanism. *Structural Change and Economic Dynamics, 23*(3), 300-312.

Dietrich, A. (2012). Does growth cause structural change, or is it the other way around? A dynamic panel data analysis for seven OECD countries. *Empirical economics, 43*(3).

Dollar, D., & Kraay, A. (2003). Institutions, trade, and growth. *Journal of monetary economics, 50*(1), 133-162.

Domar, E. D. (1946). Capital expansion, rate of growth, and employment. *Econometrica, Journal of the Econometric Society*, 137-147.

Donou-Adonsou, F. (2019). Technology, education, and economic growth in Sub-Saharan Africa. *Telecommunications policy*, *43*(4), 353-360.

Doucouliagos, C., & Ulubasoglu, M. A. (2006). Economic freedom and economic growth: Does specification make a difference?. *European journal of political economy*, *22*(1), 60-81.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied economics*, *38*(10), 1091-1110.

Dunne, J. P., & Tian, N. (2014). Conflict spillovers and growth in Africa. *Peace Economics, Peace Science and Public Policy*, *20*(4), 539-549.

Durlauf, S. N., Johnson, P. A., & Temple, J. R. (2005). Growth econometrics. *Handbook of economic growth*, *1*, 555-677.

Dutta, N., & Williamson, C. R. (2016). Aiding economic freedom: Exploring the role of political institutions. *European Journal of Political Economy*, *45*, 24-38.

Dzansi, J. (2013). Impact of remittances on domestic investment: the role of institutional and financial development. *Global Review of Accounting and Finance*, *4*(2), 65-84.

Easterly, W., & Levine, R. (1997). Africa's growth tragedy: policies and ethnic divisions. *The quarterly journal of economics*, *112*(4), 1203-1250.

Efendic, A., Pugh, G., & Adnett, N. (2011). Institutions and economic performance: A meta-regression analysis. *European Journal of Political Economy*, *27*(3), 586 599.

Ejigu, W. G. (2020). Structural Change, Total Factor Productivity and Sectoral Labor Productivity in Selected African Countries. *Journal of Research in Economics*, *4*(2), 23-43.

ElFayoumi, K., Ndoye, A., Nadeem, M., & Auclair, G. (2018). *Structural Reforms and Labor Reallocation: A Cross-Country Analysis*. International Monetary Fund.

Elshamy, H. M. (2016). Economic Structural Change and Economic Growth in Egypt. *Journal of Emerging Issues in Economics, Finance and Banking*, *5*(2), 1938-1946.

Engelbrecht, H. J. (2003). Human capital and economic growth: Cross-section evidence for OECD countries. *Economic Record*, *79*(SpecialIssue), S40-S51.

Fabricant, S. (1942). *Manufacturing in the National Economy* (No. c4878). National Bureau of Economic Research.

Fabricant, S. (1959). *Basic facts on productivity change* (No. 63). New York: National Bureau of Economic Research.

Fagerberg, J. (2000). Technological progress, structural change and productivity growth: a comparative study. *Structural change and economic dynamics*, *11*(4), 393-411.

Fatmawati, I., Suman, A., & Syafitri, W. (2018). The impact of FDI, human capital, and corruption on growth in Asian developed and developing countries. *International Journal of Scientific and Technology Research*, *7*(12), 216-221.

Fernández-Torres, Y., Gutiérrez-Fernández, M., & Ramajo-Hernandez, J. (2018). Business regulation and economic growth: the indirect effect of corruption in Latin America and the Caribbean. *Journal of Developmental Entrepreneurship*, *23*(01), 1850003.

Gabardo, F. A., Pereima, J. B., & Einloft, P. (2017). The incorporation of structural change into growth theory: A historical appraisal. *EconomiA*, *18*(3), 392-410.

Gabardo, F. A., Pereima, J. B., & Porcile, G. (2019). The dynamic of sectoral labour reallocation: an agent-based model of structural change and growth. *EconomiA*.

Gagliardi, F. (2008). Institutions and economic change: A critical survey of the new institutional approaches and empirical evidence. *The Journal of Socio-Economics*, *37*(1), 416-443.

Garcia-Fuentes, P. A., & Kennedy, P. L. (2009). *Remittances and economic growth in Latin America and the Caribbean: The Impact of the human capital development* (No. 1369-2016-108616).

Gatti, D. D., Gallegati, M., Greenwald, B. C., Russo, A., & Stiglitz, J. E. (2012). Sectoral imbalances and long-run crises. In *The global macro economy and finance* (pp. 61-97). Palgrave Macmillan, London.

Gerring, J., Bond, P., Barndt, W. T., & Moreno, C. (2004). Democracy and economic growth: A historical perspective. *World Pol.*, *57*, 323.

Glewwe, P., Maiga, E., & Zheng, H. (2014). The contribution of education to economic growth: A review of the evidence, with special attention and an application to Sub-Saharan Africa. *World Development*, *59*, 379-393.

Greiner, A., Semmler, W., & Gong, G. (2016). *The forces of economic growth: A time series perspective*. Princeton University Press.

Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. MIT press.

Grossman, H. I., & Kim, M. (1995). Swords or plowshares? A theory of the security of claims to property. *Journal of Political Economy*, *103*(6), 1275-1288.

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage publications.

Hall, S. G., & Ahmad, M. (2014). Revisiting the institutions–growth nexus in developing countries: The new evidence. *New Zealand Economic Papers*, *48*(3), 301- 312.

Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The quarterly journal of economics*, *114*(1), 83-116.

Hanif, N., & Arshed, N. (2016). Relationship between school education and economic growth: SAARC countries. *International Journal of Economics and Financial Issues*, *6*(1).

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, 1029-1054.

Hanushek, E. A. (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*, *37*, 204-212.

Hanushek, E. A., & Kimko, D. D. (2000). Schooling, labor-force quality, and the growth of nations. *American economic review*, *90*(5), 1184-1208.

Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of economic literature*, *46*(3), 607-68.

Hanushek, E. A., & Woessmann, L. (2011). How much do educational outcomes matter in OECD countries?. *Economic policy*, *26*(67), 427-491.

Harrod, R. F. (1939). An essay in dynamic theory. *The economic journal, 49*(193), 14-33.

Hartwig, J. (2012). Testing the growth effects of structural change. *Structural Change and Economic Dynamics, 23*(1), 11-24.

Hasan R., Lamba, S., & Sen Gupta, A. (2013). Growth, structural change and poverty reduction: evidence from India. Manila: ADB South Asia Working paper Series, No. 22.

Hashem, E. (2019). The Impact of governance on economic growth and human development during crisis in middle east and north africa. *International Journal of Economics and Finance, 11*(8), 61-79.

Hawkes, D., & Ugur, M. (2012). *Evidence on the relationship between education, skills and economic growth in low-income countries*. Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre).

Hayat, A. (2019). Foreign direct investments, institutional quality, and economic growth. *The Journal of International Trade & Economic Development, 28*(5), 561-579.

Haydaroglu, C. (2015). The relationship between property rights and economic growth: an analysis of OECD and EU countries. *DANUBE: Law, Economics and Social Issues Review, 6*(4), 217-239.

Helliwell, J. (1992). Empirical linkages between democracy and economic development. In *Working paper no. 4066*. NBER Cambridge, MA.

Herrendorf, B., Rogerson, R., & Valentinyi, Á. (2014). Growth and structural transformation. In *Handbook of economic growth* (Vol. 2, pp. 855-941). Elsevier.

Hill, H., & Gochoco-Bautista, M. S. (Eds.). (2013). *Asia rising: growth and resilience in an uncertain global economy*. Edward Elgar Publishing.

Hillier, D., Pindado, J., De Queiroz, V., & De La Torre, C. (2011). The impact of country-level corporate governance on research and development. *Journal of International Business Studies, 42*(1), 76-98.

Holland, D., Liadze, I., Rienzo, C., & Wilkinson, D. (2013). The relationship between graduates and economic growth across countries. *BIS research paper, 110*.

Holtz-Eakin, D., Newey, W., & Rosen, H. S. (1988). Estimating vector autoregressions with panel data. *Econometrica: Journal of the Econometric Society*, 1371-1395.

Ibrahim, M. (2018). Interactive effects of human capital in finance–economic growth nexus in Sub-Saharan Africa. *Journal of Economic Studies*.

Iheonu, C., Ihedimma, G., & Onwuanaku, C. (2017). Institutional quality and economic performance in West Africa.

In, F., & Doucouliagos, C. (1997). Human capital formation and US economic growth: a causality analysis. *Applied Economics Letters*, *4*(5), 329-331.

Iqbal, N., & Daly, V. (2014). Rent seeking opportunities and economic growth in transitional economies. *Economic Modelling*, *37*, 16-22.

Islam, N. (1995). Growth empirics: a panel data approach. *The Quarterly Journal of Economics*, *110*(4), 1127-1170.

Iyke, B. N. (2018). The real effect of currency misalignment on productivity growth: evidence from middle-income economies. *Empirical Economics*, *55*(4), 1637-1659.

Jamison, E. A., Jamison, D. T., & Hanushek, E. A. (2007). The effects of education quality on income growth and mortality decline. *Economics of Education Review*, *26*(6), 771-788.

Jena, D., & Barua, A. (2020). Trade, structural transformation and income convergence: The case of EU. *Journal of Public Affairs*, 1. https://doi.org/10.1002/pa.2565

Jilenga, M. T., & Helian, X. (2017). Institutional quality and economic growth in East African economies. *Turkish Economic Review*, *4*(3), 282-289.

Johnson, T., de Dios, E., & Martin, A. L. (2010). Governance and institutional quality and the links with economic growth and income inequality: With special reference to developing Asia. *Asian Development Bank Economics Working Paper Series*, (193).

Jones, E. L. (1987). The European Miracle: Environments, Economies, and Geopolitics in the History of Europe and Asia. *Cambridge University Press.*

Jones, S., & Tarp, F. (2016). Does foreign aid harm political institutions?. *Journal of Development Economics*, *118*, 266-281.

Justman, M., & Teubal, M. (1991). A structuralist perspective on the role of technology in economic growth and development. *World Development*, *19*(9), 1167-1183.

Kaldor, N. (1961). Capital accumulation and economic growth. In *The theory of capital* (pp. 177-222). Palgrave Macmillan, London.

Kane, C. S., Thérèse, E. Z., & Diandy, I. Y. (2019). Institutions and the Economic Performance of Central African Countries. *Theoretical Economics Letters*, *9*(01), 33.

Karaalp-Orhan, H. S. (2017).). Human capital and economic growth: bounds and causality analysis for turkey. *Siyaset Ekonomi ve Yönetim Araştırmaları Dergisi*, *5*(1), 21-32.

Kebede, J. G., & Takyi, P. O. (2017). Causality Between Institutional Quality and Economic Growth: Evidence From Sub-Saharan Africa. *European Journal of Economic and Financial Research*.

Khan, J., Burdey, M. B., & Adeel Farooq, R. M. (2019). Governance and Economic Growth: A Case of Selected SAARC Countries. *Pakistan Journal of Social Sciences (PJSS)*, *39*(4).

Khan, M. (2010). Political settlements and the governance of growth-enhancing institutions.

Khan, Y., & Javid, A. Y. (2015). *The Impact of Formal and Informal Institutions on Economic Performance: A Cross-Country Analysis* (No. 2015: 130). Pakistan Institute of Development Economics.

Kanyama, I. K. (2014). Quality of institutions: Does intelligence matter?. *Intelligence*, *42*, 44-52.

Keho, Y. (2017). The impact of trade openness on economic growth: The case of Cote d'Ivoire. *Cogent Economics & Finance*, *5*(1), 1332820.

Knack, S., & Keefer, P. (1995). Institutions and economic performance: cross-country tests using alternative institutional measures. *Economics & Politics*, *7*(3), 207-227.

Koopmans, T. (1965). On the concept of optimal growth, The Econometric Approach to Development Planning. *Econometric approach to development planning, 1st edn. North Holland, Amsterdam*, 225-287.

Kormendi, R. C., & Meguire, P. G. (1985). Macroeconomic determinants of growth: Cross-country evidence. *Journal of Monetary economics*, *16*(2), 141-163.

Krishna, P., & Levchenko, A. A. (2013). Comparative advantage, complexity, and volatility. *Journal of Economic Behavior & Organization*, *94*, 314-329.

Krueger, A. B., & Lindahl, M. (2001). Education for growth: Why and for whom?. *Journal of economic literature*, *39*(4), 1101-1136.

Krüger, J. J. (2008). Productivity and structural change: a review of the literature. *Journal of Economic Surveys*, *22*(2), 330-363.

Kurniawan, Y., Ratnasari, R. T., & Mustika, H. (2020). The Corruption and Human Development to the Economic Growth of OIC Countries. *JEBIS (Jurnal Ekonomi dan Bisnis Islam)*, *6*(2), 209-220.

Kuznets, S. (1957). Quantitative aspects of the economic growth of nations: II. Industrial distribution of national product and labour force. *Economic development and cultural change*, *5*(S4), 1-111.

Lawanson, O. I., & Evans, O. (2019). Human Capital, structural change and economic growth developing countries: the case of Nigeria. University of Lagos Press and Bookshop.

Lavopa, A. M. (2015). Structural transformation and economic development: can development traps be avoided?. (Doctoral dissertation).

Le, T., Gibson, J., & Oxley, L. (2005). *Measures of human capital: A review of the literature* (No. 05/10). New Zealand Treasury Working Paper.

Lee, C. G. (2010). Education and economic growth: further empirical evidence. *European Journal of Economics, Finance and Administrative Sciences*, *23*(8), 161-169.

Lee, K., & Kim, B. Y. (2009). Both institutions and policies matter but differently for different income groups of countries: Determinants of long-run economic growth revisited. *World development*, *37*(3), 533-549.

Leftwich, A. (2006). What are institutions. *IPPG briefing paper*, *1*.

Leite, N. S., Lucio, F. G. C., & Ferreira, R. T. (2019). Long-Term Effects of Corruption Control and Economic Freedom on Economic Growth. *Theoretical Economics Letters*, *9*(8), 2965-2974.

Lenkei, B., Mustafa, G., & Vecchi, M. (2018). Growth in emerging economies: Is there a role for education?. *Economic Modelling*, *73*, 240-253.

Letsoela, M. L. (2017). Structural Change and Economic Development: An Analysis for Lesotho.

Levine, R., Loayza, N., & Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of monetary Economics*, *46*(1), 31-77.

Levine, R., & Renelt, D. (1992). A sensitivity analysis of cross-country growth regressions. *The American economic review*, 942-963.

Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The manchester school*, *22*(2), 139-191.

Li, H., & Liang, H. (2010). Health, education, and economic growth in East Asia. *Journal of Chinese Economic and Foreign Trade Studies*.

Lilien, D. M. (1982). Sectoral shifts and cyclical unemployment. *Journal of political economy*, *90*(4), 777- 793.

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

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, *22*(1), 3-42.

Mahmood, T., & Linden, M. (2017). Structural change and economic growth in Schengen region. *International Journal of Economics and Financial Issues*, *7*(1), 303-311.

Mallick, L., Das, P. K., & Pradhan, K. C. (2016). Impact of educational expenditure on economic growth in major Asian countries: Evidence from econometric analysis. *Theoretical & Applied Economics*, *23*(2).

Maneejuk, P., & Yamaka, W. (2021). The Impact of Higher Education on Economic Growth in ASEAN-5 Countries. *Sustainability*, *13*(2), 520.

Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, *107*(2), 407-437.

Martins, P. M. (2015). *Sub-regional perspectives on structural change* (No. 15/03). CREDIT Research Paper.

Martins, P. M. (2019). Structural change: Pace, patterns and determinants. *Review of Development Economics*, *23*(1), 1-32.

Matsuyama, K. (2008). Structural change. *The new Palgrave dictionary of economics*, *2*.

Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, *110*(3), 681-712.

McMillan, M. S., & Harttgen, K. (2014). *What is Driving the'African Growth Miracle'?* (No. w20077). National Bureau of Economic Research.

McMillan, M., Rodrik, D., & Verduzco-Gallo, Í. (2014). Globalization, structural change, and productivity growth, with an update on Africa. *World Development*, *63*, 11-32.

McMillan, M., Rodrik, D., & Sepulveda, C. (2017). Structural change, fundamentals and growth: A framework and case studies. National Bureau of Economic Research. (No. w23378).

Mehrara, M., & Musai, M. (2013). The relationship between economic growth and human capital in developing countries. *International Letters of Social and Humanistic Sciences*, *5*(55), 55-62.

Mensah, J. T., Adu, G., Amoah, A., Abrokwa, K. K., & Adu, J. (2016). What Drives Structural Transformation in Sub-Saharan Africa?. *African Development Review*, *28*(2), 157-169.

Michaely, M. (1962). *Concentration in international trade* (No. 28). North-Holland Publishing Company.

Mijiyawa, A. G. (2017). Drivers of structural transformation: The case of the manufacturing sector in Africa. *World Development*, *99*(C), 141-159.

Mincer, J. (1958). Investment in human capital and personal income distribution. *Journal of political economy*, *66*(4), 281-302.

Mohanty, S., & Sethi, N. (2019). Outward FDI, human capital and economic growth in BRICS countries: an empirical insight. *Transnational Corporations Review, 11*(3), 235-249.

Moussir, C. E., & Chatri, A. (2020). Structural change and labour productivity growth in Morocco. *Structural Change and Economic Dynamics, 53*, 353-358.

Murtaza, G., & Faridi, M. Z. (2016). Economic Institutions and Growth Nexus: The Role of Governance and Democratic Institutions—Evidence from Time Varying Parameters'(TVPs) Models. *The Pakistan Development Review*, 675-688.

Mustafa, G., Rizov, M., & Kernohan, D. (2017). Growth, human development, and trade: The Asian experience. *Economic Modelling, 61*, 93-101.

Narayan, S., Narayan, P. K., & Mishra, S. (2010). Investigating the relationship between health and economic growth: Empirical evidence from a panel of 5 Asian countries. *Journal of Asian Economics, 21*(4), 404-411.

Navarrete Gallo, P. L., & Ritzen, J. (2021). *Do institutions and ideology matter for economic growth in Latin America in the first two decades of the 21st century?* (No. 2021-012). United Nations University-Maastricht Economic and Social Research Institute on Innovation and Technology (MERIT).

Nawaz, S. (2015). Growth effects of institutions: A disaggregated analysis. *Economic Modelling, 45*, 118-126.

Nawaz, S., Iqbal, N., & Khan, M. A. (2014). The impact of institutional quality on economic growth: Panel evidence. *The Pakistan Development Review*, 15-31.

Nawaz, S., & Khawaja, M. I. (2019). Fiscal policy, institutions and growth: New insights. *The Singapore Economic Review, 64*(05), 1251-1278.

Neamtu, D. M. (2015). Education, the economic development pillar. *Procedia-Social and Behavioral Sciences, 180*, 413-420.

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American economic review, 56*(1/2), 69-75.

Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. *International Economic Review*, 777-787.

Ngo, M. N., & Nguyen, L. D. (2020). Economic growth, total factor productivity, and institution quality in low-middle income countries in Asia. *The Journal of Asian Finance, Economics, and Business*, *7*(7), 251-260.

Nguyen, H. C. (2018). Empirical Evidence of Structural Change: The Case of Vietnam's Economic Growth. *Journal of Southeast Asian Economies*, *35*(2), 237-256.

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the econometric society*, 1417-1426.

North, D. C. (1981) Structure and Change in Economic History. *Norton.*

North, D. C. (1990). Institutions, institutional change and economic behaviour. *Cambridge University*.

North, D. C., & Thomas, R. P. (1973). *The rise of the western world: A new economic history*. Cambridge University Press.

Nonneman, W., & Vanhoudt, P. (1996). A further augmentation of the Solow model and the empirics of economic growth for OECD countries. *The Quarterly Journal of Economics*, *111*(3), 943-953.

Nurkse, R. (1953). *Problems of Capital Formation in Underdeveloped Countries*. Blackwell.

Nyasha, S., & Odhiambo, N. M. (2019). Government size and economic growth: A review of international literature. *SAGE Open*, *9*(3), 2158244019877200.

OECD (2001). *The Well-being of Nations: The Role of Human and Social Capital*, OECD Publishing, Paris.

Ogbuabor, J. E., Orji, A., Manasseh, C. O., & Anthony-Orji, O. I. (2020). Institutional Quality and Growth in West Africa: What Happened after the Great Recession?. *International Advances in Economic Research*, *26*(4), 343-361.

Ogundari, K., & Awokuse, T. (2018). Human capital contribution to economic growth in Sub-Saharan Africa: does health status matter more than education?. *Economic Analysis and Policy*, *58*, 131-140.

Olczyk, M., & Kordalska, A. (2018). Growth and structural changes in transition countries: the chicken or the egg?. *Journal of Business Economics and Management*, *19*(3), 544-565.

Olson, M. (1982). *Rise and Decline of Nations: Economic Growth*.

Opoku, E. E. O., & Yan, I. K. M. (2018). Industrialization as driver of sustainable economic growth in Africa. *The Journal of International Trade & Economic Development*, 1-27.

Osiobe, E. U. (2019). A Literature Review of Human Capital and Economic Growth. *Business and Economic Research*, *9*(4), 179-196.

Osiobe, E. U. (2020). Human Capital and Economic Growth in Latin America: A Cointegration and Causality Analysis. *The Economics and Finance Letters*, *7*(2), 218-235.

Osipian, A. (2008). Economic Growth Human Capital Nexus in Post-Soviet Ukraine, 1989-2009.

Padilla-Pérez, R., & Villarreal, F. G. (2017). Structural change and productivity growth in Mexico, 1990–2014. *Structural Change and Economic Dynamics*, *41*, 53-63.

Paul, S. (2018). Kuznets Beyond Kuznets: Structural Transformation and Income Inequality in the Era of Globalization in Asia.

Pegkas, P., Staikouras, C., & Tsamadias, C. (2020). On the determinants of economic growth: Empirical evidence from the Eurozone countries. *International Area Studies Review*, *23*(2), 210-229.

Pelinescu, E. (2015). The impact of human capital on economic growth. *Procedia Economics and Finance*, *22*, 184-190.

Prasetyia, F. (2020). Good Governance and Economic Growth: Empirical Evidence from ASEAN 10. In *23rd Asian Forum of Business Education (AFBE 2019)* (pp. 376-383). Atlantis Press.

Pritchett, L. (2001). Where has all the education gone?. *The world bank economic review*, *15*(3), 367-391.

Porras, A. R., & Vázquez, N. G. (2015). Governance and Economic Growth in Latin America: Some Stylized Facts and Relations. *Journal of Public Governance and Policy: Latin American Review*, *1*(1), 55-76.

Qadri, F. S., & Waheed, A. (2013). Human capital and economic growth: Cross-country evidence from low-, middle-and high-income countries. *Progress in Development Studies*, *13*(2), 89-104.

Rahman, A. A., & Schmillen, A. (2020). From Farms to Factories and Firms: Structural Transformation and Labor Productivity Growth in Malaysia.

Rahman, M. M., Rana, R. H., & Barua, S. (2019). The drivers of economic growth in South Asia: evidence from a dynamic system GMM approach. *Journal of Economic Studies*, *46*(3), 64-577.

Raifu, I. A., Nnadozie, O. O., & Opeloyeru, O. S. (2021). Differences in Colonial Experience and the Institution-Economic Growth Nexus in West Africa. *Institutions and Economies*, 27-58.

Ramirez, M. D. (2013). Do financial and institutional variables enhance the impact of remittances on economic growth in Latin America and the Caribbean? A panel cointegration analysis. *International Advances in Economic Research*, *19*(3), 273-288.

Ramirez, M. D., & Nazmi, N. (2003). Public investment and economic growth in Latin America: An empirical test. *Review of Development Economics*, *7*(1), 115-126.

Ranis, G., & Fei, J. C. (1961). A theory of economic development. *The american economic review*, 533-565.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, *9*(2), 131-165.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, *94*(5), 1002-1037.

Romer, P. M. (1990). Endogenous technological change. *Journal of political Economy*, *98*(5, Part 2), S71-S102.

Roncolato, L., & Kucera, D. (2013). Structural drivers of productivity and employment growth: a decomposition analysis for 81 countries. *Cambridge Journal of Economics*, *38*(2), 399-424.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The stata journal*, *9*(1), 86-136.

Sacerdoti, E., Brunschwig, S., & Tang, J. (1998). The impact of human capital on growth: evidence from West Africa.

Sachs, J. D., & Warner, A. M. (1997). Fundamental sources of long-run growth. *The American economic review*, *87*(2), 184-188.

Sahadevan, K. G. (2020). Services Activity, Economic Growth and Regional Equality-Some Empirical Evidence on their Relationship. *Prajnan*, *49*(1).

Salman, M., Long, X., Dauda, L., & Mensah, C. N. (2019). The impact of institutional quality on economic growth and carbon emissions: Evidence from Indonesia, South Korea and Thailand. *Journal of Cleaner Production*, *241*, 118331.

Sarwar, K., Afzal, M., Shafiq, M., & Rehman, H. (2013). Institutions and economic growth in South Asia. *Journal of Quality and Technology Management*, *9*(2), 01-23.

Sarwar, A., & Hayat, M. A. (2021). A Nexus among Institutions, Education and Economic Growth: An Analysis of Developing Countries. *Asian Economic and Financial Review*, *11*(1), 30-42.

Sarwar, S., Siddiqi, M. W., & Butt, A. R. (2013). Role of institutions and economic growth in Asian countries. *Developing Country Studies*, *3*(2), 80-91.

Saviotti, P. P., & Pyka, A. (2012). On the co-evolution of innovation and demand: Some policy implications. *Revue de l'OFCE*, (5), 347-388.

Schultz, T. W. (1960). Capital formation by education. *Journal of political economy*, *68*(6), 571-583.

Schultz, T. W. (1961). Investment in human capital. *The American economic review*, *51*(1), 1-17.

Scully, G. W. (1988). The institutional framework and economic development. *Journal of Political Economy*, *96*(3), 652-662.

Sen Gupta, A., More, V., & Gupta, K. (2016). *Structural Change and Poverty Reduction at Sub-State Levels in India* (No. 72740). University Library of Munich, Germany.

Shah, S. W. A., Shahzad, S. K., & Abrar Ul Haq, M. (2015). Human capital and economic growth: evidence from selected Asian countries. *Journal of Resources Development and Management Journal, 11*.

Sharma, C., & Mitra, A. (2019). Corruption and economic growth: Some new empirical evidence from a global sample. *Journal of International Development, 31*(8), 691-719.

Sharma, P., & Sahni, P. (2015). Human capital and economic growth in India: A co-integration and causality analysis. *Ushus Journal of Business Management, 14*(2), 1-18.

Siddiqui, A., & Rehman, A. U. (2017). The human capital and economic growth nexus: in East and South Asia. *Applied Economics, 49*(28), 2697-2710.

Siddiqui, D. A., & Ahmed, Q. M. (2013). The effect of institutions on economic growth: A global analysis based on GMM dynamic panel estimation. *Structural Change and Economic Dynamics, 24*, 18-33.

Silva, E. G., & Teixeira, A. A. (2008). Surveying structural change: Seminal contributions and a bibliometric account. *Structural Change and Economic Dynamics, 19*(4), 273-300.

Silva, E. G., & Teixeira, A. A. (2011). Does structure influence growth? A panel data econometric assessment of "relatively less developed" countries, 1979–2003. *Industrial and corporate change, 20*(2), 457-510.

Singh, R. (2012). An extension to the Solow growth model within an endogenous growth framework.

Singh, B. P., & Pradhan, K. C. (2020). Institutional quality and economic performance in South Asia. *Journal of Public Affairs*, e2401.

Siyakiya, P. (2017). The impact of institutional quality on economic performance: An empirical study of European union 28 and prospective member countries. *World journal of applied Economics, 3*(2), 3-24.

Škare, M., & Lacmanović, S. (2015). Human capital and economic growth: a review essay. *Amfiteatru Economic Journal, 17*(39), 735-760.

Slesman, L., Baharumshah, A. Z., & Ra'ees, W. (2015). Institutional infrastructure and economic growth in member countries of the Organization of Islamic Cooperation (OIC). *Economic Modelling*, *51*, 214-226.

Slesman, L., Naseem, N., Fuad, R., & Aldomi, M. (2017). Economic Freedom, Real Exchange Rates and Economic Growth in Emerging Markets and Developing Countries. *International Journal of Economics & Management*, *11*.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.

Son, H. H. (2010). Human capital development. *Asian Development Bank Economics Working Paper Series*, (225).

Soto, M. (2009). System GMM estimation with a small sample.

Sovina, J. (2000). Human capital and models of economic growth.

Ssozi, J., & Bbaale, E. (2019). The Effects of the Catch-Up Mechanism on the Structural Transformation of Sub-Saharan Africa. *Economies*, *7*(4), 111.

Sterlacchini, A. (2008). R&D, higher education and regional growth: Uneven linkages among European regions. *Research Policy*, *37*(6-7), 1096-1107.

Stijepic, D. (2011). *Structural Change and Economic Growth: Analysis within the" Partially Balanced Growth-Framework"* (Doctoral dissertation).

Stoikov, V. (1966). Some determinants of the level of frictional unemployment: a comparative study. *Int'l Lab. Rev.*, *93*, 530.

Sumanjeet. (2015). Institutions, transparency, and economic growth. *Emerging Economy Studies*, *1*(2), 188-210.

Swan, T. W. (1956). Economic growth and capital accumulation. *Economic record*, *32*(2), 334-361.

Sweetland, S. R. (1996). Human capital theory: Foundations of a field of inquiry. *Review of educational research*, *66*(3), 341-359.

Syrquin, M., & Chenery, H. B. (1989). *Patterns of Development, 1950 to 1983* (No. 41). Washington: World Bank.

Tahir, M., Hayat, A., Rashid, K., Afridi, M. A., & Tariq, Y. B. (2020). Human capital and economic growth in OECD countries: some new insights. *Journal of Economic and Administrative Sciences*.

Teixeira, A. A., & Fortuna, N. (2010). Human capital, R&D, trade, and long-run productivity. Testing the technological absorption hypothesis for the Portuguese economy, 1960–2001. *Research Policy*, *39*(3), 335-350.

Teixeira, A. A., & Queirós, A. S. (2016). Economic growth, human capital and structural change: A dynamic panel data analysis. *Research Policy*, *45*(8), 1636-1648.

Temple, J. (1999). A positive effect of human capital on growth. *Economics Letters*, *65*(1), 131-134.

Temple, J. (2002). Growth effects of education and social capital in the OECD countries. *Historical Social Research/Historische Sozialforschung*, 5-46.

Temple, J., & Wößmann, L. (2006). Dualism and cross-country growth regressions. *Journal of Economic growth*, *11*(3), 187-228.

Timmer, M. P., & Szirmai, A. (2000). Productivity growth in Asian manufacturing: the structural bonus hypothesis examined. *Structural change and economic dynamics*, *11*(4), 371-392.

Totouom, A., Kaffo, H. F., & Sundjo, F. (2019). Structural transformation of Sub-Saharan Africa: Does the quality of institutions matter in its industrialization process?. *Region et Developpement*, *50*, 119-136.

Tukur, G., Bello, M. U., Abdullahi, H., & Abubakar, M. Y. (2016). Institutions, Natural Resources and Economic Growth: An Application of Cointegration with Structural Break to Nigerian Dataset.

Tullock, G. (1967). The welfare costs of tariffs, monopolies, and theft. *Economic Inquiry*, *5*(3), 224-232.

Uddin, M. A., Ali, M. H., & Masih, M. (2017). Political stability and growth: An application of dynamic GMM and quantile regression. *Economic Modelling*, *64*, 610-625.)

Uddin, M. A., Ali, M. H., & Masih, M. (2020). Institutions, human capital and economic growth in developing countries. *Studies in Economics and Finance*.

Uddin, M., Chowdhury, A., Zafar, S., Shafique, S., & Liu, J. (2019). Institutional determinants of inward FDI: Evidence from Pakistan. *International Business Review*, *28*(2), 344-358.

Üngör, M. (2017). Productivity growth and labor reallocation: Latin America versus East Asia. *Review of Economic Dynamics*, *24*, 25-42.

United Nation (2016). Economic governance institutions, corruption and structural transformation, African Governance Report IV - 2016, pp 1-27, DOI: https://doi.org/10.18356/099e559c-en.

Uzawa, H. (1965). Optimum technical change in an aggregative model of economic growth. *International economic review*, *6*(1), 18-31.

Valeriani, E., & Peluso, S. (2011). The impact of institutional quality on economic growth and development: An empirical study. *Journal of Knowledge Management, Economics and Information Technology*, *1*(6), 1-25.

Van Neuss, L. (2019). The drivers of structural change. *Journal of Economic Surveys*, *33*(1), 309-349.

Vianna, A. C., & Mollick, A. V. (2018). Institutions: Key variable for economic development in Latin America. *Journal of Economics and Business*, *96*, 42-58.

Vijayaraghavan, M., & Ward, W. A. (2001). *Institutions and economic growth: empirical evidence for a cross-national analysis* (No. 633-2016-41441).

Vinod, H. D., & Kaushik, S. K. (2007). Human capital and economic growth: evidence from developing countries. *The American Economist*, *51*(1), 29-39.

Vu, K. M. (2017). Structural change and economic growth: Empirical evidence and policy insights from Asian economies. *Structural Change and Economic Dynamics*, *41*, 64-77.

Wako, H. A. (2018a). Aid, institutions and economic growth in sub-Saharan Africa: Heterogeneous donors and heterogeneous responses. *Review of Development Economics*, *22*(1), 23-44.

Wako, H. A. (2018b). Economic globalization, institutions and development: essays on aid, foreign direct investment and trade. (Doctoral dissertation).

Wanjuu, L. Z., & Le Roux, P. (2017). Economic institutions and economic growth: Empirical evidence from the Economic Community of West African States. *South African Journal of Economic and Management Sciences*, *20*(1), 1-10.

Wilson, R. A., & Briscoe, G. (2004). The impact of human capital on economic growth: a review. *Impact of education and training. Third report on vocational training research in Europe: background report. Luxembourg: EUR-OP.*

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of econometrics*, *126*(1), 25-51.

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of financial economics*, *105*(3), 581-606.

Wu, J., Wang, C., Hong, J., Piperopoulos, P., & Zhuo, S. (2016). Internationalization and innovation performance of emerging market enterprises: The role of host-country institutional development. *Journal of World Business*, *51*(2), 251-263.

Yao, Y., Ivanovski, K., Inekwe, J., & Smyth, R. (2020). Human capital and CO2 emissions in the long run. *Energy Economics*, *91*, 104907.

Yardimcioglu, F., Gürdal, T., & Altundemir, M. E. (2014). Education and economic growth: A panel cointegration approach in OECD countries (1980-2008). *Egitim ve Bilim*, *39*(173).

Yıldırım, A., & Gökalp, M. F. (2016). Institutions and economic performance: A review on the developing countries. *Procedia Economics and Finance*, *38*, 347-359.

Yusuf, H. A., Shittu, W. O., Akanbi, S. B., Umar, H. M., & Abdulrahman, I. A. (2020). The role of foreign direct investment, financial development, democracy and political (in) stability on economic growth in West Africa. *International Trade, Politics and Development.*

Zergawu, Y. Z., Walle, Y. M., & Giménez-Gómez, J. M. (2020). The joint impact of infrastructure and institutions on economic growth. *Journal of Institutional Economics*, *16*(4), 481-502.

Zhu, S., & Li, R. (2017). Economic complexity, human capital and economic growth: empirical research based on cross-country panel data. *Applied Economics*, *49*(38), 3815-3828.

Zhou, X., Cai, Z., Tan, K. H., Zhang, L., Du, J., & Song, M. (2021). Technological innovation and structural change for economic development in China as an emerging market. *Technological Forecasting and Social Change*, *167*, 120671.

Zhuo, Z., O, A. S. M., Muhammad, B., & Khan, S. (2020). Underlying the Relationship between Governance and Economic Growth in Developed Countries. *Journal of the Knowledge Economy*, 1-17.

Zouhaier, H., & Kefi, M. K. (2012). Institutions and economic growth. *Asian Economic and Financial Review*, *2*(7), 795.

Zulfiqar, K. (2018). An Analysis of Income Convergence across Asian Countries. *Forman Journal of Economic Studies*, *14*.

Zulkhibri, M., Naiya, I., & Ghazal, R. (2015). Structural change and economic growth in selected emerging economies. *International Journal of Development Issues*, *14*(2), 98-116.

List of Appendices

Appendix 1 Typology of Growth Patterns

Typology of growth Patterns		Structural Transformation	
		Slow	Rapid
Investment in Fundamentals (Human Capital, Institutions)	Low	(1) No Growth	(2) Episodic growth
	High	(3) Slow Growth	(4) Rapid, sustained growth (South Korea, Taiwan, and Hong Kong)

Notes: Table is taken from McMillan et al. (2017)

Appendix 2 Variables Definition and Data Sources

Types of Variables		Variables Name	Definition	Data Sources
Dependent Variable		Growth	Log difference of real per capita GDP multiplied by 100	WDI, 2019
Explanatory Variables	**Core Variables**	Human Capital	Average years of schooling and returns to education	PW Table, 9.1
		Institutions	Average of political rights and civil liberties indexes	Freedom House (FH)
		Structural Change	Reallocation of labor between nine different sectors	Asian Productivity Organization (APO)
	Control Variables	Domestic Investment	Gross fixed capital formation (as % of GDP)	WDI, 2019
		Government Expenditure	General government final consumption expenditure (as % of GDP)	WDI, 2019
		Trade Openness	Exports plus imports (as % of GDP)	WDI, 2019
		Financial Development	Domestic credit to private sector (as % of GDP)	WDI, 2019

Appendix 3 List of Sample Countries

Australia	India	Mongolia	Sri Lanka
Bangladesh	Indonesia	Myanmar	Thailand
Cambodia	Japan	Nepal	Turkey
China	Korea, Rep	Pakistan	
Fiji	Lao PDR	Philippines	
Hong Kong	Malaysia	Singapore	

Appendix 4 Growth Effects of Human Capital, Institutions and Structural Change (via Fixed Effect)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Y0	-1.880	-2.532*	-2.320***	-2.517*	-2.234**	-2.792***
	(1.169)	(1.218)	(0.596)	(1.329)	(1.067)	(0.939)
HCpw	-0.464	0.233	0.892	1.055	-0.331	0.733
	(4.749)	(2.567)	(2.651)	(4.405)	(4.599)	(2.237)
INSfh	0.312	-0.033	0.397	0.445	0.389	0.378
	(0.736)	(0.774)	(0.670)	(0.714)	(0.804)	(0.534)
SCssa	0.795***	0.471***	0.736***	0.741***	0.714***	0.355**
	(0.184)	(0.158)	(0.243)	(0.187)	(0.179)	(0.154)
Dom. Invest.		4.488***				4.879***
		(0.708)				(1.032)
Govt. Exp.			-0.591			
			(1.010)			
Openness				0.391		
				(0.776)		
Fin. Deve.					0.840*	-0.182
					(0.449)	(0.398)
Constant	14.203*	6.642	18.304***	16.822	14.571*	7.722
	(7.966)	(8.654)	(4.707)	(9.887)	(7.016)	(6.795)
Model Diagnostics						
No. of observations	199	180	180	184	191	172
R-squared	0.175	0.377	0.224	0.235	0.209	0.416
No. of Groups	21	20	20	20	21	20
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Same as Table 4.3.

Appendix 5 Moderating Effects of Human Capital and Structural Change on Economic Growth (via Fixed Effect)

VARIABLES	(1)	(2)
Y0	-2.010*	-2.935***
	(1.152)	(0.891)
HCpw	0.696	1.924
	(4.948)	(2.263)
INSth		0.428
		(0.549)
SCssa	1.066***	0.654***
	(0.333)	(0.172)
Dom. Invest.		5.078***
		(0.869)
Fin. Dev.		-0.289
		(0.407)
SCssa*HCpw	0.423	0.429***
	(0.367)	(0.135)
Constant	14.876*	7.640
	(7.751)	(6.584)
Model Diagnostics		
No. of observations	199	172
R-squared	0.185	0.431
No. of Groups	21	20
Time dummies	Yes	Yes
Conditional Effects of Human Capital		
SCssa at 25th percentile	0.409	1.632
	(4.892)	(2.232)
SCssa at 50th percentile	-0.035	1.181
	(4.829)	(2.191)
SCssa at 75th percentile	-0.417	0.795
	(4.799)	(2.163)
Conditional Effects of Structural Change		
HCpw at 25th percentile	0.865***	0.451***
	(0.217)	(0.148)
HCpw at 50th percentile	0.762***	0.347**
	(0.195)	(0.146)
HCpw at 75th percentile	0.655***	0.238
	(0.212)	(0.152)

Notes: Same as Table 4.4.

Appendix 6 Moderating Effects of Institutions and Structural Change on Economic Growth (via Fixed Effect)

VARIABLES	(1)	(2)
Y0	-1.887*	-2.791***
	(1.045)	(0.931)
HCpw		0.713
		(2.220)
INSfh	0.814	0.837
	(1.069)	(0.626)
SCssa	1.054***	0.612**
	(0.290)	(0.233)
Dom. Invest.		4.891***
		(1.044)
Fin. Dev.		-0.165
		(0.392)
SCssa* INSfh	0.206	0.193
	(0.214)	(0.202)
Constant	13.338	6.899
	(8.023)	(7.007)
Model Diagnostics		
No. of observations	199	172
R-squared	0.179	0.420
No. of Groups	21	20
Time dummies	Yes	Yes
Conditional Effects of Institutions		
SCssa at 25th percentile	0.674	0.706
	(0.953)	(0.562)
SCssa at 50th percentile	0.458	0.502
	(0.795)	(0.522)
SCssa at 75th percentile	0.272	0.328
	(0.689)	(0.554)
Conditional Effects of Structural Change		
INSfh at 25th percentile	0.849***	0.418***
	(0.177)	(0.138)
INSfh at 50th percentile	0.770***	0.345**
	(0.188)	(0.165)
INSfh at 75th percentile	0.715***	0.294
	(0.215)	(0.200)

Notes: Same as Table 4.5.