

Financial Development and Economic Growth: Role of Adaptive Efficiency



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CERTIFICATE

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Dedication:

This thesis is dedicated to my cousin

Dr. Shahid Mansoor Hashmi

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Table of Contents

Abstract	
Introduction	1
1.2 Significance of the Study	5
1.3 Objectives of the Study	6
1.4 Organization of the Study	6
Chapter: 2	7
Literature Review	7
2.1 Financial Development and Economic Growth	8
2.1.1 Causality between financial development and economic growth	12
2.1.2 Comparative financial systems	17
2.1.3 Finance and institutions	20
2.2 Institutions and Economic Growth	24
2.2.1 Relationship between institutions and economic growth	24
2.2.2 Role of institutions in economic growth	27
2.3 Adaptive Efficiency, Financial Development and Economic Growth	31
Conclusion	32
Chapter: 3	34
Theoretical Framework	34
3.1 Framework for Using Adaptive Efficiency	37
3.2 Econometric Specification	38
3.3 Econometric Methodology	39
Static Panel Methods	39
3.3.3 Choice among fixed effect model and random effect model through “Hausman Test”	42
Dynamic panel method:	43
3.3.5 Validity of instruments	48
Chapter 4	49
Data and Construction of Variables	49
4.1 The Construction of Variable	49
4.1.1 Economic growth	49
4.1.2 Financial Development	49
4.1.3 Adaptive Efficiency	50
Adaptive Efficiency	53

4.1.4 Control variables	54
4.3 Descriptive Analysis	57
Data Sources	58
Chapter: 5	59
Estimation and Results	59
5.1 Empirical Results (GMM)	59
Diagnostic test	66
5.2 Robustness check	67
<i>GMM</i>	67
<i>Fixed effect model</i>	69
Chapter: 6	71
Conclusion and Recommendations	71
Policy recommendations	75
References	77
Appendix	85

Abstract

This study investigates the role of adaptive efficiency for the financial development and the economic growth. The study tests the relationship between the financial development and the economic growth. A highly tested concept of the literature that financial development can lead to the economic growth is revisited in this study with an addition of the adaptive efficiency. It provides the first formal empirical analysis on the “adaptive efficiency”. The concept of adaptive efficiency states that the, flexible institutions can get efficient over the time leading to the higher economic growth. The three types of institutions governance, regulations and business environment are used to form the adaptive efficiency index using PCA.

The study is conducted by using 123 developed and developing economies. The analysis is done by using Arellano Bond (1991) estimations, which follows the GMM (generalized Methods of Moments) estimation technique. The results show that the explanatory variables are positive and significant. It indicates that all the exogenous variables can positively affect the dependent variable in the model i.e. economic growth. Both the financial development and the adaptive efficiency can lead to increase the economic growth.

In addition to that, the results of interaction term between financial development and adaptive efficiency is also positive and more significant. These results are consistent with the theoretical framework of the study that, financial development through adaptive efficiency can better lead to a higher economic growth. Moreover, in a robustness check through GMM, results show that there is more potential for the explanatory variables in case of developing economies. However, here also the results are positive and significant for both the samples, i.e. developed and developing economies.

The study concludes that, there should be a focus on the financial development and the quality of the institutions. To achieve the better adaptive efficiency, policies should form to ensure the quality performance of these institutions. As these institutions for adaptive efficiency are now empirically tested as most important for the economy. Especially, in case of developing economies there is much potential for both the financial development and adaptive efficiency. So the emphasize should be on favorable policies in this regard.

Chapter: 1

Introduction

Financial development and its impact for the economic growth is an extensively discussed issue over the last few decades in the literature of economics¹. The discussion which is initiated by MacKinnon (1969) and Shaw (1969) has become mature over the time. The literature has witnessed four school of thoughts, over the last six decades, on finance-growth nexus and provide inconclusive evidences on the issue. However, recently, there is near to consensus that financial sector development has a vital role in explaining the economic growth of the economies. Furthermore, financial development become more important in the backdrop of Great Financial Crises (GFC) of 2008 and financially integrated markets. Because, a number of mainstream economists had a point of view that financial could be avoided in the era of great modernization and financial sector development.

In this backdrop, a string of research emerges which postulates that the lack of good institutions was the major source of GFC in the era of financial sector development and financially integrated markets. Along this discussion, the institution-economic growth nexus establishes. A number of prominent economists like North (1995, 2005), Jones (2000) and Acemoglu et al. (2001) post that different institutions can play a vital role in defining or shaping the path of economic growth. Therefore, we have several reasons to reinvestigate the impact of financial development on the economic outcomes for the economies by incorporating role of the institutions.

More specifically, there are several lines of research are being followed in the literature of economic growth. First, as mentioned earlier, the literature is failed to provide

¹ The term financial development can be defined as the development in the financial sector, like innovations, development and ease of financial institutions and the markets. Broadly the types of financial development can be categorized into two parts i.e. Bank based financial system and Market based financial systems. Literature has discussed the both types of the financial developments and provides mix views in favors of both, the financial systems. However, due to less developed stock markets in developing economies, the focus is on bank based financial systems.

any conclusive evidence for the linkages among economic growth and the financial development. The researchers provide four different school of thought on finance-growth nexus. First, Levine (1993) notes that the economic growth is caused by the financial development. Second, Robinsons (1952) concludes that the economic growth leads the financial development. Third Patrick (1966) postulates that both the financial development causes economic growth and the economic growth causes the financial development. Fourth, Locus (1988) argues neither financial development causes economic growth nor the economic growth causes the financial development. Therefore, this is still an open question for the reinvestigation.

In addition to this, it is well established in the literature that the empirical results may vary with the measurements of the financial development. Similarly, the findings of the empirical analysis are sensitive to estimation techniques as well. Therefore, there is a need to reinvestigate the nexus with different measures and different measures. More specifically, the financial sector development is measured through various proxies. For example, three major dimensions of financial development sector are taken into the consideration. First, the depth of financial sector development (broad money to GDP ratio), second the structure of the financial sector development (Private Sector Credit), and third the efficiency of the financial sector development (net Interest margin). Therefore, there is need to test the finance growth nexus through various indicators, in a single study, to measure the robustness of the nexus.

Second, beside this, there is another line of research that the institutions may also play a significant role in the shaping of the economic growth profile of the economies. We may find a number of stories about the role of institutions that contribute for the literature of the economic growth. For example, Jones (1995) posts that the differences among the per-capita income of the countries lies in the level of institutions. Then Acemoglu et al. (2001) point out that the institutions have a pivotal role in the development of the countries. Similarly, there is

a vast literature which shows the impact of institutional development on the economic development.

Third, then there is another important discussion in the literature that how these institutions are determined over time. For example, Acemoglu et al (2001) among others note that the colonial origin plays an important role in the determining the level of institutions. North (2005) claims that an economy may get benefit, over the time, from the institutions even in the case of failure of the allocative efficiency. Specifically, North (2005) postulates that the institutional framework of the country gets an efficiency over the time. He termed this phenomenon as *adaptive efficiency*. More clearly, the adaptive efficiency means that the efficiency that is adopted over the time due to the improvement of other institutions. For example, the influence of financial development for the economic growth may be catalyzed if the other relevant institutions or the environment of the economy work accordingly.

Therefore, North (2005) notes that the efficiency which is acquired over time may enhance the linkages among the relevant variables. Specifically, adaptive efficiency has the major role in the process of economic changes which involves some basic stages. For example, “changes in quantity or quality of human beings, changes in stock of human knowledge specially applied to human command over nature and the changes in the institutional framework that defines the deliberate incentive structure of a society” as proposed by the North (2005). Furthermore, North (2005) narrates that the adaptive efficiency can be achieved over the time through a well-working institutional framework. The adaptive efficiency refers to the effectiveness of a society in creating productive, stable, fair and broadly accepted institutions that should flexible enough in response to economic or political change.

So, up till now, we have discussed there are three strands of research. First, the impact of financial development for the economic growth. Second, the influence of institutions on economic growth. Third, the effect of institutions to get adaptive efficiency. These three strands are researched through different studies. However, the present study tries to combine these strands of research in a cohesive way. Specifically, we hypothesized that the institutions improve the adaptive efficiency over the time which catalyze the effect of financial development for the economic growth of countries.

This area of research is infant. There are very few studies which try to generate a linkage from institutions to adaptive efficiency and then to economic growth. For example, Ma and Jalil (2008) investigate the linkages between economic growth and the financial development for the economies of China & Pakistan. The study shows that reason behinds continuous increased growth rate in China since few decades is not due to the allocative efficiency or static efficiency, rather the dynamics are consistent with the “adaptive efficiency”.

However, there was an interesting observation in China. The Chinese banking system, mostly comprised of State Owned Banks (SOBs), was not well working and have the highest “non-performing loans (NPLs)” among the peers. As majority of loans by SOBs were provided to the “State Owned Enterprises (SOEs)” rather than to the private sector for achieving the social objectives like poverty and inequality curtailment. More clearly, as unlikely to the private sector, the SOEs does not only perform or function for the profit maximization objective, but their major objective is social benefit, advantageous for the people and society. For example, to curtail the poverty, increase the employment level, to build the infrastructure, increase the literacy rate and to improve institutional framework. Also the North (1990) supports this phenomenon termed as *adaptive efficiency*.

So we shall attempt, by taking this line of research, to explore about the role of adaptive efficiency for the linkage of financial development and economic growth. We postulate that the impact of the financial development for the economic growth will be improved through the channel of adaptive efficiency. Stating that the adaptive efficiency is measured through the institutions, we have literature that uses the impact of institutions for the financial development and the economic growth. Various studies in the literature has used different types of the institutions in like political institutions, property rights, legal institutions, contracts and contractual rights etc. the positive and significant role of these institutions has been witnessed in the literature as a whole.

1.2 Significance of the Study

As mentioned earlier, there are two nexuses which are tested in the literature. First, “financial development - economic growth nexus” and “institutions-economic growth nexus”. However, we can rarely find a study which throw the light on the role of institutions to enhance the impact of financial development and economic growth. The present study shall attempt in this way. More importantly, we shall see the combine effect of several institutions over time, which is termed as adaptive efficiency, on the financial development-economic growth nexus. We can safely claim this is a pioneer study in its nature. This will add in the literature to guide the policy makers regarding the financial development sector along with improvements of institutional framework to spur the economic growth of the countries. We shall use the set of number of countries to investigate the research question.

1.3 Objectives of the Study

Following the above mentioned backdrop, the present study will pursue the following specific objectives:

1. To investigate the link between financial development and the economic growth as a baseline scenario.
2. To investigate the role of adaptive efficiency in enhancing the impact of financial development and economic growth.
3. To check the robustness of the findings with different measures of the indicators by using the different econometric techniques in different regions.

1.4 Organization of the Study

This study will follow a conventional way of writing. Chapter 2 will present a comprehensive literature to set a stage for the theoretical framework and the empirical findings. Chapter 3 will establish a theoretical framework to pursue the empirical findings. The data, specifications of the econometric regressions and estimation methodologies will be presented in chapter 4. Chapter 5 will confer about the empirical findings of this study. Then, Chapter 6 will conclude the study.

Chapter: 2

Literature Review

As mentioned earlier, the literature has an inconclusive stance on the impact of the financial development on economic growth. Even, Locus (1988) posts that it the financial development is over stressed term. However, the work of Levine et al. (2000), Beck et al. (2001) and Asli et al. (2004) give it a new surge since the last two decades. Furthermore, the importance of financial sector development and the role of institutions are recognized after GFC of 2008. In this backdrop, we establish a case that there are three lines of research are prevailing in the literature. First, the impact of financial development on the economic growth, second the impact of institutions on the economic growth, third the role of institution in enhancing the impact of financial development on the economic growth.

This study mainly focuses on the last strand of the research that the role of institutions in enhancing the impact of financial development on the economic growth of the economies. Indeed, the institutions play a vital role in the finance-growth nexus. Interestingly, North (2005) postulates that the combined impact of institutions over time has a different impact as compare to the sever impact at a point of time. He termed this combined impact as the *adaptive efficiency*. This line of research is really infant in the literature. The focus of this study is the role of adaptive efficiency on the linkages of the financial development for the economic growth.

It is important to mention, before moving on, that this chapter will be divided into three parts. Because, we are going to combine three different lines of researches and then try to search the research gap for the investigations. Therefore, this separation will bring the clarity for the readers. First the impact of financial development on the economic growth, second the impact institutions on the economic growth and third, the adaptive efficiency and economic growth.

2.1 Financial Development and Economic Growth

As mentioned earlier, the linkages among financial development and economic growth is well discussed in the literature. No one should move on the literature before discussing the two recently published survey articles on the subject. First, Ang (2007) surveys the recent developments on the literature of financial development and economic growth. A number of issues related to subject. Specifically, the paper focuses on studies explaining the role of financial development in economic growth. Specifically, this articles reviews the most important studies from 1873 to 2006. It is important to mention that the most of the studies are empirical in their nature.

The article explains the reasons for the emergence of financial markets and intermediaries mainly due to the difference of resources for any two institutions which cannot perform efficiently alone. The role of intermediaries become important when there are trust issues between the parties and the existence of lemon market hypothesis. Furthermore, the study explains that financial system exists due to total factor productivity, efficient allocation of resources, mobilizing savings, reducing risks, facilitating transactions and exercising corporate controls. In addition to this, the study raises a number of questions for the further research. Many of the articles which are emerged in the last decade takes guidance from these research questions.

The second important survey article is produced by Arestis et al. (2014). This article focuses on the meta-analysis of a huge number studies on financial sector development and its impact on the economic growth. As this a meta-analysis therefore the authors focus on the empirical studies. Specifically, 118 empirical papers were selected till the end of September 2013. The authors argue that the empirical findings may vary due to the differentiations in

methodology, proxies of variable, country sample and data samples. The article also finds a positive relationship between financial development and economic outcomes of the countries.

Apart from these surveys, the debate on the financial development has been started a long ago. During this process the definitions and role of finance developed in a well appropriate way and these theorists emphasized contributed a valuable role in the knowledge of literature. The theoretical economist, among the empirical economist as mentioned, do not have the consensus on the role of financial development in the enhancing the economic activities of the countries. For example, Modigliani and Miller (1958) document that the financial development is irrelevant. They postulate that real economic decisions are independent of the financial system. Similarly, Minsky (1975) note that the negative influence of banks, destabilizing the effects of stock market, the instability in financial system can cause the financial crisis. Most of the theorists has contributed the literature not in favor with the financial liberalization. For example, Stiglitz (2000) proposed that most of financial crises are due to the liberalization of financial sector.

The most recent surge in the finance-growth nexus literature comes through the work of McKinnon and Shaw (1973). The McKinnon (1973) and Shaw (1973) describe the role of interest rate in the financial development. MacKinnon (1973) believes in raising finance outside the money model, that is, gold or cash and the Shaw (1973) is in favor of inside the money model financing, that is, *debt*. The rest of the financial economists of that era believes that both are true in their respective positions as the financing practically can be done in both ways. However, some are in favor of the role of interest rate as it effects the financing position and the other believes that the use of interest rate as key indicator of financial development is not logical.

Then Locus (1988) turned the discussion by that finance is an *overstressed* term. Actually, the discussion on financial development was hovering between the positive and

negative impact on the economic growth. Locus (1988) notes that financial development neither benefits nor hurts the economic activities in the countries rather it is the overstressed term in the literature of the development or growth economics. However, Ross Levine changes the discussion through a series of paper. He is the leader of recent discussion of financial development and economic growth.

For example, Levine (1997) settles the “views and agenda” for the financial development in the seminal paper. He set the different channels through the financial development may affect the economic growth of the economies. More clearly, Levine (1997) closes the study with a statement that the financial development may have a positive impact on the economic growth on the countries. However, there remain several research questions to be investigated. Then Levine (2002) searches for the better financial system, either “bank based” or “market based”. The study provides broad cross-country examination that which financial system is consistent with the data. The study uses the data of 48 countries from 1980 to 1995 comprising on the variables of growth, financial structure, banks structures and macroeconomic indicators. The results conclude that overall financial structure has impact on economic growth but there is no result in favor of any specific financial system whether bank based or market based.

Levine (1998), finds the relationship between legal environment, banks and the long-run economic growth. The study uses the variables of “real GDP per capita, capital stock growth, and productivity growth, creditor’s right credit to private sector by GDP, income per capita, education, political stability, ethnic diversity, civil rights, bureaucratic efficiency, and indicators of trade, fiscal and monetary policy” for the period of 1976-1993. The results based on Generalized Method of Moments (GMM) estimation technique shows that the countries with legal system stresses over credit rights and rigorously enforces contracts have better developed banking system than the countries which lack these qualities. Moreover, the

components of legal system are positively associated with the per capita growth, physical capital accumulation and productivity growth. This analysis is based on 46 developed and developing economies.

Levine (1999) introduces the legal framework in the discussion of financial sector development as well. The paper focuses that in what ways the legal environment effects the financial development and how it is related with the economic growth. The study uses the data of 77 countries from year 1960 to 1989 by applying the GMM estimation technique. The measures of financial intermediary development include, “liquid liability, BANK the degree of credit to central bank versus the commercial banks, private sector credit to total domestic credit ratio and private sector credit to GDP ratio”. Whereas, legal system indicators broadly include, legal traditions and creditors right. The results indicate that the countries with legal and regularity system, creditor right, enforcement of contracts and comprehensive financial reporting system of corporation have more developed financial intermediaries than others. Furthermore, the study concludes that the legal and regulatory environment is positively linked with the economic growth.

Then Beck and Levine (2003) study legal institutions and the financial development. The paper focuses on the historical origin, emergence and the development of different legal institutions, that is, law enforcement, political and property right protection on the financial development. The author shows that the historically developed legal institutions effects the protection of private property rights, investors protection law, corporate governance to govern, favorable environment for saver to invest and the development of the financial sector. However, each of the component is being discussed, criticized and developed by many researchers in the field and much more is required to be done.

Beck and Levine (2004) study the effect of stock market development, the banks development and the economic growth. The study follows the panel data of 40 countries

using 146 observations with 5-year averaged from 1976 to 1998. The variables of stock market are, “turnover ratio, value traded and market capitalization, and bank credit as bank development and GDP per capita” are regressed using GMM, estimation technique developed for dynamic panels. The results are consistent with the theory which supports that the financial development is important for the economic growth. The findings suggest that the bank development and the stock market development does positively influence the economic growth in both ways being used separately and collectively.

As mentioned earlier, there are several of studies which have discussed the link for the financial development and the economic growth. The following lines will present a summary of the studies on the subjects. The financial dependence does also effects the economic growth. In such a way that the firms rely on the external financing. The economic growth does effects positively where the financial markets are developed. For example, Rajan and Zingales (1998) show that countries with developed financial markets have high growth rate. Because, due to availability and easy excess to the external finance, firms performances are better. The high profits and the performances of these firms contributes for the high e growth rate. They take a specific sample that indicates the impacts of dependence of financial sources on the economic growth. The analysis is based on industrial data of 42 countries from 1980 to 1990 using dependent variable as average annual real growth of value added in an industry and the proxy for financial dependence, variables are external financing, total capitalization, bank debt and capital expenditures.

2.1.1 Causality between financial development and economic growth

Besides this the literature does also investigate the causality between the financial development and the economic growth. The direction of causality varies in different studies, that is, one way, two way and even no causality relationship has been witnessed, for example, Hondroyannis et al. (2004), Ma and Jalil (2008) and Rachdi and Mbarek (2011). They find

the two-way causality between the variables in the economies of Greece, OECD, Pakistan and China. However, Ma and Jalil (2008), also find some specific results with different indicators for the economy of China.

For the economy of China there is positive and significant relationship for deposit liability ratio but positive and insignificant for credit to private sector. The paper provides the reason behind these insignificant result in support with the Chinese history of state owned banks (SOB's), providing high amount of loans to state owned enterprise (SOE's), with high rate of non-performing loans. However, the results are positive and significant in case of Pakistan.

The variables used for the study are “per capita GDP as indicator of economic growth, ratio of deposit liabilities to nominal GDP, ratio of currency in circulation to GDP (M2), ratio of credit to private sector to nominal GDP and ratio of domestic credit to GDP as the indicators of financial development”. The data used from year 1960 to 2005 annually. The methodologies used for the analysis are Auto Regressive Distributed Lag (ARDL), co-integration tests and unit root tests. Similarly, in order to test the hypothesis that financial development causes the economic growth.

Various studies find uni-directional causality between the variables. The studies like Chirstopoulos and Tsionas (2004), Halicioglu (2007), Rachdi and Mbarek (2011), Jung (2013) and Aydi and Aguir (2017) show the one-way causality from financial development to the economic growth. These studies test the association between financial development and economic growth for different economies. The specifications of these are, Chirstopoulos and Tsionas (2004), uses the data of 10 developing countries from year 1970 to 2000. Halicioglu (2007), studies for the economy of turkey. The study uses the annual data from 1968 to 2005. The variables are “per capita real income, ratio of broad money (M2) to nominal GNP and ration of bank deposit liabilities to nominal GNP”. The econometric methodologies follow

the “Auto Regressive Distributed Lag (ARDL), Granger Causality and Co-integration tests” approaches.

The empirical investigation of causality used 10 economies from 1990 to 2006 in the study of Rachdi and Mbarek (2011). The study applies “Panel Data Co- integration and GMM system Approach techniques and causality tests”. The 4 MENA economies shows uni-directional results. However, the OECD economies results are bi-directional. Whereas, Jung (2013), investigate the relationship for the economy of Korea. The time series data of the four variables, economic growth, M2 money supply, real exports and real imports from 1961 to 2013 is used.

The study follows the “Augmented Dicky-Fuller (ADF), Phillip Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) approaches are used for the stationary tests”. The econometric specifications follow the “Vector Autoregressive (VAR) models and Vector Error Correction Model (VECM), Granger Causality estimation techniques are used.” The results show that the real GDP per capita, financial development, real exports and real imports are co-integrated with one vector. Aydi and Aguir (2017), empirically shows the relationship for Southern Mediterranean economies. The study finds there is long run relationship between financial development and the economic growth. The data from 1981 to 2014 for 34 economies consisting of the variables on “real GDP per Capita (GDP), the internal credit supplies to private sector, the market Capitalization (M2/GDP)” and Inflation as control variable are used. The econometric specifications consist of “Unit Root Tests, Co integration tests, Vector Error Correction Mechanism (VECM) and Vector Auto Regression (VAR)”.

However, few studies show the mix results, while investigating different economies, e.g. Sinha and Macri (2009), shows different results for different economies. Also Valickova, et al. (2015) through meta-analysis supported the view of mix results. There is also a study

which finds no relationship between the financial development and economic growth, that is, Prera et al. (2009). The study of Sinha and Macri (2009) shows positive and significant relationship between income and financial variables for India, Malaysia, Pakistan and Sri Lanka, bi-directional causality for India and Malaysia, whereas, uni-directional causality in Japan and Thailand. However, reverse causality from income variables to financial variables does exist in Korea, Pakistan and Philippine.

The study uses the variables of financial development and economic growth used in the study are, “growth rate of money supply to GDP ratio, growth rate of real per capita income, growth rate of quasi-money to GDP ratio, growth rate of domestic credit as GDP ratio, growth rate of real GDP, growth rate of real investment as ratio of GDP, growth rate of population, growth rate of real money supply, growth rate of real domestic credit and growth rate of real broad money”.

Data used for the study ranged differently for each economy. For India, Japan, Korea, Malaysia, Pakistan, Philippines, Sri Lanka and Thailand data used from years (1950-94), (1955-96), (1953-97), (1955-97), (1960-97), (1948- 97), (1950-97) and (1951-97) respectively. Methodologies are, augmented production function estimation with growth rate of variables, unit root tests and the causality tests.

Similarly, different results shown for different regions. The results are strong in Europe and Latin America, where opposite exists in case of sub Saharan Africa, in Valickova, et al. (2015). This analysis is based on 67 studies and 1334 estimates shows the different results on the basis of estimation techniques as the studies with endogeneity shows powerful relation whereas other don't. The results do also vary regarding developed and developing economies, as in developing economies relation doesn't exist or is weak and vice versa for developed economies. The study performs the meta-regression analysis to investigate the effect of financial development on economic growth and found half of the

estimates as positive and statistically significant. However, the literature as a whole show, moderate and positive significant link between the financial development and the economic growth using meta-analysis.

The author concludes The results also varied on the basis of time period as in 1990's the relation became weak, while presently from last decade the results are showing similarity with 1980's, that is, strong link between financial development and economic growth. This analysis on the basis of literature also explains the positive effect of financial development on economic growth varies according to use of measures, that is, effects of growth are high with stock market as measure and low where banking system is the measure. The finance-growth analysis also depends on the control variable included in regression. Such as those studies which control for initial income level, human capital and financial fragility shows great effects. The greater effects of finance on the growth also shown in the studies which tend to use averages of observations across longer periods and those which used longer data samples.

There is no link between the financial development and economic growth for Sri-Lanka in the study of Prera et al. (2009). The study uses the variable of economic growth as broad money stock (M2) to nominal per capita GDP. The study uses the variables like the "ratio of narrow money to nominal per capita GDP, the ratio of broad money to nominal per capita GDP, the ratio of total deposits to nominal per capita GDP, the ratio of private credit to nominal per capita GDP, the ratio of total credit to nominal per capita GDP and the ratio of private credit to total domestic credit" ranged from 1995 to 2005 are used. The econometric methodologies follow the "Johansen Co-integration and Error Correction Model (ECM) techniques". The unit root tests follow the "Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF)".

Besides this, contrary to recent researches Ketteni et al. (2007), find linear relationship between the financial development and economic growth. Stating that when the

non-linearity between per capita income, human capital and economic growth is being accounted for. The results are based on the nonparametric estimation technique.

However, inflation rate, ration of government consumption degree of openness to trade and financial development affect the non-linearity between financial development and growth shows in Jude (2010). Besides this, these variables have the great influence on the relationship of finance-growth. The study is based on panel data of 71 developed and developing countries from 1960 to 2004, by establishing the country-specific and time-specific finance-growth coefficients.

2.1.2 Comparative financial systems

In The literature of financial economics, studies do also try to find the better financial system in the financial development. In this regard Allen and Gale (2001), surveys the comparative financial system for the world economies. The paper mainly focuses on defining the financial system, growth and investment, growth and financial structure, risk sharing, information provision, corporate governance, law politics and finance and financial crisis. On the basis of survey analysis, the study finds different financial systems prevailing in the world. So the paper states that much work is required in this field. Moreover, the prevailing diverse financial system in world economies, that is, formal communist economies transformation in Eastern Europe, the development of the European Union from single economy and the process of emergence of financial markets globalization does also encourages more research in this area.

Similarly, various other studies search for better financial system. These studies study the both financial systems, that is, “bank based and market based” financial systems. As a whole, it is hard to Supports any specific argument. Because of mix results, it is unable to write in favor of any specific financial system. However, few studies do not support this phenomena. In comparison with bank based and market based financial systems, the stock

markets has relatively weak impact. This is because of the less developed stock markets in developing economies. Also the most of the financial system depends on banks in such economies.

Like, Arestis et al. (2001) & Hondroyannis et al. (2004), find that market based financial system has less impact on financial development as compared to bank based financial system. The study of Arestis et al. (2001) is based on the quarterly data of the “banking system development, stock market development and stock market volatility”. The paper does study for the markets of “Germany, United States, Japan, United Kingdom and France”. The results followed by using “vector auto regression (VAR) estimation”, as methodology. In addition, the paper also finds that the stock market volatility effect on the financial development and economic growth. In most cases it is negative and insignificant in few. Contrary to the “volatility in stock prices reflect efficient functioning.” Hypothesis. Whereas, Hondroyannis et al. (2004) follows “value of commercial bank credit to private sector by GDP and stock market indicators include total market capitalization by GDP”, over the period of 1986-99. The econometric methodologies include the “Vector Auto regression (VAR) and the Vector Error Correction Model (VECM)”.

However, the studies also support the role of stock markets for the economic growth. For example, Jahfer and Inoue (2014) shows that the stock market development does effects the economic growth positively and significantly. The study is based on the Johansen Co-integration Technique and Vector Error Correction Model to find the long-run relationship by using data from 1974 to 2011.

The results show that there is long-run equilibrium relationship between the financial developments, stock market development and the economic growth in Japan, that is, the financial development and the stock market development causes the economic growth. However, the economic growth does not cause the financial development and the stock

market development. Azam et al. (2016), also find stock market estimates positive and significant to the economic growth. Moreover, evidence from Omoruyi and Osaretin (2015) and Ogochukwu and Raifu (2017) also show the positive relationship of stock market development with the economic growth.

The approaches of “unit root test, co-integration, error correction mechanism and granger causality” over the period of 1980 to 2011 in Omoruyi and Osaretin (2015). The study uses the variables of “Real Gross Domestic Product (RGDP), Market Capitalization (MCAP), and Turnover Ratio (TR), Total Value of Shares Traded (VLT), and All Shares Index (ASI)”. The results show that the turn over ration influence the economic growth positively and significantly both in short run and long run. While, the value of shares traded and all shares index are significant in short run and also the slope of all shares index observed negative, whereas, the market capitalization influences the economic growth positively and significantly only in the long run.

Furthermore, the results of granger causality show that the economic growth promotes the stock market development but there is evidence that the stock market development causes the economic growth. The long term elasticity estimates of stock market development are only significant for China and Singapore in spite of positive signs for all countries in Azam et al. (2016). Moreover, the FDI has non positive relationship with economic growth only in India and statistically insignificant for China. In short run the stock market development is only significant for India and China, but positive for all. Overall empirical findings shows that stock market development and FDI has impact on the economic growth for the selected economies.

The study follows Time series data of the “variables of stock market, economic growth, inflation and FDI” from the period of 1991 to 2012. For. The results methodology of “autoregressive distributed lag bound testing approach” applied to the four Asian economies,

that is, “Bangladesh, India, China and Singapore”. While, the Ogochukwu and Raifu (2017) follows the data of 13 African countries from year 1990 to 2014 using variables of “market capitalization, value of shares traded and turnover ratio and economic growth” is used. The estimation techniques follow “pooled OLS, fixed effect, random effect, fully modified Ordinary least square (FMOLS), dynamic Ordinary least square (DOLS) and Common correlated effect”. The principle component analysis (PCA) is also used to construct composite index for the indicators of stock market development.

Within, the bank based financial system, Barra et al. (2013), compares the impact of local banks and the cooperative banks. The paper suggests that both the studies both measures has significant impact on GDP Per Capita for Italy. However, the impact of cooperative banks is relatively higher than the local banks. This study analyzes the impact of local banks and cooperative banks by computing profit efficiency through “true fixed effects” models a qualitative measure of financial development. Besides, this the study has also used a quantitative measure as “stochastic Frontier Analysis” (SFA). A panel data ranges from 2001 to 2010 comprising of the variables: “customer loans, commission income, operating income, bank loans, securities and bonds, labor cost, ratio of personal (direct) expenses, cost of physical capital, ratio of administrative expenses, value adjustment to tangible and non-tangible assets, operating expenses over number of branches, cost of financial capital, interest expenses and commission expenses over total liabilities” is used.

2.1.3 Finance and institutions

The financial development and the institutions has been widely discussed in the literature. Various studies has try to investigate the relationship between finance-institutions nexus. Literature studies different type of institutions and established link with the financial development. These institutions discussed in the literature are, legal traditions, Ergungor

(2004) and Chin and Ito (2006). Eryigit (2010) studies, formal and informal institutions which influence the financial development.

Similarly, Calderon et al. (2001), find the linkages with “trust”. The corruption and law & order being discussed by Cherif and Dreger (2014). While Fernandez and Tamayo (2015) categorized the institutions into 1). Legal origin, 2). Colonization strategy and 3). Historical junctures and the role of investment is discussed by Ndkao (2017). The study of Ergungor (2004), states that the legal traditions has positive and significant impact on financial development. However, the impact of common-law traditions is higher than the civil-law traditions. Moreover, the common-law courts enforce laws and regulations more efficiently and it boosts the stock markets and also the bank development is more in common-law countries than in civil-law countries.

The analysis is based on 46 countries out of which 28 follows civil law and 18 from common law traditions, ranging data from 1960 to 1995. The indicators are markets, banks, creditors, enforcement, shareholders right and institutions. The results based on the Ordinary Least Square (OLS). Specifically, “the civil-law financial systems are bank oriented than common-law”. Similarly, Chin and Ito (2006) state the development of legal system and institutions is necessary for the development of other system. Whereas, contribution of financial openness to the equity market development is secondary to legal system development. Moreover, financial development through stock market depends upon the capital account openness in both cases, that is, individually and interaction with the legal development level.

The study is based on using the variables of financial development, legal and institutional development comprising of 108 countries panel data from 1980 to 2000. By investigating the nexus between capital account liberalization and financial development. Stating the importance of formal and informal institutions, Eryigit (2010) reviews the

literature of financial development and institutions. The paper concludes that historical and political characteristics related to the institutional structure of the countries effects the variety of institution's impact on the financial development. The institutional differences are determined on the basis of developed and underdeveloped financial markets.

So the author suggests that this issue should be considered by taking up the changes in institutional structure over the time in any country. The study is based on empirical literature of formal and informal institutions in a cross-country analysis. These institutions are law system, trade openness, and trust, social capital and political groups. Another study Calderon et al. (2001), try to find the link of "trust" with the structure and development of financial system. The study finds that "trust" has correlation with financial depth, efficiency and development of stock market conditional to incorporating the development level of country, macroeconomic stability and rule of law. Moreover, "rule of law" enables the "trust" to have more impact on financial depth and structure.

The analysis is based on 48 countries data from year 1980 to 1990. The variables used for the study are "size and activity of financial intermediaries, efficiency of commercial banks and stock and bond market development" as indicators of the financial development. These indicators comprise of "liquid liabilities, size of banks to assets ratio to GDP, ratio of credit from deposit banks to GDP and ratio of economy wise credit to GDP". Net interest margin and bank's overhead cost are the measure of efficiency. Stock and bond market development variables are "stock market capitalization and stock market total value traded". Besides this economic growth variable are initial GDP per capita, human capital, inflation rule of law and law origin. The results based on Ordinary Least Square (OLS).

The better law enforcement policies and anti-corruption measures are suggested by Cherif and Dreger (2014). For the development of the banking system and the stock market institutional conditions are important. However, the impact of corruption and law & order for

stock market and openness to foreign trade for overall financial sector is most relevant. Whereas, the per capita income and inflation are not much important for the financial sector development. The panel econometric technique is applied for the countries of Middle East and North Africa using data from 1990 to 2007.

There are four types of institutions: property rights, enforcement of contracts, macro and financial stability and informal institutions defined by Fernandez and Tamayo (2015). The paper conclude that these institutions play an important role for the financial development and economic growth. The study finds these institutes as the root cause of economic growth through the financial development. The level of financial development is related with the health of these institutions as they can cause the imperfection in financial development if they do not perform well. The paper suggest three broader categories 1). Legal origin, 2). Colonization strategy and 3). Historical junctures, which are the root of these institutions.

On the basis of above discussion, it can conclude that the institutions are important for financial development. These institutions act as an important role in shaping of the financial structure. Besides, these institutions discussed above, the investment does also effects the financial development and the economic growth. As Ndkao (2017), show that investment is key channel of economic growth through the financial development. Studying for the economy of Nigeria, the paper suggests that all the developing economies should follow policies which promotes the investment. Moreover, Nigeria should promote domestic and foreign investment with an appropriate environment of financial development and economic growth.

The study uses the annual data from 1960-2014 for the variables of “Gross Domestic Per Capita (GDP), Investment (INV), Financial Development represented by Domestic Credit to Private Sector (DCP) and Brad Money (LM2)”. The econometric specifications are unit

root test, rank test with endogenous structural breaks, “Augmented Dicky-Fuller, (ADF) and Dicky-Fuller GLS (DF-GLS), Zivot and Andrews (ZA) unit root test”. The standard Vector Auto regression (VAR) is also applied in the study.

2.2 Institutions and Economic Growth

The other strand of research is the institutions-growth nexus. The line of research is initiated by Douglas North. Then this is popularized by Jones (1995), Barro (1995) and Acemoglu et al (2001) among many others. There is near to consensus that the institutions, most of the time, add in the economic activities of the economies with some exceptions. Sometimes the researchers note that the institutions work as a sand the wheel mostly in the case of corruptions. However, generally it is believed that the institutions have a positive role over a longer period of time.

There literature on economic growth and institutions is categorized into two parts. One, explaining the direct link between the institutions and the economic growth, that is, relationship between institutions and economic growth. Second, explains those studies which indirectly influence the economic growth, that is, role of institutions in economic growth.

2.2.1 Relationship between institutions and economic growth

There are several studies which state the importance of institutions for the economic growth. These studies show that the institutions play a key role for the economic growth and the development. A theoretical framework. Emphasizing the role of institutions, that is, Institutional Political Economy (IPE), introduced by Chang (1994). The author discusses the view point of neo-liberals. Study criticize the view in role of state as it is contradictory to the neo classical economics and Libertarian-Austrian political philosophy. Moreover, it explains that neo-Liberal view point is history biased of capitalism and the globalization.

IPE is introduced by the study as an alternative to this dominated view point. IPE, is a new debate which explains the role of institutions and politics in the economic development. Similarly, property right institutions are find to be more important for economic growth by Knack and Keefer (1995). As compare to liberty, frequencies of regulations and coups and political assassinations. The study focuses on the property right and contract enforceability institutions as important for the economic growth.

The study analyzes the five countries using data from 1960 to 1988. The data is taken from “International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI)”. For the variables consisting of “corruption, political instability, and bureaucratic quality, real GDP per capita as measure of growth, the measures of property rights, contract enforceability and risk of expropriation”.

Moreover, the political institutions are viewed as the source of long run economic growth by Glaeser et al. (2004) and Acemoglu, et al. (2005). The studies explain that these institutions have much importance to the economic growth. For example, Glaeser et al. (2004), state that the difference among the levels of income among the countries is due to the institutional performances. Poor countries are less developed due to week institutions. Similarly, the better performance of the institutions led the economies to become developed. The paper also suggests the poor economies to make better policies to get out of poverty. By making strong political institution, they can get rid of poverty. Furthermore, it emphasizes on the quality of human capital prior to the political institutions. Quality human capital with regularized institutions can perform better.

The study uses the various construct of authority levels as the measure of authority along with the executive parity, democracy, autocracy, expropriation risk, government effectiveness, judicial independence, constitutional review, plurality, years of schooling and GDP per capita in their study. Based on OLS estimation technique. Similarly, the change in

the performance of these institutions is due to the change in political powers, also these institutions are the cause of fundamental long run growth conclude by Acemoglu, et al. (2005). They cause the economic growth to effect positively when these political institutions allocate resources efficiently and effectively.

The paper focuses on empirical and theoretical work mainly on the division of Korea into two parts on the basis of differences in the economic institutions, that is, “quasi-natural experiments” and colonization of many areas of the world by the European powers since fifteenth century. As the economic institutions plays role in determining the incentives and constraints on the economic actors and also causes the economic outcomes. So, due to this fundamental cause the economic institutions differ across the country as shown in the paper. Moreover, the authors describe that the institutions are shaped in favor of the strong political power group as there are conflicts between different groups as they benefit from the institutions differently.

The institutional structure matters a lot for the development of financial sector and the economic growth. The studies find low income countries have less developed financial sector and low growth rate. This is due to the week institutional structure e.g. Law (2006).

The study uses the 72 middle and low income economies for the analysis. The econometric methodologies applied on the data from year 1978 to 2000, comprising on the variables of finance, institutions and the economic development. According to the results the study find that financial development has more effects on GDP per capita where the quality of the financial system is better with a developed institutional framework. Moreover, the results reveal that strong financial development exists in middle-income countries due high quality of institutions. Paper states that without making healthy institutional framework more finance cannot effect the long run economic growth.

2.2.2 Role of institutions in economic growth

The literature does also links the institutions with the economic growth indirectly. The above discussed studies directly linked the institutions with the economic growth. This section discuss the studies which links the importance of institutions to the economic growth through indirect channels.

For example, studying the importance of institutions for the firms which ultimately leads to the economic growth. Similarly, the property rights institutions are viewed in another way by Johnson et al. (2002). The study views the importance of property right institutions for the firm level. The paper states that the countries where these property right institutions are strong, the profitability of the firms is better. Moreover, firms in countries with better rules and regulation, are willing to reinvest their profits and vice versa.

The study links the performances and quality of doing private business with the quality of these institutions. The study shows that property rights security effects the firm's investment as it is shown in both the firm level and cross-country analysis. The reinvestment rate is low where the property rights are not secured, bribe culture for the government services and the licenses, courts are least effective and the firms has to pay for such protections at 32 percent in Russia and Ukraine. While the reinvestment rate is relatively high with 56 percent in the countries with better property right conditions like Poland and Romania. Despite the demand for external finance and available collateral against bank loans there is not much investment in the countries where the property rights are not secured. The study is based on the private manufacturing firms of Russia, Ukraine, Poland, Slovakia and Romania.

Moreover, the importance of the institutions over the geography and integration viewed by Subramanian (2004). The study find that the institutions has the supremacy role over the geography and trade. It states that once the institutions have been controlled then the

geography have best weak direct effect on the income level. Similarly, the trade is also insignificant and has negative sign for income level after getting institutions “controlled”.

The study estimates the contribution of institutions, geography and trade in income level using the recent developed instrumental variables following the methodology of OLS. As discuss earlier, the change in income levels is due to the change in institutional structure. The above mentioned studies clearly, state the importance of institutions for the economic growth. It’s been seen that changes in institutions effects the growth. Similarly, another study Arkadie and Mallon (2008), investigate this change for the business development. The effects of institutional change on business development for Viet Nam are viewed by the author.

It is found that there is a rapid increase in productivity which cause increase in output and exports in spite of the dominance of state enterprises in these industries. The paper studies the process of change due to the interaction of formal and informal development institutions. The authors focused on identifying the key actors in the business sector during reform process, by examining the institution and law in business and economic development, by providing an overview of institutional reform process in the country, international perspective on state enterprises reform and business development, overview of state enterprise reform in the country, state and non-state business development since *doi moi*² and industrial output from 1995 to 2000 and implication of private business development and state enterprise reforms. The paper concluded as the key actor in business activities for the countries during reform process are farmers and other household business, cooperative, state enterprises, domestic private enterprises and business involving foreign investment.

The key practical role of these institutions can be described as following: “property rights and contract enforcement” are established in subject to act as a reliable arbitrator and intermediary for the protection of any two parties’ rights. If they don’t perform well then the

² Economic reforms started in Vietnam in 1986, for “socialist oriented market economy”.

issues arises and these may involve in moral hazards like: benefiting a specific elite and costly enforcement of contracts. Moreover these institutions are important for economic policy and financial development as: in establishing policies related to macroeconomics and financial development, policies regarding regulations, financial openness and competition. The study does also shows that how the growth can be effected through the different institutional arrangements to reduce transaction cost and effects of asymmetric information like: “financial constraints, imperfect risk-sharing, liquidity shortages and market discipline”.

On the basis of the empirical studies the author concludes that the important key institutions are property rights in financial contracting and implementation of macroeconomic and financial policies. The author does also suggests that further studies can be carried out on the availability of better data and econometric techniques for establishing the relation among institutions, financial development and the economic growth as: the model requires to be improved upon empirical studies, regarding Lucas critique, that endogenous variable appears as restriction free function of exogenous or fixed variables.

Another study, while investigating the rural markets and institutions for China. States the reasons behind the low performances of the rural markets. As mentioned by Cheng (2012), the reasons are moral hazards like difference in lending rates for rural and urban areas. The author study the role of formal and informal rural financial institutions and the reasons for mid-1990's crises and low rural development in china, caused by the low growth rate of farmer's income and increased in difference of income level between both areas (rural & urban) . The study found the reasons for decline in institutional credit supply in rural china as: deterioration in loan quality, distortion in financial prices, and lack of competition in rural financial markets, ownership structure problem and corporate governance problem of rural financial institutions.

On the basis of the microfinance movement in china for testing lending methodologies and sustainable lending interest the paper has concluded: the poor in many areas of china are bankable, the current lending rate as regulated by “People’s Bank of China” are far below the sustainable rate for the operations of rural financial institution in many areas of china and the mechanisms of microfinance, such as group guarantee, dynamic incentives and the targeting of women, help loan repayment in rural areas of china.

However the government initiated reforms have focused on institutional changes as: the separation of “Agriculture Development Bank of China” and cooperatives for rural credit from Agriculture Bank of China, commercialization of ABC, relaxing the state control over lending rates and incentives for lending to rural cooperatives. Resolving the problems associated with moral hazards for rural credit cooperatives, low lending rate and low margins for the operations of rural financial institutions, the separation of management from monitoring and supervisions of rural credit cooperatives and historical burdens for rural credit cooperative.

Furthermore, in other studies the importance of institutions is explained.as Oluwatobi et al. (2015), state that the institutions do matter for the innovation in Africa. Similarly, Perry and Garcia (2016) find the role of multilateral development institutions for the development strategies of Latin America. In Oluwatobi et al. (2015), the innovation causes the economic development, the enabling factors for institutions are being examined in the paper. It finds that the rate of innovation is affected by the control of corruption, government effectiveness and improvement in quality of institutions leading to the improvement in the economic growth. The two institutions government effectiveness and the regularity quality effects the innovation positively and it should be adopted as policy to make these institutions better for the countries of Africa.

The study is conducted using the variables of GDP, FDI and per capita income for the 40 African countries over the time period of 1996 to 2012. Using the system generalized method of moment (SGMM) estimation technique. Whereas, Perry and Garcia (2016) show that how the influence of such MDIs like World Bank and IMF (international monetary fund) has been changed over the time since 1980.

This change in influence explained by the author is associated with “the access to international private capital markets, the long term development of domestic currency markets for government bonds and the regional substantial reduction of macro-financial vulnerabilities”. The study using the macroeconomic variables concluded that the influence of MDIs has evolved much over the time due to the orthodox macroeconomic policies adopted by the regional countries and the above stated strategies. And the degree of influence of these MDIs has varied with the development and cycle of international private financial markets and individual countries access to them along with other factors. Such that the influence was at its highest during the Latin American debt crises I 1980’s, and significantly declined in early 1990’s, after 1998 the Russian crisis’s impact capital flow reversal in the region and during recent global financial crisis in 2009. It is expected to increase the influence due to currently lower term of trade and capital inflow environment.

2.3 Adaptive Efficiency, Financial Development and Economic Growth

The third line of research is the role of adaptive efficiency in enhancing the impact of the financial development. This strand of research is based on the *Northian* perspective of institutions-growth nexus. It has already discussed that North (1990), North (1994) and North (2005) document that the economic performance of the countries explicitly depends on the adaptive efficiency of the institutions. More specifically, he does not believe in a single institution. But, he argues that the economic performance is an outcome of efficiency of

institutional matrix. In simple words, the adaptive efficiency is a capability of society to create the productive and fair institutions. More importantly, this matrix of institutions should be able to absorb the negative or positive exogenous shocks to the society or economy. North (2005) notes that it is a wrong postulation that only the best institutions can survive or only the best institutions can serve the economy.

This concept of adaptive efficiency is rarely researched in the literature of financial development and economic growth. We can see only few papers in this way. Ma and Jalil (2008) study and compare the “financial development, economic growth and adaptive efficiency” for the countries of China and Pakistan. The study tries to explore the assumption that GDP growth rate depends on financial development using the “autoregressive distributed lag model”. The results concluded that the set hypothesis cannot be rejected, however there is a negative link between economic growth and private sector credit for china. The study does also explain that the china’s high growth is due to adoptive efficiency rather than the allocative efficiency.

Yu and Zhang (2008) aimed to study the contracts and contractual enforcement role in view of adaptive efficiency and financial development for China. The author claims that both the formal and informal contracts play an important role for economic development in china. The paper is in a view the arrangement followed by the economic actors is as initially they focus on self-enforcing and informal contractual arrangements and then on formal arrangements. They concluded that as long the economic development become more advance, the formal contractual process will also become more important and the legal development process in china is consistent to the theme of “adaptive efficiency”.

Conclusion

Since the literature has provided the linkages in the “financial development and economic growth nexus” and the significance of role of institutions has also been widely

discussed. But there is not clearly mentioned the empirical role of adaptive efficiency regarding the magnitude and type of institutional role in the “financial development and economic growth”. The role and impact of performance of all three types of institutions stated above (, that is, governance, business and regulatory) is yet not discussed in the literature. So this study is aimed to investigate role of adaptive efficiency in the financial development and economic growth nexus. It also empirically studies the “financial development and the economic growth”.

Chapter: 3

Theoretical Framework

This study is going to examine the *Northain* perspective of economic growth. That is the role of adaptive efficiency to enhance the growth activities in the economies. Specifically, we shall concentrate on the role of adaptive efficiency on the linkages for the “financial development and the economic growth”. This research is very relevant because there is a new surge, in the backdrop of financial recession of 2008, in the literature on the discussion of financial sector development. This is plethora of research on the financial sector development and the economic growth. However, the role of adaptive efficiency is completely missing in this nexus.

Levine (1997) explains how the financial development or the financial system are important to the economic growth. Specifically, financial system tries to “facilitate the trading, hedging, diversifying and pooling of risks, to allocate resources, to monitor managers and exert corporate control, to mobilize savings and to facilitate the exchange of goods and services”. Moreover, on the basis of empirical analysis of various studies comprising of “firm level, industry level, and individual countries and cross country comparisons, a strong positive relationship between functioning of the financial system and the long run economic growth has been established”.

Furthermore, the structure of financial system and the quality of financial services does also influence the non-financial developments. For example, “changes in telecommunications, computers, non-financial sector policies, institutions and economic growth”. Furthermore, Merton (1992) notes that technological improvements reduces transaction costs and affects financial arrangements. In addition to this, “monetary and fiscal policies affects the taxation of financial intermediaries and the provision of financial services (Bencivenga and Smith 1992; and Roubini and Sala-i- Martin 1995). Legal system also

affects financial system (LaPorta et. al 1996)”. Similarly, political changes and national institutions critically influence the financial development (Haber 1991, 1996). Economic growth changes the inclination of savers and investors to pay the cost related with participating in financial system (Greenwood and Jovanovich 1990).

We postulate that the well-functioning financial system has a positive influence on the economic growth of the economies. This well-functioning system can be generated through the financial reforms. These reforms have a proper justification because of lot of countries have introduced the reforms over the past three decades. It is evident from the figure 3.1 that the reform can enhance the financial sector depth and change the structure of the financial structure.

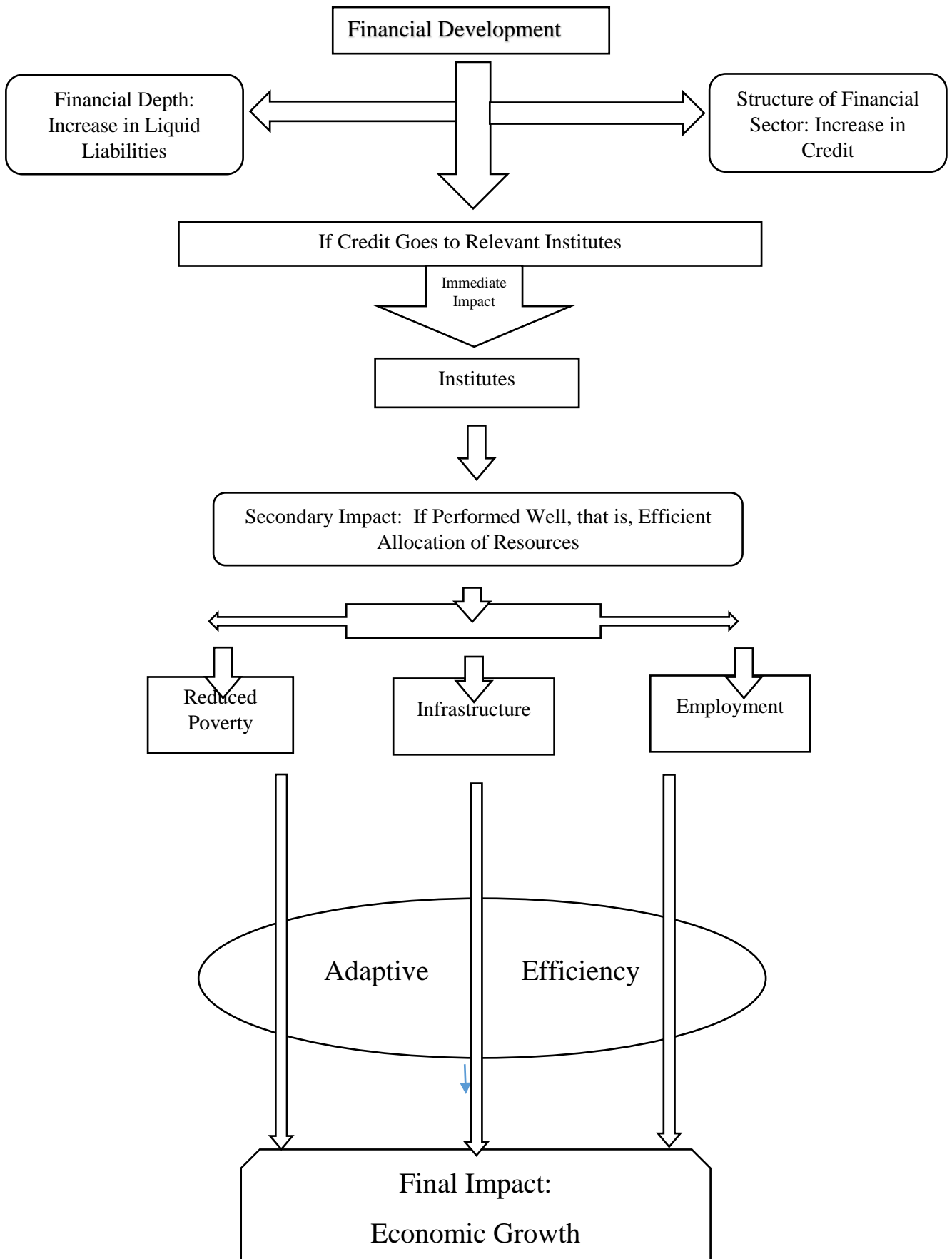
Before moving on, it is important to mention here that the any exogenous policy in the financial sector may affect the sector in three ways. First, it can change the depth of the financial sector, second it can affect the structure of the financial sector and third the efficiency of the financial sector may be affected. The depth of financial sector means that the people will approach to financial sector for the supply of funds. That is, the deposits or the liquid liabilities will be increased in the sector. The structure of the financial sector implies that the change in the demand of the funds. More clearly, the demand of funds, that is the credit, will move from public sector to private sector. The efficiency means the cost of transactions, the net interest margins, of the financial sector. In this study, we shall concentrate on the depth and the structure of the financial sector.

We argue that that the exogenous shocks, for example the reforms, will directly affect the depth and the structure financial sector. Let us take the case of structure of the financial sector. There are various possibilities. The credit may directly go to the private sector or the partially goes to the state owned enterprises. This credit to state owned enterprise may enhance the working of institutes to facilitate the general public. No matter the state owned

enterprises are making profits or not. North (2005) explicitly rejects the idea that only the profit making institutes will survive. He as the view that society depends on the matrix of the institutes. Therefore, these state owned enterprise may reflect in the positive impacts on the countries. For example, it may reduce the poverty, to enhance the infrastructure or/and to enhance the level of employment. Ultimately, all these things will promote the role of institutions in the economic activities of the countries. This is known as the adaptive efficiency. It is evident from the figure that the financial reform has an impact on the economic growth through the institutions. We argue that if a considerable share of the credit to government or state owned enterprises then it will enhance the efficiency of the institutions over the time.

3.1 Framework for Using Adaptive Efficiency

Figure: 3.1



3.2 Econometric Specification

In this study, starting right from the financial development to ultimate economic growth target, the channel of adaptive efficiency follows a specific flow. Such that in the given model the economic growth depends upon the financial development and institutions, individually and collectively. Moreover, a very important role of institutions is established theoretically in this study, stating that the role of the institutions is necessary along with the financial development for the economic growth and this process is named as “adaptive efficiency”.

There is no surprise in claiming that a good chunk of credit goes into the government sector and state owned enterprises, especially for developing economies case. Most of the times this the rate of NPLs remain high in the case of the SOEs loans. However, over the time these state owned enterprises get efficiency and become a source of the growth and other social outcome of the economy. Therefore, we are arguing that the efficiency, which is acquired over the time, will enhance the impact of financial development on the economic growth. In this backdrop, we shall specify the following equation:

$$y_{it} = \beta_0 + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + u_{it} \quad 3.1$$

Where

y is the GDP per capita, fd is financial development, ae is the measure of adaptive efficiency, z is the vector of other control variables, u is the Guaussian error and it is the subscript for cross section and time series.

3.3 Econometric Methodology

The study is based on the panel data. The panel data is the “combination of cross section and time series data”. Panel data gives more information, less collinearity, more degree of freedom and more efficiency. Furthermore, we may take the benefits of measuring the cross sectional heterogeneity across the times and cross sectionals. The recent developments enable us to study more complicated models and is better suited for studying the dynamics of change. There are several estimation methodologies which are used to estimate the panel data sets. Generally, they are bifurcated into static panel data methods and dynamic panel methods. We shall narrate, in the following lines, both of these methodologies in a bit details.

Static Panel Methods

There are two major techniques are discussed in this category. That is “Fixed Effect Models (FEM) and Random Effect Models (REM)”.

3.3.1 Fixed effect models (FEM)

The FEM is applied where the issue of association between the individual-specific intercept and the other regressors- may arise. Fixed effect model solves the problem of intercept heterogeneity by using the fixed dummies. Furthermore, there are two another ways of estimation using FEM, that is, One is least square dummy variable model (LSDV) used where intercept is different among different individuals in order to have unique feature of individual units in regression model. The other way is within-group (WG) estimators, resolving the problems of degree of freedom and the mean-corrected variable wipe out time-in-variant variables that exists in LSDV. The said method is used by subtracting the mean values of regressors and regressand from their individual values and regressing on the mean-corrected variables.

The fixed effect model solves the problem of intercept heterogeneity, through fixed dummies.

Given specific model from equation: 3.1 is,

$$y_{it} = \beta_0 + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + u_{it} \quad 3.2$$

$$i = 1, 2, 3, \dots, n$$

$$t = 1, 2, 3, \dots, T$$

$$y_{it} = \beta_0 + \alpha_i D_i + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + \mu_{it} \quad 3.3$$

The impact of differences among all cross sectional units is explained by a specific dummy variable. Where the dummy variables has been given to each and every particular unit.

3.3.2 Random effect models (REM)

A general criticism on the fixed effect model is that it involves large number of parameters with a large cross section set, in order to capture individual specific effect using fixed dummies. “Due to this, problem of loss of degree of freedom occurs. The intercept term in random effect model expresses time variant dummy variables”.

The REM is appropriate to use where the regressors are uncorrelated with the intercept of each cross-sectional units. As in REM the intercept values of individual units are drawn from a much larger population with a constant mean. Where the means of each individual are considered as the deviations from the constant mean. In REM it is possible to have time invariant regressors which are not possible in FEM because of the problem of “collinearity” of these variables with the subject-specific intercept.

As the fixed effect model presents the individual specific effect, due to which, it involves a large number of parameters with large set of cross sections. Due to this issue, a criticism on fixed effect model is that, the major loss of degree of freedom occurs. So, to cover the issue of country's effect, dummy variables are introduced in this regard. Therefore, this effect must be articulate in error term.

Now the model follows following form:

$$y_{it} = \alpha_{1i} + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + \mu_{it} \quad 3.4$$

In the above equation, “the intercept term in random effect model (REM), states the time variant dummy variables”, the intercept value for an individual country would be as follow:

$$\alpha_{1i} = \alpha_1 + \varepsilon_i \quad 3.5$$

Where, ε_i is the part of “disturbance term”, which is random and observable, and μ_{it} is residual part of this error term.

Model would be as follow:

$$y_{it} = \alpha_{1i} + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + \varepsilon_i + \mu_{it} \quad 3.6$$

as

$$v_{it} = \varepsilon_i + \mu_{it} \quad 3.7$$

Hence,

$$y_{it} = \alpha_{1i} + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + v_{it} \quad 3.8$$

μ_{it} Is the “disturbance term”. It combines the impact of time series and cross sectional series, where, v_{it} is that error term which combines the effects of ε_i a particular effect of cross sectional and time series.

3.3.3 Choice among fixed effect model and random effect model through “Hausman Test”

The literature has mentioned various criteria's, for the selection of “fixed effect model and random effect model”. Various studies mentioned the reasons and purpose of the selection of these models. Also literature provides empirical evidences in this regard. However, this study follows the Hausman (1978), statistical test for the selection between both models. This statistical test is advantageous over any other judgmental criteria. It is useful to test the endogeneity, (which occurs because of the correlation between error term's components and explanatory variables), for the selection between “fixed effect and random effect models”.

Let, Following is the fixed effect model:

$$y_{it} = \beta_0 + \alpha_i D_i + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + \mu_{it} \quad 3.9$$

And, random effect model:

$$y_{it} = (\alpha_i + \varepsilon_i) + \beta_1 fd_{it} + \beta_2 ae_{it} + \beta_3 fd_{it} * ae_{it} + \beta_4 z_{it} + \varepsilon_i + \mu_{it} \quad 3.10$$

The cross sectional effects are combined with the error term in case of estimation through Random Effect Model (REM). So, whenever these cross sectional effects correlate with the explanatory variables, the estimators of parameters will show biased results. However, these components of error terms are constant and does not vary with the time In case of fixed effect model (FEM). So, such biasness will not occur because of the error term component which is unobservable, while through fixed effect models.

Following this judgmental criteria, the estimators of Random Effect Model (REM), are not acceptable. Because of the correlation between estimators of parameters and individual specific effect which is unobserved. Whereas, the Fixed Effect Model (FEM) is acceptable. Because, the results are consistent when estimating through fixed effect model.

The Hausman statistical test for the selection of “fixed effect” and “random effect” models follows the following equation:

$$w = (\tilde{\beta}_{FEM} - \tilde{\beta}_{REM})' [v(\tilde{\beta}_{FEM}) - v(\tilde{\beta}_{REM})]^{-1} (\tilde{\beta}_{FEM} - \tilde{\beta}_{REM}) \approx \chi^2 \quad 3.11$$

The above equation compares both models and statistically check to explain the better model. The selection criteria follows model with more consistent results and statistical approach of Chi-Square. χ^2 .

Dynamic panel method:

Since using panel data estimations there may arise the problem of “endogeneity”, that is, the endogenous variable may correlate with the independent variables. As in current model there also exists the problem of endogeneity according to the literature. As Levine (1997) states that the financial development causes the economic growth, while another school of thought opposite to it, that is, Robinson (1952) concludes that economic growth causes the financial development.

Where for the other independent variable, that is, “institutions” Jung and Moon (2013) states that it is not possible to conclude whether the “better” institutions can cause economic growth or the economic growth causes the “better” institutions. On the basis of which the current model may have the issue of endogeneity. The static methods are not recommended for this solution. As both “fixed effect models (FEM) and random effect models (REM)” are not suitable in such situation. Since their estimates are not true representative of parameters. For this solution taking first difference of error term and applying instrumental variable technique is recommended by Anderson and Hsiao (1981). Through this way consistent and unbiased estimated results can be obtained. Whereas, Arellano and Bond (1991), criticize it in a way that estimates obtained cannot be efficient because the all the existing moment are not included in these methodology.

Arellano-Bond (1991) estimation technique solves this problem of unreliable results, for the estimation of dynamic panel models. so in order to cope up with this issue. It gives solution by presenting more reliable and stable technique which depends on the “Generalized Methods of Moments (GMM)”. The GMM estimation considers all the available moments

3.3.4 Arellano-bond GMM estimator

In our model, there arises the problem of several endogenous variables on the independent side. On the dependent side, the economic growth is determine and determined by the independent side variables. As, mentioned in the theoretical framework section, the economic growth may affect or may get effected by the financial development at the same time. However, a problem while estimating the original model through fixed effect model or the random effect model, assumes that independent variables are exogenous. Hence, for solving this model, the Ordinary Least Square (OLS), methodology is not appropriate and both the “fixed effect model and random effect model” are not suitable in this situation. Because their result estimates are not good representation of the parameters, as a solution to this problem, researchers recommend the “Instrumental Variable Technique”.

Moreover, the dependent side variable, that is, Economic Growth, may also depend on its lag value. But the fixed effect model (FEM), does not incorporate the lag value of dependent variable as explanatory variable, because incorporation of lag of dependent variable as independent variables makes the model more complex. So, this lag of dependent variable correlates with the error term when fixed effect model is applied, also it assumes the time invariant property, which is practically seems to be inappropriate.

Also, the biased results will occur while estimating through fixed effect model, in specific condition that “number of cross sectional units exceeds number of time periods”.

The problem of inconsistent results in estimation of dynamic panel models is solved by the Arellano-Bond estimation technique. The dynamic panel data model will take following form:

$$y_{it} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 fd_{it} + \beta_3 ae_{it} + \beta_4 fd_{it} * ae_{it} + \beta_5 z_{it} + \varepsilon_i + \mu_{it} \quad 3.12$$

Here, $y_{i,t-1}$ represents the history of dependent variable, a lagged term of dependent variable.

In such case, the estimates of Ordinary Least Square (OLS), would be biased and inconsistent due to the presence of dependent lagged term which is also a function of error term. However, the result estimates of fixed effect model would be consistent but biased when T tends to infinity. Even though the fixed effects can be removed through any alteration or modification but, in spite of that the error's random component by default will correlate with the lagged dependent variable. Similarly, the estimated results of random effect model (REM), would also be biased because of correlation between lagged dependent and error terms.

Anderson and Hsiao (1981) states that, the consistent and unbiased result estimates can be obtained by taking first difference for the elimination of μ_{it} and at the same time by applying the instrumental variable technique. While, the Arellano and Bond (1991), critiques that such result estimates cannot be efficient, because the methodology applied doesn't incorporate all the existing moments. So, the Arellano and Bond (1991), gives the solution to this problem by introducing the Generalized Methods of Moments (GMM) estimation technique, which is more reliable and consistent. It takes all available moments into the consideration.

GMM estimators take all the past information of dependent variables into consideration and it removes individual effect by taking first difference.

The y_{it} would be the additional instrumental in this case:

$$y_{it} = \beta_0 + \beta_1 y_{i,t-1} + \mu_{it} \quad 3.13$$

And

$$\mu_{it} = \varepsilon_i + v_{it}$$

Individual effect will remove by taking first difference

$$y_{it} - y_{i,t-1} = \beta_1 (y_{i,t-2} - y_{i,t-3}) + (v_{it} - v_{i,t-1}) \quad 3.14$$

And

$$y_{i3} - y_{i2} = \beta_1 (y_{i2} - y_{i1}) + (v_{i3} - v_{i2}) \quad 3.15$$

Here, the y_{i1} is the valid instrument as it does not show correlation with error term $(v_{i3} - v_{i2})$ and perfectly correlates with $(y_{i2} - y_{i1})$.

Same pattern follows:

$$y_{i4} - y_{i3} = \beta_1 (y_{i3} - y_{i2}) + (v_{i4} - v_{i3}) \quad 3.16$$

y_{i1} And y_{i2} represents valid instruments, so on for time period t.

$$\{y_{i1}, \dots, (y_{i,t-2})\}$$

So, the matrix of instruments can be written as:

$$W_i = \left\{ \begin{array}{cccc} [y_{i1}] & 0 & \cdot & \cdot & 0 \\ 0 & [y_{i1}, y_{i1}] & 0 & \cdot & \vdots \\ \vdots & 0 & \cdot & \cdot & \vdots \\ \vdots & \cdot & \cdot & \cdot & \vdots \\ 0 & \cdot & \cdot & \cdot & [y_{i1}, \dots, (y_{i,t-2})] \end{array} \right\} \quad 3.17$$

The variance-covariance matrix of error term is considered as follow, because the difference of error term is still not accounted for:

$$E[\Delta v_i \Delta v_i'] = \sigma_v^2 (I_N, M)$$

Here,

$$M = \left\{ \begin{array}{ccccc} 2 & -1 & 0 & : & 0 \\ -1 & 2 & -1 & . & 0 \\ : & -1 & . & . & : \\ : & . & -1 & 2 & -1 \\ 0 & . & . & -1 & 2 \end{array} \right\} \quad 3.18$$

$$E[W_i' \Delta v_i] = 0$$

This is the moment condition, stating the link among instrument and the error term. So, one step estimator of Arellano-Bond would be as following:

$$\hat{\delta}_1 = \left[(\Delta y_{-1})' W (W'(I_N \otimes M)W)^{-1} W' (\Delta y_{-1}) \right]^{-1} \times \left[(\Delta y_{-1})' W (W'(I_N \otimes M)W)^{-1} W' (\Delta y_{-1}) \right] \quad 3.19$$

“When there are exogenous independent variables present, then these elements must be incorporated in each element at diagonal place of W_i ”.

Generalized methods of moments is the general estimation process or principle that allows to relax some unnecessary assumptions. The advantage of using the GMM estimation technique is that, it does not require a specific statistical specifications to estimate an econometric model. Rather, it starts with the specific moment conditions or restrictions which depends on the data and the parameter vector which is unknown and to be estimated for that specific econometric model. It follows the specific moment conditions depending upon the model parameters where the expectations are zero. The GMM estimation method is appropriate for solving the problem of endogeneity by using the “instrumental variables”. The GMM handles this problem by using the instrumental variables in replacement of those independent variables that may have the said problem.

The Generalized Methods of Moment (GMM), estimation technique developed by “Lars Peter Hansen” in 1982, which was introduced in 1892 by “Karl Pearson”.

3.3.5 Validity of instruments

For a valid instrument, it is necessary to have zero correlation with the error term, and the correlation with explanatory variable, must not be zero. This condition is necessary in all techniques and in the absence of this condition any instrumental variable selected is not valid. Moreover, any instrumental variable without these qualities will give biased results in estimation. The literature has provided different test to check the validity and strength of the instrumental variables. However, the most prominent test used in the econometrics is Sargan (1958). The test statistics are considered as better with higher p-value or acceptance of null hypothesis, that is, the instruments considered as group are exogenous in nature and do not correlate with the error term. Same null hypothesis is also established in Hansen test and J-test. It is essential that there should not presence of heteroscedasticity and autocorrelation in the model, because all instrumental variables will be redundant and unnecessary in presence of autocorrelation. The over identifying restrictions are imposed by these tests on Arellano-Bond estimators, which is consistent robust error estimator.

As, in dynamic models the first order autocorrelation can be controlled by the inclusion of lagged dependent term on the independent side. But, the second order autocorrelation requires extra care in whole process of estimation. However, the “Arellano and Bond (1991)”, follows the null hypothesis of “no autocorrelation”, in autocorrelation test. This test of second order autocorrelation evaluates it in levels, by incorporating differences among error terms.

Chapter 4

Data and Construction of Variables

4.1 The Construction of Variable

There are four major categories of variables here. First, the economic growth, second financial development, third the adaptive efficiency and fourth some control variables. We shall follow the literature for constructing the first two variables. However, the variable of adaptive efficiency is the innovation of the present study. We don't have the literature to follow in this regard. Therefore, we are relying on the intuition in this regard.

4.1.1 Economic growth

There are various measures to gauge the economic growth or the economic activities in an economy. The economic growth can be measured through different proxies. As Real Gross Domestic Product followed by Chan et al. (1990) and Hussein (1996). Halicioglu (2007), measures through per Capita real Income. However, this study measures the economic growth through Per Capita GDP as Current US Dollars. "The economic growth is the dependent variable in the model". The data of economic growth is taken in current US dollars from the World Development Indicators (WDI). The data period ranged from year 1996 to 2017.

4.1.2 Financial Development

The financial development is being used as the independent variable which is subject to alter the economic growth along with the other independent variables. The financial development is defined as combination of financial depth and structure of financial sector. By financial depth, we mean the increase in liquid liability. An increase in demand deposits, enhances the financial depth. Similarly, improvement in structure of financial sector is linked

with the “increase in credit. Both of these measures collectively defines the level of financial development in an economy.

The financial development can be measured through the proxies as credit to private sector and M2 to GDP ratio by Levine (1997, 1999), Beck and Levine (2004) etc. various other studies uses the variables of financial development as: “liquid liability to GDP (%), central bank assets to GDP (%), private sector credit by deposit money banks to GDP (%), private credit by deposit money banks and other financial institutions to GDP (%) and net interest margin (%)”.

However, this study has used the “private sector credit by deposit money banks to GDP (%)” as the measure of the financial development. The selection financial development a follow the study of similar literature e.g. Levine (1997) Ma and Jalil (2008) and Acemoglu et al. (2001) etc. The data of these variables is taken from the Financial Structure and Database (FSDA) from year 1996 to 2017.

4.1.3 Adaptive Efficiency

As mentioned earlier, the adaptive efficiency evolves over the time through the improvement of the institutions. Therefore, at the moment, the institutions are the best proxy for the construction of the index of adaptive efficiency. For this purpose, we use the data of different institutions like governance, regulation and business. We shall construct an index by using the “principal component analysis”.

Since the adaptive efficiency is the innovation of this study and we do not have literature to follow in this regard as mentioned earlier, the study uses the data of institutions. As it is clearly mentioned the importance of these institutions in chapter 2. These institutions play an important role for the financial development and the economic growth. Moreover, it is shown in the literature a positive and significant relationship between the institutions and the variables of financial development and the economic growth.

As in this study these institution's variables are being used as proxy of "adaptive efficiency". The approach of measuring adaptive efficiency as follows:

First, we shall construct the indices of institutions thorough a number of measures. We shall construct three main indices through Principle component analysis (PCA). These indices will be named as i) Governance ii) Regulations and iii) Business environment.

PCA is a multivariate statistical method. The PCA follows a "mathematical procedure to transform a number of possibly correlated variables into smaller number of uncorrelated variables". It is used for reducing dimensionality of large datasets. It minimizes loss of information and increases the interpretability of such datasets. Along with analyzing the variance-covariance matrices and correlations, the PCA does also determines the eigenvalues and eigenvectors of these matrices. It Tests the Principle Components. Importantly, it determinates the share variation of all initial variables in the variation of particular component.

The result estimates of PCA are given in table 4.4, appendix.

Governance

There is a set of institutions which are promoting the governance of the country. For example, democratic accountability, corruption, law & order, government stability and bureaucratic quality. We use PCA to construct a single index, named as governance, from these indices.

The results based on the PCA reveals that, most of the variation is explained by the first component, that is, "principal component". The principal component explains more than fifty percent variation on average for each country. However, the countries with developed economies and better governance system have more variation, explained by first component. The highest percent of variation is 76.7% or 0.767, explained by the first component. This highest variation is explained by "Japan", which is a developed economy with high income.

Whereas, the lowest number is explained by “The Gambia”, that is, 47.3% or 0.473. The Gambia is a low income, developing economy. As the first component explains most of the variation and other components do not show much variation. So, here the value of first component variation is used for analysis. The estimates are given in table 4.2

Regulations

It is argued, in the backdrop of financial crises of 2008, that the regulations and the implementations of regulations play an important role in the crises. Therefore, the regulations related and judiciary related institutions are important to include in the index of adaptive efficiency. For this purpose, we use the index of information of contracts, judicial independence, and reliability of police, legal system and property rights, military interference and protection of property rights.

In regulations, index there also the most variation is explained by the first component of the PCA. An economy with better regulation shows a good number of variation explained by first component in PCA. For particular, countries the highest number of variation explained by first component is of “Uruguay”, that is, 0.746 or 74.6%. However, the lowest number is 46.2% or 0.462, for the economy of “Namibia”. See table 4.1 for estimates

Business Environment

The third major set of institutions is business environment. There are various indicators for measuring the business environment on the basis of various arguments. However, this study follows the report of “economic freedom of the world (2016) of Fraser Institute”. It measures the business environment through six different indices. These indices are “administrative requirements, bureaucracy costs, starting a business, Extra

payments/bribes/favoritism, Licensing restrictions and tax compliance³”. However, in this study the administrative requirements, bureaucracy costs and Extra payments/bribes/favoritism are already taken as the indicators of governance and regulations. Therefore, we focus upon only three indices to avoid the problem of multicollinearity. These three indices are starting a business, Licensing restrictions and tax compliance. The index of business environment is extracted through PCA based on the mentioned three indices.

Similar to the governance and regulation index, the PCA for the business environment does also explain a single value of index for each economy. Since, here also the first component of PCA explains enough variation, so it used for further analysis. A higher number of first component value, reveals the favorable environment for the business. The economy of “Senegal” explains the highest percent of variation for the first component, that is, 0.7744 or 77.44%. Whereas, the lowest percentage is 44.32% or 0.4432 explained by the economy of “Taiwan”. All other economies show percentage of variation for the first component of PCA is between these two extreme numbers. Table 4.3 comprises of estimates.

Adaptive Efficiency

As mentioned earlier, the “adaptive efficiency” is measured through the institutions. The theoretical framework of the study explains that the institutions can be used as the proxy for the adaptive efficiency. As mentioned earlier, there is no guideline is available to measure the adaptive efficiency in the literature. Therefore, we may argue, intuitively, that there are ways to construct the adaptive efficiency indicator. These are 1) Principal Component Analysis (PCA), 2) Structural Equation Modelling and 3) we may use the rate of change in of the indices of institutions.

We choose the PCA to accomplish the task. The SEM is preferred to PCA when there is exact specification between the index or latent variables. However, we are not concentrating

³ http://www.freetheworld.com/datasets_efw.html

on the exact specification of the variable but we are interested to generate an index to show the trend in the improvement in the institutions. Therefore, we are using PCA avoid the problem of multicolleraity and over-parameterization. There is a little variation in the institution indices in the case of developing countries, therefore the idea of rate of change will not work properly.

The above explained three types of institution's indices are used in this regard. These indices are, Governance, Regulation and Business environment. For the adaptive efficiency an index is constructed by using these three indices. The construction of index is done through the Principal Component Analysis (PCA).

The percentage variation of principal component explains the level of adaptive efficiency in a country. As it is being measured through the above indices of the institutions, so it depends on the strength of these institutions. Better level of governance, regulation and business environment shall lead to a high level of adaptive efficiency and vice versa. The results of PCA reveal that, there exists adaptive efficiency as a whole for each economy. Because, on average the percentage value of principal component show a greater number in each economy. However, this number vary with the level of institutions. Out of all the countries used in the analysis, "Chile" is top ranked economy with 0.8253 or 82.53%, variation explained by principal component. Whereas, the lowest principal component is 0.4709 or 47.09% for the economy of "Namibia".

Table 4.4 appendix, describes the results.

4.1.4 Control variables

There are some variables other than stated above which in our knowledge may have effect on the economic growth and may have impact on the channel of theoretical framework established in this study. Those variables are also included on the independent side of the

model, which are: inflation, Foreign Direct Investment (FDI), School enrollment and trade etc.

Inflation

The inflation is an important indicator for an economy. It indicates the prevailing price level in an economy. The CPI, measures the percentage change in prices of a specific goods and services in a basket, being used by the consumers. The CPI is taken as control variable in this study, as it directly effects dependent variable in our model, that is, Economic Growth. However, this relationship may be positive or negative supported by various studies, e.g. Bittencourt (2012) and Burdekin et al. (2004). Out of various indicators to measure the inflation, this study takes Consumer Price Index (CPI) as measure of inflation. Baglan and Yoldas (2014) Bittencourt (2012) and Burdekin et al. (2004), also used CPI, as measure of inflation.

The data of CPI annual percentage, is taken from WDI, from year 1996 to 2017.

Foreign Direct Investment

The World Bank defines the FDI, as inflow of investment from other countries. The inflow of resources from foreign investors, including short term and long term investments as shown in balance of payments. The FDI, inflow is important for growth of an economy, as it fulfils the needs of domestic investment deficiencies. Alfaro (2003), states that FDI, may have positive and negative effects on growth. As FDI in primary sector is negatively and in manufacturing sector positively related with the growth. So, the FDI, effects the dependent variables, so this effect is captured by taking it as control variable in the model. The study uses the data of FDI inflow as percentage of GDP, from WDI over the year of 1996 to 2017.

Human Capital

Human capital can be defined as an investment in education, health etc. for the people of a country. The human capital is important for the economic growth. As it enhances the productivity of human. Human capital is also a sum of skills, knowledge, social awareness and creativity. There are different proxies used to measure the human capital. For example, expenditures on education as percentage of GNP, school enrollment, that is, primary, middle and secondary. However, this study uses the school enrollment as proxy to the human capital. Abbas and Mukhtar (2000), Wang and Yao (2003) and Benhabib and Spiegel (1994), also used the data of school enrollment at different levels. Education is an important factor for the growth of an economy. As it contributes for the human capital accumulation and increase in labor productivity. A skilled labor is always much better than an unskilled labor. Developing economies lack this due to lack of education. Studies like Holger and Peter (2003), find the education an important source of economic growth.

This study uses the indicator of education as “net percentage of primary school enrollment”. The variable is taken from WDI, from the year 1996 to 2017.

Trade Openness

The trade openness is also taken as control variable in our model as it does also effect the economic growth. The trade openness is “the total sum value of imports and exports as GDP”. An export oriented economy is considered as better trade openness or a surplus balance of trade refers to a good trade openness. Various studies show that trade positively effects the economic growth, e.g. Van Den Berg (1997) and Bojanic (2012). It effects the economic growth in both ways which is imports and exports. The study uses the trade as percentage of GDP, also used by Bojanic (2012). The trade variable uses total volume of imports and exports. The data of “trade (% of GDP), is taken from WDI, from 1996 to 2017.

4.3 Descriptive Analysis

The descriptive analysis of all the variables is discussed under the table 4.5

Table 4.5 descriptive statistics				
Variables	Mean	Standard Deviation	Minimum	Maximum
Voice and accountability	16.63291	6.063512	1	26
Political stability and absence of violence	44.47095	11.81114	1	69
Government effectiveness	5.096397	2.631007	1	10
Regulatory quality	14.31353	4.680268	1	23
Rule of law	7.609867	2.683104	1	13
Control of corruption	5.491399	2.449226	1	13
Institutions index	201.8932	134.3165	1	482
Liquid liability	1221.64	698.7884	1	2465
Central bank assets	461.2907	380.1611	1	1214
Private credit by deposit money banks	1226.558	710.2724	1	2480
Private credit by deposit money banks and other financial institutions	1236.522	714.8607	1	2502
CPI	652.4407	419.7326	1	1448
Per capita GDP (current US\$)	1499.944	857.7524	1	2702
FDI	485.4859	313.9454	1	1170
Education	430.5339	438.2379	1	1228
Trade	1187.07	779.5031	1	2540

The overall results of descriptive stats indicates, a high variation among the countries. The standard deviation as a whole show a high dispersion in the data.

For the economic growth variable of per capita GDP in current US dollars show a high variation, resulting the standard deviation of 857.75. Similarly, the per capita GDP in constant dollars also show a high deviation from the mean value.

The measures used for the financial development also show the high dispersion from the mean value. The standard deviation for these variables ranged from 229.8376 to 257.8695.

Where the variable with highest standard deviation is “Liquid liability” and the lowest is “net interest margin”. All the indicators of financial development are taken as “percentage of GDP).

However, the variables of institutions show lowest value of mean with least dispersion of standard deviation among all other variables. The overall mean of institutional index is 201.8932, with the standard deviation of 134.3165. Moreover, the individual, variables of institutions also show minimum mean value and the standard deviation. The variable with highest number of standard deviation is “Voice and accountability” with SD 6.063512.

The “trade” variable is with highest SD value i.e. 779.5031 with 1187.07 mean value. Whereas, the standard deviation for the rest of control variables i.e. CPI, FDI and School enrollment. Is between this ranges.

4.4 Data

This study follows the panel data. As Levine (1998), Aydi and Aguir (2017), Levine (1999) does also uses the panel data. The annual panel data from the year 1996 to 2017 for 123 economies is used in this study. All the economies are divided into two main income groups’, that is, “developed and developing economies”.(see appendix table 4.6 for sample) The classification of the data into developed and developing economies is on the definition of the world stakeholders that are the ” World Bank” and the “International Monetary Fund (IMF)”, sourced from the “Financial Structure and Development Database (FSDA)”.

Data Sources

Data sources are “world development indicators (WDI), financial structure and development database (FSDA), international country risk guide (ICRG) and economic freedom of the world (2016) of Fraser Institute report”.

Chapter: 5

Estimation and Results

The main objective of the study revolves around the “adaptive efficiency”. The study is aimed to check the role of adaptive efficiency and financial development for the economic growth. This study is optimistic to have positive results for the explanatory variable. Various studies has tested and showed mix results for the financial development and the economic growth. However, this study will also test the adaptive efficiency along with the financial development for the economic growth.

To empirically test our model, different estimates have been discussed in chapter 3. These are mainly the “fixed effect model, random effect model and Arellano and Bond (1991) estimates”. However, the main estimation for the study is based on the Arellano and Bond (1991) estimates and other estimates are used for robustness check. These results are following.

5.1 Empirical Results (GMM)

The Arellano and Bond (1991) estimates is basically based on “GMM (Generalized Methods of Moment) estimation”. This is used to test the dynamic panel models. This technique, use lag value of dependent variable as explanatory variable on the independent side.

The dependent variable in the model is GDP per capita. Whereas the independent variables are, financial development, institutions, adaptive efficiency and some other control variables. The result estimates are given in table 5.1 and discussed in the following.

Table 5.1: Financial Development and Economic Growth : The Role of Adaptive Efficiency (GMM Methodology)

Dependent variables is Per-Capita GDP

Regressors	1	2	3	4	5	6
<i>Financial Development</i>	0.7730***	0.8041*	0.5594***	0.5577***	0.5549***	0.1233*
	(0.1017)	(0.4206)	(0.1553)	(0.0639)	(0.1586)	(0.0754)
<i>Regulations</i>	0.3003*	-	-	-	-	0.5082*
	(0.1747)	-	-	-	-	(0.2706)
<i>Governance</i>	-	0.2903***	-	-	-	0.3224*
	-	(0.0416)	-	-	-	(0.1648)
<i>Business</i>	-	-	0.5296***	-	-	0.8735*
	-	-	(0.1398)	-	-	(0.4869)
<i>Adaptive Efficiency</i>	-	-	-	0.1532***	0.3398***	0.2748**
	-	-	-	(0.0315)	(0.0943)	(0.1351)
<i>AE*FD</i>	-	-	-	-	0.8966***	0.4167**
	-	-	-	-	(0.1931)	(0.1942)
<i>Inflation</i>	0.3908***	0.2894	0.5054	0.9400***	0.2371	0.5565
	(0.1492)	(0.8231)	(0.6596)	(0.1884)	(0.3601)	(0.3513)
<i>Trade Openness</i>	0.3209***	0.3578***	0.6405*	0.4957***	0.3874***	0.2602***
	(0.1344)	(0.1505)	(0.3348)	(0.1655)	(0.0924)	(0.1031)
<i>Education</i>	0.2737***	0.8757**	0.4175***	0.2333**	0.4308***	0.8783***
	(0.1094)	(0.4104)	(0.1455)	(0.1095)	(0.0433)	(0.1668)
<i>Foreign Direct Investment</i>	0.8322*	0.8800***	0.7391***	0.2330*	0.4790	0.3479*
	(0.4373)	(0.1746)	(0.0850)	(0.1257)	(0.4140)	(0.1820)
<i>Human Capital</i>	0.3902***	0.9913***	0.1835*	0.4558	0.3313***	0.6063***
	(0.1594)	(0.1410)	(0.1080)	(0.3251)	(0.0121)	(0.1978)
<i>Lag of Dependent Variable</i>	1.0884***	1.0667**	1.0777***	1.0693***	1.0889***	1.0667***
	(0.3951)	(0.4856)	(0.2488)	(0.2072)	(0.3877)	(0.4440)
<i>CONSTANT</i>	0.8602***	0.7240***	0.7057***	0.0189	0.5502	0.1569
	(0.2354)	(0.0094)	(0.2110)	(0.5040)	(0.97000)	(0.5882)
Diagnostic Test						
N	2588	2588	2588	2588	2588	2588
R2	0.4614	0.4501	0.4718	0.4223	0.5388	0.5416
AR(2)	0.1607	0.2761	0.5561	0.1884	0.2469	0.4810
Sargan	0.5298	0.2333	0.3823	0.9617	0.7745	0.2715
. Note1: *, **, and *** show the 10%, 5% and 1% level of significance.						

The estimation results using Generalized Method of Moments (GMM), suggest that all the explanatory variables in our model show positive and significant results. The explanatory variables in our model are the “financial development, adaptive efficiency, the interaction between financial development and the adaptive efficiency and the control variables”. Since the adaptive efficiency is measured through the institutions, so the institutions are, governance, regulations and business environment. The schematic theme for the interpretation of these explanatory variables follow the three strands of the literature review, that is, “Financial development and economic growth”, “institutions and economic growth”, “adaptive efficiency and economic growth” and then the other control variables and the lag of dependent variables, that is, “GDP per Capita”.

The results of the financial development show that, it positively and significantly effects the economic growth. The results are consistent with the theoretical framework established for the study, that is, Levine (1997). It states that the financial development is a main source of the economic growth. The coefficient of the financial development is 0.7730. It indicated that 1% change in the financial development will cause 0.7730 percent change in the economic growth. This highly significant results for the financial development are also consistent with the literature stating that, financial development effects the economic growth. Also, the results strengthen the view of this study.

The second strand of the study states that, the institutions and the economic growth. The institutions used in this regard are, governance, regulations and the business environment. The specification about these institutions are discussed in chapter 4. However, the results of these institutions does also show the positive and significant effect on the economic growth.

The result coefficients for governance is 0.2903. It shows that 1% change in governance will lead to 0.2903 percentage point change in economic growth. A better governance in an economy can enhance the economic growth. The PCA index of the governance is comprises of the “government stability, democratic accountability, corruption, law & order and the bureaucratic quality”. These institutions together form “governance” and their better performance leads to a good governance in the economy. The results are also consistent with the “Knack and Kefer (1995)”, emphasizing on the role of these institutions. The good governance is beneficial for the economic growth, as these institutions, empowers the economy. It can lead the economy to a favorable environment, for the economic stockholders, to achieve healthy economic indicators.

The second type of institutions tested for the study are “regulations”. The results statistics for the regulation are also positive and significant. It shows that a better regulation in an economy can lead the economic growth to increase. The magnitude of coefficient for the regulations indicates that 1% change in the regulations can lead to the 0.3003 percentage point change in the economic growth. The institutions for regulations index includes: “Judicial independence, legal informant of contracts, legal system and property rights, protection of property rights, military interference and reliability of police”. Since, these institutions are considered as the regulator institutions of the economy. So, it is their responsibility to ensure a peaceful environment, with a certainty for the economic actors. A stable economic environment can lead to a healthy economy, accelerating the economic growth. A better regulation, indicating these institutions can play an effective role in this regard. The literature does also support these views in the studies of “(Bencivenga and Smith 1992; and Roubini and Sala-i- Martin 1995)”. These studies are also established in the theoretical framework of the study.

The third type of institutions comprises of the business environment. As the investment is the integral for the economic growth and it comes through business in an economy. The PCA index for business environment includes the three indices, explaining three businesses. The business 1 is “starting a business”, business 2 shows, “Licensing restrictions” and business 3, indicates “tax compliance”. These indicators are considered as responsible for successful businesses in the economy. The pro-business environment is necessary for an increase in investment both domestic and foreign, that is, FDI. For example, low cost of doing business will encourage more business leading to increase in business volume and then contributing for high economic growth in an economy. This stance of the study has also been tested through the GMM. The results estimates supports this view point of this study and many other studies in the literature. The results are positive and show much significance for the economic growth. The 0.5296 magnitude for coefficient is encouraging to make friendly business environment in order to achieve high growth.

Especially for the developing economies, it is recommended to focus on better business environment. As such economies always face the problem of less investment and high consumption. The major portion of economic growth in these economies is based on the consumption rather than on the investment, due to the lack of good business environment. So, in order to gain a sustainable increase in economic growth, the developing economies are recommended to focus on their institutions that are governance, regulations and business environment.

These results are also consistent with the literature. Many studies show positive role of the different types of the institution. Like Calderon et al. (2001), Fernandez and Tamayo (2015) etc. studies and shows positive and significant impact of different institutions on the economic growth. The details about the institutions are discussed in chapter 4.

The third strand of the research is the “adaptive efficiency”. To explore the role of adaptive efficiency along with the financial development is the main objective of this study. As mentioned in chapter 2, the empirical investigation of the adaptive efficiency is the innovation of this study. To measure the adaptive efficiency the proxies are the institutions as established in North (1990, 1991 and 2005). The above mentioned institutions governance, regulations and business environment collectively form the adaptive efficiency. The details about the existence of adaptive efficiency are discussed in chapter 4. The results of GMM estimation show that the adaptive efficiency effects the economic growth positively and significantly. The results are consistent with our theoretical framework of the study. However, the magnitude of the coefficient of adaptive efficiency is 0.1532. The result coefficient state that the 1% change in adaptive efficiency effects the 0.1532 percent of the economic growth. The results are consistent with the studies of Ma and Jalil (2008) and Yu and Zhang (2008). These studies mentions the existence of adaptive efficiency.

The interaction term between the “financial development and the adaptive efficiency”, enhances the impact on the economic growth. The GMM results support the view point of the study, that is, the financial development along with the adaptive efficiency can enhance the economic growth. The magnitude of this interaction term is 0.8896. This magnitude is much higher than the individual impact of both, financial development and the economic growth. Hence, the result statistics are consistent with the objective of the study. Moreover, it is proved that both the financial development and the adaptive efficiency together can better enhance the economic growth than individually.

Then it comes the control variables, which can also effect the economic growth. These variables are other than the explanatory variables used in our model. The importance and specification of these variables are discussed in chapter 4. According to the results these

control variables have impact on the economic growth in the model. These effects the economic growth positively and significantly. These variables are as follow:

The first control variable used for the study is inflation. As mentioned earlier the inflation play an important role for the economic growth. Literature has also shown the significant impact of the inflation for economic growth. However, the association between “inflation and economic growth” can be positive and negative in different studies. This study shows the positive and significant impact of inflation for our dependent variable, that is, GDP per capita. The magnitude of the coefficient show that can affect the economic growth by 0.3098 percentage points.

“Trade openness” is also used as the control variable for the study. As in our knowledge and according to the literature, it can also effect the dependent variable. The results also show that it can affect the dependent variable positively and significantly. The magnitude for the coefficient is 0.3209, which has significant impact for the economic growth.

Education is another control variable in our model. It also show positive and significant impact for the economic growth. The education can play role in stimulating the human capital and providing a skilled labor for an economy. It can affect the dependent variable by 0.2737, percentage points.

“FDI (Foreign Direct Investment)”, can play a vital role for economic growth. Many studies show positive and significant impact of FDI inward for the economic growth. Likewise, the result estimates of this study are also positive and significant for the coefficient. 0.8322, is the magnitude for the coefficient, that is, FDI

Human capital is a necessary control variable for the economic growth. It can lead the economic growth through participating in human development and productive labor. The

magnitude show that human capital can affect the economic growth by 0.3902 percentage points.

These positive and significant results, supports the view point of their selection as control variable in our model. Also these results are consistent with the literature, mentioned earlier in respective chapters.

Finally, presenting the impact of lag of dependent variable. The advantage of using the Generalized Methods of Moments (GMM) here is that it takes the “lag of dependent variable” as the “explanatory variable”. As the dynamic panel model allows to take the lag of dependent variable as explanatory variable because it can also effect the dependent variable, that is, Per Capita GDP. The results of GMM also support this argument and shows that, the lagged term of dependent variable is an important determinant for the economic growth. It positively and significantly effects the economic growth.

The result statistics of GMM stated in table 5.1 are “significant at 1%, 5% and 10% level of significance”.

Diagnostic test

The Arellano Bond estimation technique is applied for the panel model in the present study. There are some diagnostic tests which shows the strength of the model estimation. The GMM methodology is based on the instrumental variable technique, the validity and the strength of the instrumental variable is a crucial part of the GMM estimation. More clearly, the instrumental variable technique has no meaning in the presence of invalid instruments.

In this backdrop, there are several tests which can be used for the testing of the validity of instruments. The ‘Sargan Test’ is one of them. The null hypothesis for the test states that “instruments are exogenous or instruments do not show correlation with the error term”. It implies that the instruments are valid. So, the higher P-value will be an indication of

the acceptance of the null-hypothesis. Here, in the model, the null hypothesis for Sargan test is accepted with the p-value of 0.5298. It shows that the exogenous variables have no correlation with the error term and the instruments used here are valid.

Another check of the validity of the instrument is the second order of serial correlation, that is, AR (2). AR (1) value remain redundant due to the inclusion of the lag dependent variables. In the model. Here, also the null hypothesis states that “there is no autocorrelation” present in the model. Again, the acceptance of null hypothesis is preferred. The P-value of AR (2), for the model is 0.1607, stating that, the autocorrelation is not present in the model. It shows that the value of error terms has no correlation with each other.

To check, the strength of models the R^2 is used. The coefficient of R^2 , explains the variation explained by the explanatory variables. Higher the value shows the more strength of the model. Here, in model the coefficient of R^2 is 0.5416, from model 5, table 5.1. It shows that the 54.16% of variation in the estimation results is explained by the exogenous variables. Where, the rest of the variation is in the error term. Since, the study has used the panel data, so for that, this much variation is considered as better and shows that model is strong.

5.2 Robustness check

To check the robustness, the analysis is further tested through GMM and fixed effect model. For the robustness through GMM the sample is divided into two parts. The sample for developed and developing economies is again tested using GMM estimation. The results discussed in the following and estimates are provided in the appendix.

GMM

GMM estimation is further extended into two parts. The overall sample is divided into developed and developing economies. The estimation results on the basis of this division does also reveal that all the explanatory variables are positive and significant. The

explanatory variables in both sample show that the core explanatory variables found to be significant. These results are consistent with the GMM estimations of overall sample. Moreover, on the basis of these results it can infer that the study has much practical implication and it is useful for the policy implications.

However, the magnitude of the coefficient for explanatory variables in both samples vary from each other. This difference and the level of magnitude for both samples defines their respective positions for each explanatory variables. For example, one of the main explanatory variable, that is, financial development, explains the impact for economic growth. From the model 1, the magnitude of its coefficient is slightly higher in case of developing countries. It shows that for the developing countries the impact of financial development is higher on the economic growth. Since, because of less financial development in such economies, there is a much opportunity for higher economic growth from the financial development. However, this magnitude for developed economies also show a higher impact for the economic growth.

The results for adaptive efficiency, also show positive and significant impact for the economic growth. The adaptive efficiency is the core explanatory variable in our model. The significance of this variable is consistent with GMM estimation of whole sample and support the framework of our study. Moreover, in the bifurcation of samples, these results are consistent with the original model. However, in case of developing economies sample, the magnitude for the coefficient is higher than developed economies. The practical implication of high magnitude in case of developing economies explains higher impact for the economic growth. The advantage for developing economies is that they can enjoy more economic growth by getting their institutions improved.

The estimates of results are given in appendix in table 5.2 and 5.3

Fixed effect model

The results from fixed effect model are also consistent with the GMM estimations. These results reveal that all the explanatory variables effects the dependent variable positive and significantly. However, the main focus of our study is based on the results of GMM estimation technique. Because of some more characteristics of GMM, it is preferred over other tests. But the estimations from static panel tests has also been used for the study, in order to represent the strength of the model results.

As a whole the positive and significant results of explanatory variables are consistent with the literature and the theoretical framework of the study. The results show that the economic growth can be enhance through the interaction of financial development and the adaptive efficiency. The main explanatory variables in our model show positive and significant impact on economic growth. But the magnitude of their coefficient vary as compare to the GMM estimation results.

Here, the coefficient of financial development shows maximum impact from model 5, table 5.4 that is, and 0.966. Whereas, the maximum coefficient from GMM estimation model 6, table 5.1 is higher than 1, which is greater than the coefficient from fixed effect model. The result of financial development from fixed effect model is also consistent with the literature and the theoretical framework of the study. Moreover, results from both estimation tests, show that the financial development have positive and significant impact on the economic growth.

The other important explanatory variable in our model is adaptive efficiency. As shown in the estimation results of GMM from table 5.1, the adaptive efficiency has much importance for the economic growth. The adaptive efficiency has positive and significant impact on the economic growth. These results are also consistent in fixed effect model. The

model 4, table 5.4 explains that coefficient of adaptive efficiency is 0.3071. The 1% change in the variable of adaptive efficiency can lead to 0.3071 percentage point change in the economic growth. Likely to the GMM, the fixed effect model does also explains that adaptive efficiency play an important role for the economic growth. These results strengthen, the view point established of theoretical framework of the study.

The view point of the study that financial development can enhance the economic growth through the adaptive efficiency has also been established through the estimation results. Likewise, GMM results, the estimation results from the fixed effect model does also show positive and significant result. Furthermore, these results also show that both the main explanatory variables together in an interactive term can better enhance the economic growth.

The coefficient of this interaction term from model 6, table 5.4, is 0.6914. This positive and much significant coefficient reveals that a high economic growth can be enjoyed by the better financial development and the adaptive efficiency in an economy. As mentioned in GMM results, this adaptive efficiency can be achieved through better institutions. These institutions tested for the study are governance, regulations and the business environment. All other control variables are positive and significant.

The estimates are given in appendix, table 5.4.

Chapter: 6

Conclusion and Recommendations

The present study has conducted to investigate the role of “adaptive efficiency for financial development and the economic growth”. It revisits the concept of economic growth and the financial development with an addition of adaptive efficiency. The role of adaptive efficacy provides a new dimension for the literature. As the adaptive efficiency is the innovation of the current study.

The adaptive efficiency can be measured through the institutions. As north (1990, 1991), explains the concept of adaptive efficiency is that, the flexible institutions can get efficient over the time. North (2005) postulates that the institutional framework of the country gets an efficiency over the time. He termed this phenomenon as *adaptive efficiency*. More clearly, the adaptive efficiency means that the efficiency that is adopted over the time due to the improvement of other institutions.

The study has established the view point that both the financial development and the adaptive efficiency can lead the economic growth to increase, individually and collectively. In this regard, the economic growth has been tested to be derived by the three main channels of the study. First, economic growth with financial development, second, economic growth with adaptive efficiency and third, economic growth with financial development and adaptive efficiency. Moreover, the economic growth has also been viewed through institutions, used as measure of adaptive efficiency.

The dependent variable used for the study is the “GDP per capita”. While on the independent side the main explanatory variables are financial development and the adaptive efficiency. Beside this, the model has used some control variables that are, Inflation, trade openness, education, FDI and human capital.

For the dependent variable “GDP per capita in current US Dollars” is used as economic growth. On the independent side, financial development is measured through, traditional proxies that are, Credit to private sector, M2/GDP etc. While, for the adaptive efficiency being the innovation of the present study, there is no literature available to follow. However, North (1990, 1991), explains that the adaptive efficiency can be measured through the institutions. The study has used three major types of institutions in this regard, that is, Governance, regulations and business environment. All the three major types of institutions are further set of related institutions. An index comprising of respective institutions has been made by using the “principal component analysis (PCA)”.

So, the measures of institutions has been used for the adaptive efficiency. The adaptive efficiency is measured through using the index of governance, regulations and business environment. The index for adaptive efficiency has also been formed by using Principal Component Analysis (PCA). The rest of the control variables are measured by using their respective data's. The study has used data for 22 years from 1996 to 2017. This data comprises of total 123 countries which are further divided into two parts that are, developed and developing economies.

The study analysis is mainly based on Arellano and Bond (1991) estimates (a GMM estimation procedure). This technique is twice applied on the sample, first on whole sample. Second, using the separate sample for developed and developing economies for a robustness check. However, for the robustness check, study has also used the tests of fixed effect models.

The results using Generalized Methods of Moments (GMM), show all the explanatory variable are positive and significant. The results are consistent with the theoretical framework of the study and the literature. One of the main channel using financial development as

explanatory variable show that it effects the economic growth positively and significantly. These results are consistent with various studies, especially with Levine (1997) which is the main school of thought followed in the theoretical framework of present study.

Like many other studies in the literature, this study does also recommend, the financial development as a source of economic growth. A better financial development, which is the sum of financial depth and the structure of financial sector, can lead to a high economic growth.

The second main channel of economic growth is “adaptive efficiency”. The results of adaptive efficiency are also positive and significant. As the adaptive efficiency is measured through the institutions. The institutions used in this regard does also have positive and significant impact on the economic growth. Results states that, the adaptive efficiency can enhance the economic growth.

As it comes through the institutions which are governance, regulations and business environment. So, the better adaptive efficiency can gain from better institutions. As these institutions does also individually effects the economic growth positive and significant. So, the “Policy makers are recommended to focus on the betterment of these institutions”. Moreover, these positive and significant results and the existence of adaptive efficiency also support the view point of this study and the literature of Ma and Jalil (2008) and Yu and Zhang (2008). These studies also mentioned the concept of adaptive efficiency.

Furthermore, the concept of present study also get strengthen through the results of the third main channel i.e. “economic growth with interaction term between financial development and the adaptive efficiency”. Again the results for this channel are also positive and significant .A high economic growth can be achieved through focusing on the financial development and the adaptive efficiency. Here is the advantage for stockholders to make

policies which are consistent for the better financial system and the institutions for adaptive efficiency. The financial development can better enhance the economic growth through the adaptive efficiency.

Moreover, the institutions used as measure of the adaptive efficiency, also viewed as the source of economic growth. These institutions are governance, regulations and business environment. These institutions also have positive and significant impact for the economic growth. The empirical results has established these institutions as the most important for the economy and the economic growth. A sustainable economic growth can be achieved through focusing on these institutions as adaptive efficiency.

Besides this, all other control variables also show positive and significant impact for the economic growth. These results of inflation, trade openness, education, FDI and human capital are also consistent with the literature. Also the significance show their relevance with the model.

The above mentioned results are also consistent with the robustness check. By the fixed effect model and the GMM estimation using separate sample for the developed and developing economies. In this robustness check, also all the explanatory variables are positive and significant impact on the economic growth. These results support the above recommendations for results of GMM estimations. However, in the separate sample of the developed and developing economies the magnitude of the coefficients vary slightly. The magnitude for the coefficients of main explanatory variables, that is, financial development and adaptive efficiency is higher in sample of developing economies.

The practical implication these results for developing economies is more emphasize on above recommendation. The higher magnitude of adaptive efficiency show that there is more potential for developing economies for the economic growth. As the developing

economies are less financially developed and have relatively less developed institutions. So, such economies have much potential in financial development and adaptive efficiency for economic growth.

The study concludes that there exists the impact of adaptive efficiency. The financial development and adaptive efficiency has positive and significant impact on the economic growth. These results are consistent in both developed and developing economies. The study recommendations are for, the emphasize on the better financial system and the institutions for adaptive efficiency.

Policy recommendations

In the light of the empirical results and the conclusion, this study provide some practical implications for the policy makers. First, in the view point of the financial development, it is recommended to focus for the developed financial system. A well-established financial system can lead the economic growth to increase. Such policies should adopted which are in favor of the financial system, by empowering the depth of financial system and structure of the financial system. Especially for the developing economies, as there is much potential which requires more focus in this regard.

Second, based on the results of adaptive efficiency, the stakeholders are recommended to focus on the betterment of the institutions. The empirical results suggests that, the institutions have adaptive efficiency and they can get efficient over the time. It is not necessary that only profitable enterprises can survive, rather the institutions established for the betterment of the society can also get efficiency with the time. To achieve the targets, the policy makers are recommended to focus of the institutions established as important in the study i.e. governance, regulations and business environment. Here, also the developing

economies has more potential and emphasize is on strong policies in the subject, for such economies.

There is an advantage for the policy makers that they can enjoy more economic growth by simultaneously focusing on the financial development and the adaptive efficiency. The adaptive efficiency through the financial development can better enhance the economic growth. The results suggests that individual positive impact for both the explanatory variable becomes more significant when focused collectively. So, the policies should form which are favorable for both the financial development and the adaptive efficiency.

The Policies should be for the better financial system and the focus should be on the betterment of institutions. Especially for the developing economies much focus is required on these sectors to achieve high economic growth. Being less developed, these economies have more potential in this regard and they can achieve high economic growth through effective policies.

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Appendix

Table 4.1

Principal Component Analysis of Regulation.

Regulations Index												
	% of Variance						Factor Scores					
	1	2	3	4	5	6	JI	LEC	LSPR	PPR	MILT	RP
Albania	0.511	0.293	0.129	0.043	0.023	0.003	0.441	0.432	0.304	0.471	0.332	0.358
Algeria	0.595	0.228	0.121	0.035	0.018	0.002	0.394	0.498	0.411	0.440	0.479	0.363
Angola	0.667	0.134	0.130	0.041	0.020	0.007	0.325	0.313	0.302	0.428	0.363	0.406
Argentina	0.506	0.282	0.138	0.045	0.027	0.001	0.442	0.392	0.334	0.393	0.425	0.437
Armenia	0.601	0.176	0.152	0.045	0.018	0.009	0.493	0.341	0.495	0.330	0.397	0.316
Aruba	0.560	0.188	0.179	0.040	0.022	0.009	0.485	0.406	0.416	0.425	0.373	0.370
Australia	0.522	0.270	0.133	0.042	0.025	0.008	0.319	0.477	0.434	0.396	0.449	0.460
Austria	0.592	0.220	0.121	0.039	0.018	0.009	0.396	0.300	0.461	0.472	0.459	0.446
Azerbaijan	0.676	0.110	0.149	0.034	0.021	0.009	0.368	0.402	0.310	0.430	0.365	0.335
Bahrain	0.532	0.260	0.145	0.034	0.023	0.006	0.406	0.327	0.368	0.474	0.484	0.394
Bangladesh	0.706	0.125	0.117	0.030	0.012	0.009	0.302	0.300	0.306	0.359	0.397	0.457
Belgium	0.630	0.186	0.121	0.033	0.023	0.008	0.376	0.340	0.353	0.371	0.315	0.445
Benin	0.547	0.226	0.162	0.031	0.025	0.009	0.332	0.324	0.331	0.469	0.421	0.495
Bolivia	0.696	0.114	0.125	0.048	0.015	0.002	0.314	0.429	0.354	0.307	0.412	0.403
Botswana	0.664	0.221	0.060	0.034	0.013	0.008	0.466	0.328	0.430	0.486	0.364	0.425
Brazil	0.570	0.291	0.080	0.039	0.017	0.002	0.421	0.460	0.303	0.379	0.475	0.428
Brunei Darussalam	0.693	0.119	0.122	0.047	0.016	0.002	0.466	0.493	0.487	0.467	0.446	0.310
Burkina Faso	0.517	0.271	0.133	0.044	0.028	0.006	0.414	0.418	0.390	0.411	0.495	0.496
Burundi	0.596	0.250	0.081	0.050	0.014	0.009	0.395	0.376	0.433	0.445	0.389	0.498
Cambodia	0.518	0.247	0.161	0.044	0.022	0.008	0.315	0.425	0.389	0.320	0.373	0.455
Cameroon	0.714	0.157	0.063	0.041	0.016	0.010	0.387	0.434	0.463	0.489	0.325	0.406
Canada	0.495	0.298	0.133	0.048	0.020	0.006	0.422	0.497	0.430	0.352	0.447	0.318
Chad	0.579	0.228	0.106	0.047	0.030	0.010	0.341	0.365	0.433	0.493	0.410	0.400
Chile	0.590	0.230	0.115	0.046	0.011	0.008	0.382	0.360	0.412	0.368	0.438	0.432
China	0.551	0.262	0.105	0.048	0.028	0.007	0.479	0.335	0.496	0.406	0.378	0.386
Colombia	0.696	0.154	0.079	0.038	0.029	0.003	0.326	0.410	0.470	0.495	0.383	0.453
Costa Rica	0.579	0.259	0.107	0.036	0.014	0.005	0.479	0.438	0.419	0.425	0.447	0.380
Cyprus	0.621	0.217	0.081	0.045	0.030	0.006	0.446	0.454	0.311	0.452	0.390	0.414
Czech Republic	0.585	0.186	0.171	0.036	0.013	0.009	0.316	0.351	0.485	0.389	0.329	0.407
Denmark	0.568	0.211	0.166	0.035	0.019	0.001	0.456	0.377	0.437	0.332	0.348	0.480
Egypt	0.500	0.250	0.174	0.047	0.028	0.002	0.458	0.363	0.346	0.444	0.400	0.385
El Salvador	0.581	0.224	0.119	0.041	0.028	0.008	0.338	0.331	0.322	0.303	0.367	0.360
Eritrea	0.636	0.223	0.084	0.031	0.019	0.008	0.349	0.358	0.384	0.479	0.324	0.373
Estonia	0.665	0.107	0.155	0.046	0.025	0.002	0.385	0.412	0.330	0.304	0.333	0.410
Fiji	0.654	0.144	0.128	0.048	0.017	0.009	0.359	0.310	0.317	0.384	0.431	0.328
Finland	0.746	0.110	0.064	0.049	0.022	0.008	0.404	0.450	0.402	0.422	0.408	0.305
France	0.632	0.196	0.094	0.040	0.030	0.009	0.314	0.406	0.346	0.349	0.448	0.431
Gabon	0.587	0.220	0.132	0.041	0.014	0.006	0.307	0.431	0.383	0.468	0.457	0.413
Germany	0.626	0.157	0.156	0.041	0.017	0.004	0.303	0.366	0.314	0.463	0.348	0.468
Ghana	0.564	0.228	0.137	0.047	0.014	0.010	0.327	0.480	0.434	0.355	0.445	0.337
Greece	0.598	0.227	0.105	0.043	0.022	0.005	0.415	0.318	0.308	0.414	0.470	0.489
Guatemala	0.630	0.206	0.102	0.033	0.022	0.007	0.405	0.346	0.489	0.376	0.430	0.367
Guyana	0.678	0.148	0.111	0.040	0.022	0.002	0.474	0.338	0.434	0.386	0.436	0.450
Hong Kong	0.683	0.150	0.093	0.042	0.024	0.008	0.392	0.305	0.313	0.460	0.413	0.410
Hungary	0.611	0.287	0.053	0.030	0.016	0.002	0.327	0.334	0.440	0.345	0.311	0.351
India	0.595	0.247	0.092	0.038	0.026	0.002	0.343	0.374	0.391	0.316	0.446	0.470
Indonesia	0.560	0.223	0.156	0.039	0.019	0.003	0.329	0.426	0.322	0.437	0.451	0.436
Iran	0.625	0.158	0.152	0.047	0.012	0.006	0.313	0.334	0.308	0.464	0.339	0.429
Iraq	0.559	0.290	0.084	0.033	0.028	0.005	0.340	0.403	0.374	0.494	0.374	0.494
Ireland	0.685	0.125	0.113	0.038	0.029	0.010	0.315	0.445	0.478	0.387	0.473	0.408

Israel	0.718	0.141	0.076	0.032	0.029	0.004	0.360	0.393	0.312	0.363	0.420	0.434
Italy	0.569	0.235	0.131	0.039	0.021	0.005	0.449	0.490	0.401	0.380	0.419	0.408
Japan	0.672	0.167	0.097	0.044	0.014	0.005	0.314	0.345	0.475	0.399	0.469	0.435
Jordan	0.773	0.100	0.077	0.030	0.013	0.006	0.419	0.428	0.303	0.302	0.417	0.489
Kazakhstan	0.571	0.274	0.078	0.048	0.019	0.009	0.414	0.412	0.356	0.467	0.406	0.482
Kenya	0.636	0.181	0.111	0.047	0.023	0.002	0.493	0.467	0.331	0.425	0.432	0.304
Korea, Rep.	0.711	0.174	0.056	0.037	0.021	0.001	0.346	0.336	0.464	0.491	0.377	0.454
Kuwait	0.591	0.253	0.078	0.046	0.029	0.003	0.451	0.318	0.359	0.491	0.428	0.447
Latvia	0.680	0.139	0.100	0.047	0.026	0.009	0.344	0.351	0.365	0.493	0.402	0.450
Lebanon	0.629	0.228	0.060	0.048	0.030	0.006	0.422	0.462	0.379	0.303	0.410	0.423
Liberia	0.723	0.122	0.088	0.034	0.030	0.005	0.334	0.314	0.469	0.342	0.374	0.468
Libya	0.703	0.189	0.059	0.034	0.013	0.002	0.338	0.372	0.342	0.392	0.358	0.347
Lithuania	0.622	0.169	0.137	0.046	0.021	0.004	0.396	0.468	0.394	0.468	0.432	0.428
Luxenberg	0.541	0.241	0.147	0.039	0.025	0.006	0.417	0.423	0.423	0.373	0.393	0.358
Madagascar	0.683	0.143	0.107	0.039	0.024	0.004	0.436	0.343	0.328	0.313	0.375	0.304
Malawi	0.533	0.239	0.155	0.044	0.019	0.010	0.481	0.351	0.357	0.404	0.471	0.488
Malaysia	0.642	0.215	0.082	0.033	0.020	0.008	0.300	0.471	0.373	0.349	0.469	0.331
Mali	0.559	0.264	0.112	0.036	0.025	0.005	0.406	0.422	0.331	0.372	0.495	0.411
Malta	0.668	0.145	0.117	0.043	0.022	0.003	0.383	0.320	0.333	0.387	0.303	0.458
Mauritania	0.515	0.284	0.146	0.040	0.013	0.002	0.431	0.306	0.331	0.370	0.378	0.403
Mauritius	0.496	0.296	0.143	0.033	0.022	0.010	0.495	0.310	0.341	0.493	0.373	0.398
Mexico	0.660	0.193	0.067	0.047	0.026	0.006	0.317	0.352	0.416	0.370	0.489	0.433
Morocco	0.702	0.111	0.125	0.033	0.022	0.007	0.491	0.497	0.415	0.418	0.306	0.443
Myanmar	0.498	0.292	0.154	0.032	0.018	0.006	0.441	0.488	0.398	0.375	0.390	0.345
Namibia	0.462	0.282	0.176	0.048	0.027	0.005	0.418	0.406	0.336	0.361	0.432	0.410
Netherlands	0.632	0.135	0.177	0.037	0.015	0.005	0.476	0.402	0.308	0.323	0.468	0.355
New Zealand	0.690	0.136	0.103	0.042	0.025	0.004	0.470	0.458	0.497	0.325	0.345	0.364
Nigeria	0.656	0.119	0.162	0.032	0.028	0.003	0.353	0.348	0.496	0.407	0.311	0.386
Norway	0.639	0.117	0.167	0.043	0.024	0.010	0.348	0.417	0.429	0.353	0.359	0.428
Oman	0.561	0.272	0.096	0.049	0.013	0.010	0.343	0.364	0.372	0.495	0.477	0.336
Pakistan	0.594	0.187	0.162	0.032	0.020	0.005	0.479	0.379	0.367	0.383	0.340	0.318
Paraguay	0.692	0.153	0.091	0.040	0.021	0.003	0.391	0.320	0.345	0.349	0.324	0.415
Peru	0.608	0.213	0.110	0.043	0.019	0.006	0.417	0.332	0.409	0.464	0.360	0.359
Philippines	0.519	0.295	0.121	0.040	0.021	0.003	0.316	0.385	0.425	0.426	0.460	0.495
Poland	0.625	0.236	0.075	0.043	0.015	0.005	0.356	0.345	0.305	0.330	0.482	0.392
Portugal	0.606	0.251	0.079	0.042	0.013	0.010	0.337	0.403	0.417	0.485	0.383	0.323
Qatar	0.511	0.286	0.147	0.037	0.013	0.006	0.405	0.334	0.484	0.495	0.384	0.475
Rwanda	0.723	0.112	0.102	0.034	0.023	0.005	0.363	0.341	0.335	0.414	0.463	0.362
Saudi Arabia	0.602	0.254	0.081	0.033	0.025	0.005	0.489	0.481	0.375	0.483	0.355	0.399
Senegal	0.583	0.176	0.174	0.033	0.025	0.010	0.454	0.496	0.419	0.430	0.453	0.344
Sierra Leone	0.715	0.100	0.114	0.043	0.021	0.008	0.496	0.428	0.368	0.378	0.370	0.353
Singapore	0.700	0.101	0.123	0.047	0.023	0.006	0.394	0.433	0.344	0.462	0.487	0.306
Slovak Republic	0.614	0.199	0.119	0.038	0.021	0.009	0.303	0.420	0.455	0.464	0.482	0.374
Slovenia	0.635	0.169	0.130	0.049	0.012	0.004	0.391	0.350	0.433	0.302	0.448	0.342
South Africa	0.564	0.213	0.160	0.045	0.014	0.004	0.319	0.441	0.345	0.395	0.374	0.390
Spain	0.760	0.104	0.083	0.035	0.015	0.002	0.402	0.327	0.305	0.479	0.324	0.363
Sri Lanka	0.500	0.245	0.179	0.046	0.028	0.002	0.463	0.389	0.310	0.345	0.390	0.394
Sudan	0.546	0.250	0.132	0.050	0.013	0.009	0.418	0.376	0.430	0.481	0.451	0.392
Swaziland	0.717	0.137	0.069	0.046	0.028	0.003	0.333	0.319	0.301	0.464	0.423	0.459
Sweden	0.711	0.176	0.057	0.033	0.017	0.006	0.449	0.460	0.468	0.422	0.484	0.464
Switzerland	0.519	0.290	0.124	0.037	0.023	0.007	0.347	0.349	0.445	0.382	0.411	0.399
Syria	0.615	0.211	0.095	0.047	0.027	0.005	0.496	0.366	0.381	0.378	0.325	0.404
Thailand	0.659	0.178	0.095	0.042	0.023	0.003	0.343	0.434	0.460	0.404	0.400	0.471
Taiwan	0.624	0.225	0.092	0.032	0.019	0.008	0.486	0.407	0.452	0.432	0.423	0.365
Tajikistan	0.549	0.289	0.092	0.037	0.025	0.008	0.433	0.397	0.363	0.391	0.317	0.489
Tanzania	0.507	0.247	0.175	0.047	0.019	0.004	0.424	0.311	0.371	0.319	0.348	0.349
Thailand	0.604	0.228	0.104	0.033	0.029	0.003	0.375	0.487	0.418	0.392	0.494	0.480
The Gambia	0.592	0.216	0.134	0.033	0.015	0.009	0.372	0.315	0.368	0.345	0.477	0.494

Tunisia	0.641	0.188	0.112	0.039	0.013	0.006	0.301	0.374	0.371	0.451	0.335	0.318
Turkey	0.640	0.246	0.061	0.034	0.015	0.004	0.475	0.378	0.482	0.370	0.492	0.390
Turkmenistan	0.679	0.117	0.140	0.043	0.012	0.008	0.473	0.310	0.359	0.406	0.376	0.327
Uganda	0.570	0.269	0.101	0.037	0.022	0.001	0.409	0.321	0.360	0.310	0.350	0.486
United Arab Emirates	0.612	0.212	0.094	0.049	0.026	0.007	0.417	0.493	0.479	0.327	0.439	0.433
United Kingdom	0.577	0.217	0.141	0.048	0.015	0.003	0.381	0.369	0.325	0.485	0.407	0.394
United States	0.722	0.140	0.073	0.045	0.016	0.004	0.429	0.301	0.361	0.421	0.362	0.440
Uruguay	0.746	0.124	0.067	0.037	0.020	0.006	0.467	0.418	0.442	0.332	0.348	0.380
Uzbekistan	0.578	0.283	0.069	0.046	0.018	0.007	0.384	0.397	0.392	0.433	0.345	0.369
Vietnam	0.676	0.162	0.097	0.043	0.015	0.006	0.389	0.304	0.431	0.493	0.328	0.435
Venezuela	0.717	0.158	0.063	0.046	0.014	0.002	0.361	0.373	0.477	0.355	0.421	0.418
Western Sahara	0.520	0.268	0.133	0.042	0.030	0.008	0.430	0.471	0.426	0.393	0.364	0.461
Yemen	0.565	0.286	0.080	0.048	0.014	0.008	0.498	0.497	0.500	0.362	0.345	0.437
Zambia	0.515	0.239	0.171	0.040	0.026	0.008	0.481	0.358	0.425	0.368	0.423	0.415
Zimbabwe	0.499	0.268	0.167	0.047	0.015	0.005	0.314	0.413	0.492	0.449	0.372	0.452

JI=Judicial Independence , LEC=Legal Informant of Contract, LSPR=legal system and property rights, PPR=Protection of property rights, Milt=military interference and RP=reliability of police

Table 4.2 Principal Component Analysis of Governance.

Governance Index

Country	% of Variance					Factor Scores				
	1	2	3	4	5	Government Stability	Democratic Accountability	Corruption	law and order	Bureaucratic quality
Albania	0.713	0.145	0.081	0.047	0.014	0.431	0.598	0.463	0.470	0.487
Algeria	0.653	0.170	0.134	0.033	0.010	0.455	0.459	0.598	0.577	0.459
Angola	0.581	0.283	0.077	0.046	0.013	0.456	0.591	0.408	0.539	0.429
Argentina	0.542	0.268	0.129	0.033	0.027	0.432	0.422	0.593	0.309	0.440
Armenia	0.601	0.274	0.065	0.049	0.011	0.493	0.529	0.439	0.506	0.534
Aruba	0.667	0.196	0.068	0.040	0.028	0.449	0.559	0.464	0.516	0.407
Australia	0.553	0.255	0.132	0.039	0.021	0.467	0.434	0.512	0.338	0.351
Austria	0.642	0.155	0.140	0.046	0.018	0.456	0.576	0.466	0.443	0.507
Azerbaijan	0.617	0.225	0.103	0.034	0.021	0.494	0.582	0.486	0.495	0.395
Bahrain	0.665	0.110	0.157	0.039	0.028	0.413	0.419	0.513	0.329	0.490
Bangladesh	0.539	0.280	0.119	0.050	0.012	0.496	0.510	0.529	0.484	0.575
Belgium	0.499	0.260	0.170	0.042	0.029	0.483	0.566	0.447	0.357	0.318
Benin	0.643	0.149	0.129	0.050	0.029	0.440	0.437	0.419	0.336	0.434
Bolivia	0.465	0.292	0.176	0.044	0.023	0.439	0.435	0.583	0.443	0.584
Botswana	0.623	0.230	0.078	0.046	0.023	0.489	0.407	0.556	0.558	0.592
Brazil	0.698	0.156	0.099	0.034	0.013	0.424	0.555	0.463	0.472	0.596
Brunei Darussalam	0.679	0.150	0.114	0.038	0.019	0.415	0.474	0.533	0.560	0.332
Burkina Faso	0.582	0.248	0.119	0.030	0.020	0.425	0.443	0.496	0.549	0.490
Burundi	0.575	0.273	0.101	0.040	0.011	0.499	0.555	0.590	0.363	0.535
Cambodia	0.661	0.116	0.164	0.049	0.010	0.463	0.549	0.495	0.382	0.387
Cameroon	0.576	0.228	0.148	0.035	0.013	0.463	0.455	0.573	0.394	0.496
Canada	0.706	0.134	0.099	0.042	0.019	0.436	0.505	0.505	0.549	0.302
Chad	0.616	0.279	0.053	0.035	0.017	0.455	0.481	0.519	0.340	0.340
Chile	0.572	0.204	0.166	0.030	0.028	0.409	0.575	0.436	0.524	0.405
China	0.698	0.127	0.115	0.036	0.023	0.438	0.404	0.410	0.330	0.416
Colombia	0.515	0.287	0.129	0.042	0.027	0.405	0.558	0.403	0.411	0.529
Costa Rica	0.604	0.212	0.113	0.050	0.021	0.429	0.477	0.561	0.433	0.504
Cyprus	0.749	0.110	0.099	0.031	0.012	0.430	0.430	0.440	0.446	0.591
Czech Republic	0.626	0.169	0.142	0.043	0.020	0.499	0.439	0.596	0.314	0.567
Denmark	0.637	0.167	0.153	0.030	0.012	0.478	0.407	0.583	0.412	0.541
Egypt	0.579	0.289	0.067	0.044	0.021	0.480	0.505	0.415	0.301	0.465
El Salvador	0.540	0.259	0.156	0.033	0.012	0.411	0.576	0.433	0.493	0.593
Eritrea	0.668	0.106	0.156	0.041	0.029	0.480	0.566	0.569	0.495	0.535
Estonia	0.550	0.241	0.151	0.044	0.015	0.429	0.581	0.482	0.562	0.396
Fiji	0.712	0.115	0.111	0.040	0.022	0.461	0.470	0.436	0.317	0.437
Finland	0.734	0.110	0.097	0.031	0.028	0.484	0.538	0.548	0.366	0.496
France	0.607	0.188	0.156	0.036	0.013	0.405	0.433	0.454	0.320	0.371
Gabon	0.664	0.214	0.060	0.047	0.015	0.419	0.516	0.592	0.380	0.479
Germany	0.656	0.207	0.065	0.048	0.024	0.407	0.525	0.596	0.312	0.415
Ghana	0.644	0.218	0.085	0.040	0.013	0.469	0.520	0.476	0.412	0.542
Greece	0.581	0.189	0.172	0.047	0.010	0.447	0.418	0.599	0.468	0.464
Guatemala	0.637	0.232	0.066	0.035	0.030	0.406	0.508	0.405	0.333	0.437
Guyana	0.677	0.169	0.089	0.046	0.019	0.460	0.453	0.470	0.377	0.555
Hong Kong	0.662	0.163	0.105	0.047	0.023	0.403	0.528	0.555	0.443	0.591
Hungary	0.622	0.155	0.169	0.043	0.011	0.500	0.415	0.414	0.495	0.334
India	0.605	0.191	0.145	0.035	0.024	0.496	0.508	0.441	0.342	0.379
Indonesia	0.608	0.168	0.152	0.047	0.025	0.414	0.555	0.576	0.353	0.536
Iran	0.752	0.138	0.055	0.038	0.017	0.409	0.540	0.581	0.327	0.538
Iraq	0.545	0.249	0.146	0.043	0.016	0.443	0.598	0.490	0.335	0.423
Ireland	0.615	0.258	0.054	0.048	0.024	0.451	0.597	0.494	0.395	0.563
Israel	0.739	0.124	0.079	0.033	0.024	0.410	0.547	0.446	0.409	0.363
Italy	0.554	0.296	0.089	0.037	0.024	0.429	0.551	0.536	0.445	0.426
Japan	0.767	0.101	0.073	0.034	0.025	0.498	0.505	0.528	0.383	0.415

Jordan	0.543	0.236	0.161	0.038	0.023	0.408	0.454	0.595	0.448	0.369
Kazakhstan	0.602	0.170	0.158	0.044	0.025	0.408	0.418	0.520	0.599	0.583
Kenya	0.630	0.223	0.102	0.033	0.012	0.482	0.554	0.429	0.434	0.558
Korea, Rep.	0.533	0.288	0.131	0.036	0.013	0.427	0.426	0.540	0.577	0.561
Kuwait	0.666	0.104	0.164	0.048	0.018	0.466	0.452	0.408	0.398	0.394
Latvia	0.653	0.159	0.139	0.030	0.019	0.415	0.574	0.422	0.530	0.390
Lebanon	0.596	0.244	0.105	0.045	0.011	0.486	0.414	0.546	0.497	0.561
Liberia	0.547	0.230	0.148	0.046	0.029	0.417	0.590	0.565	0.434	0.495
Libya	0.657	0.188	0.109	0.032	0.013	0.485	0.511	0.493	0.301	0.430
Lithuania	0.689	0.144	0.108	0.034	0.025	0.418	0.545	0.598	0.450	0.423
Luxenberg	0.637	0.186	0.108	0.046	0.023	0.488	0.408	0.411	0.358	0.495
Madagascar	0.681	0.105	0.157	0.044	0.013	0.484	0.545	0.486	0.414	0.350
Malawi	0.633	0.187	0.130	0.032	0.017	0.436	0.412	0.544	0.423	0.530
Malaysia	0.541	0.257	0.142	0.040	0.020	0.419	0.466	0.599	0.424	0.520
Mali	0.552	0.264	0.119	0.037	0.029	0.493	0.476	0.435	0.531	0.554
Malta	0.672	0.202	0.054	0.050	0.022	0.476	0.541	0.436	0.585	0.470
Mauritania	0.698	0.107	0.135	0.041	0.020	0.426	0.560	0.485	0.550	0.381
Mauritius	0.628	0.226	0.088	0.031	0.027	0.413	0.431	0.505	0.304	0.415
Mexico	0.726	0.117	0.099	0.035	0.023	0.444	0.529	0.516	0.347	0.527
Morocco	0.656	0.163	0.123	0.032	0.025	0.469	0.432	0.588	0.505	0.434
Myanmar	0.490	0.265	0.174	0.049	0.021	0.491	0.446	0.438	0.475	0.529
Namibia	0.528	0.282	0.117	0.043	0.029	0.454	0.586	0.440	0.420	0.419
Netherlands	0.533	0.240	0.166	0.033	0.029	0.435	0.489	0.480	0.310	0.342
New Zealand	0.684	0.168	0.095	0.038	0.015	0.496	0.421	0.506	0.526	0.372
Nigeria	0.729	0.153	0.070	0.033	0.015	0.499	0.579	0.434	0.490	0.401
Norway	0.547	0.266	0.135	0.035	0.017	0.442	0.431	0.559	0.515	0.418
Oman	0.661	0.204	0.088	0.036	0.011	0.405	0.418	0.559	0.307	0.418
Pakistan	0.677	0.171	0.077	0.050	0.026	0.450	0.428	0.542	0.469	0.345
Paraguay	0.751	0.113	0.065	0.045	0.026	0.418	0.507	0.542	0.344	0.339
Peru	0.739	0.110	0.091	0.036	0.024	0.435	0.570	0.524	0.312	0.443
Philippines	0.591	0.253	0.085	0.047	0.024	0.466	0.533	0.552	0.417	0.319
Poland	0.723	0.129	0.093	0.033	0.023	0.405	0.576	0.418	0.529	0.550
Portugal	0.680	0.187	0.069	0.042	0.022	0.404	0.423	0.532	0.397	0.396
Qatar	0.710	0.155	0.076	0.047	0.013	0.437	0.567	0.531	0.317	0.511
Rwanda	0.533	0.278	0.140	0.036	0.012	0.453	0.484	0.440	0.496	0.335
Saudi Arabia	0.573	0.261	0.104	0.047	0.016	0.455	0.437	0.500	0.481	0.384
Senegal	0.571	0.240	0.126	0.048	0.015	0.435	0.560	0.572	0.423	0.446
Sierra Leone	0.751	0.117	0.065	0.044	0.023	0.452	0.442	0.509	0.442	0.592
Singapore	0.567	0.266	0.111	0.034	0.023	0.466	0.402	0.465	0.300	0.564
Slovak Republic	0.621	0.168	0.156	0.034	0.021	0.480	0.541	0.587	0.442	0.530
Slovenia	0.647	0.212	0.090	0.040	0.011	0.461	0.445	0.587	0.520	0.500
South Africa	0.580	0.199	0.154	0.040	0.028	0.461	0.437	0.539	0.586	0.448
Spain	0.663	0.135	0.151	0.040	0.010	0.457	0.476	0.559	0.323	0.391
Sri Lanka	0.579	0.189	0.180	0.035	0.018	0.470	0.441	0.532	0.391	0.458
Sudan	0.639	0.185	0.118	0.031	0.027	0.470	0.421	0.535	0.513	0.320
Swaziland	0.634	0.190	0.120	0.042	0.014	0.403	0.412	0.553	0.356	0.482
Sweden	0.499	0.265	0.163	0.047	0.026	0.408	0.442	0.410	0.426	0.580
Switzerland	0.682	0.157	0.095	0.035	0.030	0.438	0.415	0.586	0.341	0.513
Syria	0.710	0.108	0.130	0.037	0.015	0.454	0.590	0.503	0.326	0.423
Tailand	0.584	0.221	0.134	0.036	0.025	0.462	0.534	0.433	0.505	0.569
Taiwan	0.575	0.287	0.087	0.038	0.012	0.423	0.561	0.597	0.545	0.494
Tajikistan	0.636	0.183	0.120	0.031	0.030	0.432	0.498	0.592	0.502	0.381
Tanzania	0.578	0.223	0.148	0.035	0.015	0.474	0.444	0.600	0.388	0.337
Thailand	0.719	0.152	0.080	0.034	0.015	0.443	0.419	0.411	0.423	0.301
The Gambia	0.473	0.297	0.165	0.038	0.026	0.470	0.558	0.494	0.380	0.515
Tunisia	0.697	0.123	0.120	0.041	0.020	0.464	0.484	0.452	0.449	0.330
Turkey	0.707	0.124	0.105	0.037	0.027	0.498	0.481	0.408	0.529	0.528
Turkmenistan	0.646	0.177	0.119	0.042	0.016	0.427	0.507	0.582	0.489	0.568
Uganda	0.651	0.174	0.130	0.030	0.015	0.478	0.437	0.444	0.392	0.380
United Arab Emirates	0.714	0.116	0.122	0.036	0.012	0.433	0.469	0.527	0.507	0.313
United Kingdom	0.496	0.299	0.145	0.037	0.023	0.481	0.412	0.595	0.393	0.470

United States	0.606	0.261	0.073	0.035	0.026		0.474	0.524	0.528	0.520	0.362
Uruguay	0.631	0.152	0.160	0.031	0.027		0.490	0.527	0.404	0.371	0.510
Uzbekistan	0.671	0.106	0.156	0.042	0.025		0.401	0.494	0.498	0.395	0.591
Vietnam	0.515	0.262	0.149	0.050	0.024		0.411	0.422	0.429	0.363	0.580
Venezuela	0.672	0.133	0.136	0.039	0.019		0.496	0.566	0.403	0.598	0.550
Western Sahara	0.630	0.158	0.147	0.037	0.028		0.457	0.405	0.598	0.317	0.458
Yemen	0.558	0.234	0.152	0.037	0.020		0.450	0.427	0.515	0.560	0.590
Zambia	0.646	0.154	0.151	0.030	0.019		0.414	0.595	0.529	0.521	0.485
Zimbabwe	0.545	0.207	0.176	0.043	0.028		0.433	0.466	0.474	0.589	0.419
GS=Government Stability ,DA=Democratic Accountability Corruptionlaw and order Bureaucratic quality											

Table 4.3 Principal Component Analysis of business.

Business Index						
Country	% of Variance			Factor Scores		
	1	2	2	Business I	Business II	Business III
Albania	0.5604	0.2913	0.1483	0.4630	0.4254	0.4384
Algeria	0.4980	0.4677	0.0342	0.5549	0.4371	0.4100
Angola	0.5022	0.3858	0.1120	0.4043	0.4725	0.4143
Argentina	0.6562	0.3080	0.0358	0.4026	0.3596	0.4711
Armenia	0.4229	0.4743	0.1028	0.4431	0.4772	0.4315
Aruba	0.4487	0.4030	0.1483	0.4171	0.4951	0.4528
Australia	0.5772	0.3413	0.0815	0.4790	0.3329	0.4472
Austria	0.4076	0.4304	0.1619	0.5972	0.4933	0.4447
Azerbaijan	0.4659	0.4325	0.1016	0.4280	0.3033	0.4370
Bahrain	0.7132	0.2191	0.0677	0.5214	0.4965	0.4430
Bangladesh	0.5918	0.3138	0.0944	0.5172	0.3427	0.4364
Belgium	0.5813	0.2814	0.1373	0.5059	0.4059	0.4050
Benin	0.6531	0.2544	0.0924	0.4155	0.3460	0.4760
Bolivia	0.6299	0.2416	0.1285	0.5050	0.3517	0.4144
Botswana	0.6178	0.3407	0.0415	0.4646	0.3674	0.4354
Brazil	0.5883	0.2515	0.1602	0.5227	0.3319	0.4465
Brunei Darussalam	0.4685	0.4888	0.0427	0.5766	0.4058	0.4716
Burkina Faso	0.3953	0.4563	0.1485	0.5994	0.3828	0.4367
Burundi	0.6789	0.2734	0.0477	0.5087	0.4209	0.4987
Cambodia	0.4859	0.3801	0.1341	0.4103	0.3098	0.4564
Cameroon	0.4625	0.4802	0.0573	0.5573	0.4238	0.4577
Canada	0.6830	0.2244	0.0926	0.5113	0.3876	0.4032
Chad	0.5502	0.3648	0.0850	0.4424	0.3256	0.4130
Chile	0.7503	0.2014	0.0483	0.5341	0.4541	0.4855
China	0.5144	0.4572	0.0284	0.4990	0.3900	0.4528
Colombia	0.5841	0.3217	0.0942	0.5459	0.3776	0.4708
Costa Rica	0.6108	0.2961	0.0931	0.4249	0.4360	0.4329
Cyprus	0.7092	0.2241	0.0666	0.4713	0.4357	0.4995
Czech Republic	0.4743	0.3727	0.1529	0.4301	0.3619	0.4832
Denmark	0.7012	0.2264	0.0724	0.4778	0.3753	0.4945
Egypt	0.4144	0.4664	0.1192	0.5276	0.3177	0.4044
El Salvador	0.4774	0.4412	0.0813	0.4355	0.4440	0.4298
Eritrea	0.4999	0.4582	0.0419	0.4993	0.4940	0.4899
Estonia	0.3912	0.4880	0.1208	0.5878	0.4220	0.4699
Fiji	0.5859	0.3834	0.0307	0.5400	0.4352	0.4413
Finland	0.6453	0.2851	0.0696	0.4022	0.4702	0.4153
France	0.4763	0.3553	0.1683	0.4926	0.4829	0.4569
Gabon	0.6388	0.2993	0.0619	0.5280	0.4205	0.4224
Germany	0.6778	0.2685	0.0537	0.4419	0.3182	0.4198
Ghana	0.6335	0.2559	0.1106	0.4024	0.3905	0.4647
Greece	0.5336	0.3155	0.1509	0.4188	0.4882	0.4208
Guatemala	0.4731	0.4660	0.0609	0.5857	0.4873	0.4794
Guyana	0.5959	0.2820	0.1221	0.4463	0.4282	0.4275
Hong Kong	0.4419	0.4760	0.0821	0.4974	0.4826	0.4322
Hungary	0.4303	0.3938	0.1759	0.5970	0.4529	0.4997
India	0.5580	0.2721	0.1699	0.4994	0.4888	0.4128
Indonesia	0.7632	0.2089	0.0279	0.4034	0.4557	0.4506
Iran	0.5060	0.3352	0.1588	0.4196	0.4812	0.4485
Iraq	0.5431	0.4048	0.0521	0.4928	0.3263	0.4548
Ireland	0.5277	0.3084	0.1639	0.4511	0.4343	0.4468
Israel	0.5907	0.3724	0.0368	0.5627	0.3661	0.4982
Italy	0.5495	0.3369	0.1137	0.4676	0.4701	0.4999
Japan	0.6376	0.3071	0.0553	0.5559	0.3489	0.4995

Jordan	0.6019	0.3325	0.0657	0.5104	0.3734	0.4022
Kazakhstan	0.4883	0.4737	0.0381	0.5942	0.3984	0.4440
Kenya	0.5286	0.4347	0.0367	0.4079	0.3509	0.4494
Korea, Rep.	0.5955	0.2849	0.1196	0.4744	0.4627	0.4809
Kuwait	0.6659	0.3103	0.0237	0.4689	0.4759	0.4279
Latvia	0.4478	0.4437	0.1085	0.5126	0.3756	0.4611
Lebanon	0.5453	0.3040	0.1507	0.5549	0.3426	0.4843
Liberia	0.4086	0.4761	0.1152	0.4563	0.3549	0.4315
Libya	0.4284	0.4327	0.1389	0.5098	0.4168	0.4434
Lithuania	0.5687	0.3257	0.1056	0.4075	0.4829	0.4940
Luxenberg	0.6243	0.2965	0.0792	0.5206	0.3645	0.4755
Madagascar	0.5861	0.2875	0.1264	0.5653	0.4957	0.4159
Malawi	0.6840	0.2035	0.1125	0.5812	0.4782	0.4890
Malaysia	0.7211	0.2246	0.0543	0.4399	0.3416	0.4795
Mali	0.6196	0.3074	0.0730	0.5001	0.3338	0.4701
Malta	0.7137	0.2390	0.0472	0.4369	0.4892	0.4373
Mauritania	0.5138	0.3802	0.1060	0.4363	0.3704	0.4855
Mauritius	0.5273	0.3546	0.1181	0.5330	0.4348	0.4732
Mexico	0.6465	0.3104	0.0431	0.4334	0.3990	0.4487
Morocco	0.4811	0.3788	0.1401	0.4219	0.4028	0.4167
Myanmar	0.5053	0.3638	0.1309	0.4140	0.3772	0.4593
Namibia	0.4281	0.4228	0.1491	0.5242	0.4006	0.4419
Netherlands	0.6150	0.3018	0.0832	0.5503	0.4435	0.4113
New Zealand	0.6393	0.2303	0.1304	0.5641	0.3630	0.4261
Nigeria	0.4651	0.3603	0.1747	0.4754	0.4801	0.4823
Norway	0.4644	0.3962	0.1395	0.5310	0.4593	0.4593
Oman	0.6448	0.3283	0.0269	0.5928	0.4846	0.4596
Pakistan	0.6906	0.2812	0.0282	0.5983	0.4330	0.4477
Paraguay	0.5632	0.3075	0.1292	0.4662	0.3688	0.4733
Peru	0.7375	0.2058	0.0567	0.5978	0.3188	0.4091
Philippines	0.6473	0.3286	0.0241	0.4912	0.3394	0.4625
Poland	0.3801	0.4887	0.1312	0.4352	0.3728	0.4889
Portugal	0.6772	0.2173	0.1055	0.5466	0.3087	0.4613
Qatar	0.5410	0.3387	0.1203	0.4151	0.4701	0.4137
Rwanda	0.5674	0.2817	0.1509	0.5368	0.3436	0.4371
Saudi Arabia	0.5216	0.4090	0.0694	0.4904	0.3858	0.4663
Senegal	0.7744	0.2011	0.0245	0.4786	0.4870	0.4074
Sierra Leone	0.6012	0.3363	0.0625	0.5771	0.3027	0.4193
Singapore	0.5482	0.4295	0.0222	0.5901	0.3270	0.4383
Slovak Republic	0.5231	0.3553	0.1216	0.5672	0.4302	0.4875
Slovenia	0.6270	0.2825	0.0904	0.5349	0.3909	0.4738
South Africa	0.6630	0.2199	0.1170	0.5786	0.3147	0.4028
Spain	0.4217	0.4749	0.1034	0.4890	0.4128	0.4483
Sri Lanka	0.7718	0.2070	0.0212	0.4340	0.3361	0.4613
Sudan	0.6005	0.2328	0.1667	0.4918	0.4158	0.4707
Swaziland	0.6710	0.2363	0.0928	0.5755	0.4819	0.4741
Sweden	0.5397	0.3767	0.0836	0.5289	0.3681	0.4292
Switzerland	0.5695	0.3401	0.0904	0.4941	0.4979	0.4488
Syria	0.3342	0.4889	0.1768	0.5391	0.4302	0.4416
Tailand	0.6195	0.2245	0.1559	0.5100	0.4329	0.4442
Taiwan	0.4432	0.4615	0.0953	0.5223	0.4450	0.4664
Tajikistan	0.6201	0.2871	0.0928	0.5207	0.4907	0.4403
Tanzania	0.5538	0.3445	0.1018	0.4624	0.3057	0.4700
Thailand	0.5946	0.2414	0.1640	0.4174	0.4940	0.4825
The Gambia	0.5623	0.3924	0.0454	0.5956	0.4354	0.4877
Tunisia	0.4656	0.3777	0.1568	0.4498	0.3866	0.4780
Turkey	0.6253	0.2348	0.1399	0.5568	0.3812	0.4206
Turkmenistan	0.5047	0.3853	0.1100	0.5200	0.3231	0.4936

Uganda	0.6911	0.2408	0.0681		0.4476	0.4920	0.4363
United Arab Emirates	0.4748	0.4078	0.1175		0.5331	0.4423	0.4609
United Kingdom	0.6249	0.2255	0.1495		0.4377	0.4927	0.4357
United States	0.6616	0.3150	0.0234		0.5780	0.3405	0.4761
Uruguay	0.5050	0.4120	0.0830		0.5647	0.4594	0.4483
Uzbekistan	0.6438	0.2957	0.0605		0.4716	0.4832	0.4583
Vietnam	0.3864	0.4848	0.1288		0.5415	0.3063	0.4353
Venezuela	0.5461	0.3759	0.0780		0.4838	0.4467	0.4721
Western Sahara	0.6646	0.2255	0.1099		0.5471	0.3456	0.4308
Yemen	0.7162	0.2178	0.0660		0.4842	0.4019	0.4744
Zambia	0.6502	0.3280	0.0218		0.5478	0.3735	0.4349
Zimbabwe	0.4912	0.4873	0.0214		0.5647	0.4536	0.4755

Table 4.4 Principal Component Analysis of adaptive efficiency.

Adaptive Efficiency							
	1	2	3		Regulation	Governance	Business
Albania	0.6164	0.2330	0.1505		0.4954	0.4159	0.4487
Algeria	0.5478	0.3742	0.0780		0.5937	0.4274	0.4196
Angola	0.5524	0.3086	0.1389		0.4326	0.4620	0.4240
Argentina	0.7218	0.2464	0.0318		0.4308	0.3516	0.4822
Armenia	0.4652	0.3794	0.1554		0.4741	0.4666	0.4416
Aruba	0.4936	0.3224	0.1840		0.4463	0.4841	0.4634
Australia	0.6349	0.2730	0.0920		0.5125	0.3255	0.4577
Austria	0.4484	0.3443	0.2073		0.6390	0.4823	0.4551
Azerbaijan	0.5125	0.3460	0.1415		0.4580	0.2966	0.4473
Bahrain	0.7845	0.1753	0.0402		0.5579	0.4855	0.4534
Bangladesh	0.6510	0.2510	0.0980		0.5534	0.3351	0.4466
Belgium	0.6394	0.2251	0.1355		0.5413	0.3969	0.4145
Benin	0.7184	0.2035	0.0781		0.4446	0.3383	0.4872
Bolivia	0.6929	0.1933	0.1138		0.5404	0.3439	0.4241
Botswana	0.6796	0.2726	0.0479		0.4971	0.3592	0.4456
Brazil	0.6471	0.2012	0.1517		0.5593	0.3245	0.4570
Brunei Darussalam	0.5154	0.3910	0.0936		0.6170	0.3968	0.4827
Burkina Faso	0.4348	0.3650	0.2001		0.6414	0.3743	0.4469
Burundi	0.7468	0.2187	0.0345		0.5443	0.4115	0.5104
Cambodia	0.5345	0.3041	0.1614		0.4390	0.3029	0.4671
Cameroon	0.5088	0.3842	0.1071		0.5963	0.4144	0.4684
Canada	0.7513	0.1795	0.0692		0.5471	0.3790	0.4127
Chad	0.6052	0.2918	0.1029		0.4734	0.3184	0.4227
Chile	0.8253	0.1611	0.0136		0.5715	0.4440	0.4969
China	0.5658	0.3658	0.0684		0.5339	0.3813	0.4634
Colombia	0.6425	0.2574	0.1001		0.5841	0.3692	0.4818
Costa Rica	0.6719	0.2369	0.0912		0.4546	0.4263	0.4431
Cyprus	0.7801	0.1793	0.0406		0.5043	0.4260	0.5112
Czech Republic	0.5217	0.2982	0.1801		0.4602	0.3539	0.4945
Denmark	0.7713	0.1811	0.0476		0.5112	0.3670	0.5061
Egypt	0.4558	0.3731	0.1710		0.5645	0.3106	0.4139
El Salvador	0.5251	0.3530	0.1219		0.4660	0.4341	0.4399
Eritrea	0.5499	0.3666	0.0835		0.5343	0.4830	0.5014
Estonia	0.4303	0.3904	0.1793		0.6289	0.4126	0.4809
Fiji	0.6445	0.3067	0.0488		0.5778	0.4255	0.4517
Finland	0.7098	0.2281	0.0621		0.4304	0.4598	0.4250
France	0.5239	0.2842	0.1918		0.5271	0.4722	0.4676
Gabon	0.7027	0.2394	0.0579		0.5650	0.4112	0.4323
Germany	0.7456	0.2148	0.0396		0.4728	0.3111	0.4296
Ghana	0.6969	0.2047	0.0984		0.4306	0.3818	0.4756
Greece	0.5870	0.2524	0.1606		0.4481	0.4774	0.4307
Guatemala	0.5204	0.3728	0.1068		0.6267	0.4765	0.4906

Guyana	0.6555	0.2256	0.1189		0.4775	0.4187	0.4375
Hong Kong	0.4861	0.3808	0.1331		0.5322	0.4719	0.4423
Hungary	0.4733	0.3150	0.2116		0.6388	0.4428	0.5114
India	0.6138	0.2177	0.1685		0.5344	0.4779	0.4225
Indonesia	0.8395	0.1671	-0.0066		0.4316	0.4456	0.4612
Iran	0.5566	0.2682	0.1752		0.4490	0.4705	0.4590
Iraq	0.5974	0.3238	0.0787		0.5273	0.3190	0.4655
Ireland	0.5805	0.2467	0.1728		0.4827	0.4246	0.4573
Israel	0.6498	0.2979	0.0523		0.6021	0.3580	0.5099
Italy	0.6045	0.2695	0.1260		0.5003	0.4597	0.5116
Japan	0.7014	0.2457	0.0530		0.5948	0.3411	0.5112
Jordan	0.6621	0.2660	0.0719		0.5461	0.3651	0.4116
Kazakhstan	0.5371	0.3790	0.0839		0.6358	0.3895	0.4544
Kenya	0.5815	0.3478	0.0708		0.4365	0.3431	0.4599
Korea, Rep.	0.6551	0.2279	0.1170		0.5076	0.4524	0.4922
Kuwait	0.7325	0.2482	0.0193		0.5017	0.4653	0.4379
Latvia	0.4926	0.3550	0.1525		0.5485	0.3673	0.4719
Lebanon	0.5998	0.2432	0.1570		0.5937	0.3350	0.4957
Liberia	0.4495	0.3809	0.1697		0.4882	0.3470	0.4416
Libya	0.4712	0.3462	0.1826		0.5455	0.4075	0.4538
Lithuania	0.6256	0.2606	0.1139		0.4360	0.4722	0.5056
Luxemburg	0.6867	0.2372	0.0761		0.5570	0.3564	0.4867
Madagascar	0.6447	0.2300	0.1253		0.6049	0.4847	0.4257
Malawi	0.7524	0.1628	0.0848		0.6219	0.4676	0.5005
Malaysia	0.7932	0.1797	0.0271		0.4707	0.3340	0.4907
Mali	0.6816	0.2459	0.0725		0.5351	0.3264	0.4811
Malta	0.7851	0.1912	0.0237		0.4675	0.4783	0.4476
Mauritania	0.5652	0.3042	0.1307		0.4668	0.3622	0.4969
Mauritius	0.5800	0.2837	0.1363		0.5703	0.4251	0.4843
Mexico	0.7112	0.2483	0.0405		0.4637	0.3901	0.4592
Morocco	0.5292	0.3030	0.1678		0.4514	0.3938	0.4265
Myanmar	0.5558	0.2910	0.1531		0.4430	0.3688	0.4701
Namibia	0.4709	0.3382	0.1909		0.5609	0.3917	0.4523
Netherlands	0.6765	0.2414	0.0821		0.5888	0.4336	0.4209
New Zealand	0.7032	0.1842	0.1125		0.6036	0.3549	0.4361
Nigeria	0.5116	0.2882	0.2002		0.5087	0.4694	0.4936
Norway	0.5108	0.3170	0.1722		0.5682	0.4491	0.4701
Oman	0.7093	0.2626	0.0281		0.6343	0.4738	0.4704
Pakistan	0.7597	0.2250	0.0154		0.6402	0.4234	0.4582
Paraguay	0.6195	0.2460	0.1345		0.4988	0.3606	0.4844
Peru	0.8113	0.1646	0.0241		0.6396	0.3117	0.4187
Philippines	0.7120	0.2629	0.0251		0.5256	0.3319	0.4733
Poland	0.4181	0.3910	0.1909		0.4657	0.3645	0.5004
Portugal	0.7449	0.1738	0.0812		0.5849	0.3018	0.4721
Qatar	0.5951	0.2710	0.1339		0.4442	0.4597	0.4234
Rwanda	0.6241	0.2254	0.1505		0.5744	0.3360	0.4474

Saudi Arabia	0.5738	0.3272	0.0990		0.5247	0.3772	0.4772
Senegal	0.8518	0.1609	-0.0127		0.5121	0.4762	0.4170
Sierra Leone	0.6613	0.2690	0.0696		0.6175	0.2960	0.4291
Singapore	0.6030	0.3436	0.0534		0.6314	0.3197	0.4486
Slovak Republic	0.5754	0.2842	0.1404		0.6069	0.4206	0.4989
Slovenia	0.6897	0.2260	0.0843		0.5723	0.3822	0.4849
South Africa	0.7293	0.1759	0.0948		0.6191	0.3077	0.4122
Spain	0.4639	0.3799	0.1562		0.5232	0.4036	0.4588
Sri Lanka	0.8490	0.1656	-0.0146		0.4644	0.3286	0.4721
Sudan	0.6606	0.1862	0.1532		0.5262	0.4066	0.4817
Swaziland	0.7381	0.1890	0.0729		0.6158	0.4712	0.4852
Sweden	0.5937	0.3014	0.1050		0.5659	0.3599	0.4393
Switzerland	0.6265	0.2721	0.1015		0.5287	0.4868	0.4593
Syria	0.3676	0.3911	0.2413		0.5768	0.4206	0.4520
Tailand	0.6815	0.1796	0.1390		0.5457	0.4233	0.4546
Taiwan	0.4875	0.3692	0.1433		0.5589	0.4351	0.4773
Tajikistan	0.6821	0.2297	0.0882		0.5571	0.4798	0.4506
Tanzania	0.6092	0.2756	0.1152		0.4948	0.2989	0.4810
Thailand	0.6541	0.1931	0.1528		0.4466	0.4830	0.4938
The Gambia	0.6185	0.3139	0.0676		0.6373	0.4257	0.4991
Tunisia	0.5122	0.3022	0.1857		0.4813	0.3780	0.4892
Turkey	0.6878	0.1878	0.1243		0.5958	0.3727	0.4305
Turkmenistan	0.5552	0.3082	0.1366		0.5564	0.3159	0.5052
Uganda	0.7602	0.1926	0.0471		0.4789	0.4811	0.4465
United Arab Emirates	0.5223	0.3262	0.1515		0.5704	0.4325	0.4717
United Kingdom	0.6874	0.1804	0.1322		0.4683	0.4818	0.4459
United States	0.7278	0.2520	0.0202		0.6185	0.3329	0.4873
Uruguay	0.5555	0.3296	0.1149		0.6042	0.4492	0.4588
Uzbekistan	0.7082	0.2366	0.0553		0.5046	0.4725	0.4691
Vietnam	0.4250	0.3878	0.1871		0.5794	0.2995	0.4455
Venezuela	0.6007	0.3007	0.0986		0.5177	0.4368	0.4832
Western Sahara	0.7311	0.1804	0.0885		0.5854	0.3379	0.4409
Yemen	0.7878	0.1742	0.0379		0.5181	0.3930	0.4855
Zambia	0.7152	0.2624	0.0224		0.5861	0.3652	0.4451
Zimbabwe	0.5403	0.3898	0.0698		0.6042	0.4435	0.4867

Table 4.6 List of Countries

Sr. No	Country	Sr. No	Country	Sr. No	Country
1	Albania	42	Guatemala	83	Peru
2	Algeria	43	Guyana	84	Philippines
3	Angola	44	Hong Kong	85	Poland
4	Argentina	45	Hungary	86	Portugal
5	Armenia	46	India	87	Qatar
6	Aruba	47	Indonesia	88	Rwanda
7	Australia	48	Iran	89	Saudi Arabia
8	Austria	49	Iraq	90	Senegal
9	Azerbaijan	50	Ireland	91	Sierra Leone
10	Bahrain	51	Israel	92	Singapore
11	Bangladesh	52	Italy	93	Slovak Republic
12	Belgium	53	Japan	94	Slovenia
13	Benin	54	Jordan	95	South Africa
14	Bolivia	55	Kazakhstan	96	Spain
15	Botswana	56	Kenya	97	Sri Lanka
16	Brazil	57	Korea, Rep.	98	Sudan
17	Brunei Darussalam	58	Kuwait	99	Swaziland
18	Burkina Faso	59	Latvia	100	Sweden
19	Burundi	60	Lebanon	101	Switzerland
20	Cambodia	61	Liberia	102	Syria
21	Cameroon	62	Libya	103	Tailand
22	Canada	63	Lithuania	104	Taiwan
23	Chad	64	Luxenberg	105	Tajikistan
24	Chile	65	Madagascar	106	Tanzania
25	China	66	Malawi	107	Thailand
26	Colombia	67	Malaysia	108	The Gambia
27	Costa Rica	68	Mali	109	Tunisia
28	Cyprus	69	Malta	110	Turkey
29	Czech Republic	70	Mauritania	111	Turkmenistan
30	Denmark	71	Mauritius	112	Uganda
31	Egypt	72	Mexico	113	United Arab Emirates
32	El Salvador	73	Morocco	114	United Kingdom
33	Eritrea	74	Myanmar	115	United States
34	Estonia	75	Namibia	116	Uruguay
35	Fiji	76	Netherlands	117	Uzbekistan
36	Finland	77	New Zealand	118	Venezuela
37	France	78	Nigeria	119	Vietnam
38	Gabon	79	Norway	120	Western Sahara
39	Germany	80	Oman	121	Yemen
40	Ghana	81	Pakistan	122	Zambia
41	Greece	82	Paraguay	123	Zimbabwe

Table 5.2: Financial Development and Economic Growth : The Role of Adaptive Efficiency (GMM Methodology) Developing Countries

Dependent variables is Per-Capita GDP						
Regressors						
<i>Financial Development</i>	0.5844***	0.3190*	0.1700***	0.4933***	0.3365**	0.1691***
	(0.0998)	(0.1679)	(0.0529)	(0.1978)	(0.1414)	(0.0514)
<i>Regulations</i>	0.5832***					0.5624**
	(0.1439)					(0.1981)
<i>Governance</i>		0.7948***				0.2053**
		(0.2890)				(0.0864)
<i>Business</i>			0.9844***			0.3650***
			(0.2014)			(0.1452)
<i>Adaptive Efficiency</i>				0.2145***	0.9021***	0.7523**
				(0.0529)	(0.1996)	(0.3873)
<i>AE*FD</i>					0.8399***	0.6795***
					(0.1785)	(0.1780)
<i>Inflation</i>	0.2055**	0.0338	0.1591*	0.7194***	0.5999	0.8111
	(0.0969)	(0.0669)	(0.0980)	(0.2311)	(0.7101)	(0.9508)
<i>Trade Openness</i>	0.5586*	0.6502***	0.6395*	0.6791***	0.9807***	0.6255**
	(0.2992)	(0.1656)	(0.3694)	(0.1909)	(0.1444)	(0.2934)
<i>Education</i>	0.2775***	0.7869***	0.7334***	0.4002**	0.4903***	0.6436***
	(0.1097)	(0.2699)	(0.1614)	(0.1434)	(0.1521)	(0.0571)
<i>Foreign Direct Investment</i>	0.1957***	0.9151***	0.3806***	0.7873***	0.5951***	0.4125**
	(0.0788)	(0.1991)	(0.0793)	(0.1556)	(0.1762)	(0.1887)
<i>Human Capital</i>	0.4546***	0.9038***	0.3579**	0.6804***	0.5172**	0.5743***
	(0.1386)	(0.2291)	(0.1364)	(0.1588)	(0.2706)	(0.1536)
<i>Lag of Dependent Variable</i>	0.3108**	0.9454***	0.6740***	0.7816**	0.2145***	0.4084**
	(0.1383)	(0.1363)	(0.2474)	(0.3380)	(0.0144)	(0.1733)
<i>CONSTANT</i>	0.6332***	0.1746**	0.1965**	0.6642***	0.9306***	0.1265**
	(0.0566)	(0.0770)	(0.0694)	(0.1360)	(0.3134)	(0.0714)
Diagnostic Test						
N						
R2	0.3201	0.3993	0.3289	0.5825	0.6248	0.6271
AR(2)	0.2477	0.1869	0.2205	0.1478	0.2755	0.3000
Sargan	0.4626	0.2486	0.3571	0.2433	0.3542	0.3097
. Note1: *, **, and *** show the 10%, 5% and 1% level of significance.						

Table 5.3: Financial Development and Economic Growth : The Role of Adaptive Efficiency (GMM Methodology) Developed Countries

Dependent variables is Per-Capita GDP						
Regressors						
<i>Financial Development</i>	0.5265***	0.7418***	0.5002***	0.3243**	0.5161***	0.4342**
	(0.2001)	(0.1910)	(0.1689)	(0.1263)	(0.1388)	(0.2161)
<i>Regulations</i>	0.9856***					0.3315**
	(0.4479)					(0.1707)
<i>Governance</i>		0.2772***				0.1391*
		(0.0374)				(0.0817)
<i>Business</i>			0.9766***			0.5257***
			(0.1182)			(0.1576)
<i>Adaptive Efficiency</i>				0.1273***	0.3701***	0.7610**
				(0.0348)	(0.0866)	(0.3331)
<i>AE*FD</i>					0.8215**	0.2677**
					(0.3702)	(0.1025)
<i>Inflation</i>	0.4827**	0.7108***	0.2499**	0.7166**	0.8302	0.1439
	(0.2340)	(0.1478)	(0.1033)	(0.3098)	(0.7519)	(0.1407)
<i>Trade Openness</i>	0.1986**	0.7664***	0.5361**	0.9900***	0.7521***	0.1979*
	(0.0789)	(0.1999)	(0.2076)	(0.3038)	(0.1776)	(0.1024)
<i>Education</i>	0.5162***	0.7477***	0.6065	0.1169	0.7950*	0.5547**
	(0.0601)	(0.1275)	(0.5854)	(0.1668)	(0.5690)	(0.1538)
<i>Foreign Direct Investment</i>	0.8695***	0.5997***	0.2865***	0.1413**	0.7812*	0.3950**
	(0.2777)	(0.0419)	(0.0628)	(0.0584)	(0.4159)	(0.1573)
<i>Human Capital</i>	0.1601**	0.1532**	0.1673***	0.8960***	0.6501	0.5671**
	(0.0870)	(0.0764)	(0.0558)	(0.1599)	(0.8017)	(0.1994)
<i>Lag of Dependent Variable</i>	0.3975***	0.5719***	0.8146**	0.2135**	0.1193***	0.1655**
	(0.1233)	(0.1892)	(0.2983)	(0.1061)	(0.0300)	(0.0672)
<i>CONSTANT</i>	0.8846***	0.2693***	0.6060***	0.4421**	0.1483	0.0691***
	(0.0679)	(0.0589)	(0.0466)	(0.1591)	(0.5101)	(0.0235)
Diagnostic Test						
N						
R2	0.2777	0.2736	0.2688	0.3556	0.4870	0.5766
AR(2)	0.7122	0.5177	0.5894	0.7477	0.5592	0.6211
Sargan	0.8016	0.1824	0.5167	0.6535	0.3134	0.7149
. Note1: *, **, and *** show the 10%, 5% and 1% level of significance.						

Table 5.4: Financial Development and Economic Growth : The Role of Adaptive Efficiency Fixed-effects (within) Regression

Dependent variables is Per-Capita GDP						
<i>Financial Development</i>	0.3257*	0.4375***	0.7207***	0.3591***	0.9666**	0.3095**
	(0.1874)	(0.1333)	(0.2914)	(0.0702)	(0.4559)	(0.1469)
<i>Regulations</i>	0.0472***	NA	NA	NA	NA	0.0668***
	(0.0097)	NA	NA	NA	NA	(0.0284)
<i>Governance</i>	NA	0.8276***	NA	NA	NA	0.3279*
	NA	(0.1090)	NA	NA	NA	(0.1710)
<i>Business</i>	NA	NA	0.8055***	NA	NA	0.3497***
	NA	NA	(0.1934)	NA	NA	(0.0425)
<i>Adaptive Efficiency</i>	NA	NA	NA	0.3071***	0.1261***	0.2549***
	NA	NA	NA	(0.0955)	(0.0267)	(0.1076)
<i>AE*FD</i>	NA	NA	NA	NA	0.2397***	0.6914***
	NA	NA	NA	NA	(0.0796)	(0.1644)
<i>Inflation</i>	0.3089***	0.0896	0.1437	0.6997*	0.5584	0.5548***
	(0.0833)	(0.0849)	(0.1553)	(0.3674)	(0.9245)	(0.1557)
<i>Trade Openness</i>	0.6831***	0.3352*	0.4981***	0.4749***	0.8658***	0.4443***
	(0.2779)	(0.1779)	(0.0904)	(0.1491)	(0.1274)	(0.1384)
<i>Education</i>	0.4828**	0.8934***	0.5141***	0.9849**	0.4515**	0.9386***
	(0.1729)	(0.1765)	(0.1766)	(0.4477)	(0.2250)	(0.2331)
<i>Foreign Direct Investment</i>	0.7351**	0.2684***	0.6921***	0.8239**	0.4994***	0.4432***
	(0.3578)	(0.0858)	(0.1793)	(0.3791)	(0.1965)	(0.1610)
<i>Human Capital</i>	0.5345***	0.5745***	0.2725***	0.3010	0.6697***	0.1783***
	(0.1786)	(0.2011)	(0.0653)	(0.2471)	(0.2309)	(0.0291)
<i>CONSTANT</i>	0.0882*	0.9069***	0.0348	0.4723	0.7323***	0.7319
	(0.1043)	(0.2058)	(0.8521)	(0.5384)	(0.1170)	(0.5274)
Diagnostic Test						
R2	0.4673	0.4370	0.4172	0.4799	0.4721	0.4946
<p>Note: Heteroscedasticity consistent Standard Errors are presented in Parenthesis. Note2: *, **, and *** show the 10%, 5% and 1% level of significance.</p>						