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EMPRICAL RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND EOCNOMIC GROWTH

AN ARDL CO-INTEGRATION APPROACH FOR PAKISTAN

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I ABDUL MAJID KHAN, hereby declare that this dissertation entitled

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DEDICATION

This work is dedicated to my parents. All I have and will accomplish are only possible due to their love and sacrifices.

ABSTRACT

The study examined the empirically relationship between Foreign Direct Investment (FDI) and Economic Growth (EG) in Pakistan, from 1975-2013, the study employed Autoregressive Disttrubted Lag Approach (ARDL), the study used Augmented Dickey Fuller (ADF) and Phillips Perron test (PP) to check the presence of unit root and found out that all the variables are stationary at first differencing except Inflation was stationary at level they are mixture of I(1) and I(0). We also used bound test to check the cointegration of the model equation, which reveal the presence of cointegration long-run relationship between economic growth and other selected macro economic variables (Trade Openness, Total Debt, Inflation, Domestic Saving and Gross Capital Formation). The main aim of the study was to examine the relationship between Foreign Direct Investment (FDI) and economic growth, either in long-or short-run effects, also the highlight the relationship status between the variables included in the model and granger causality between FDI and economic growth in Pakistan. On the basis of the empirical results acquired, Policy proposals are advised to attract FDI in Pakistan. Foreign Direct Investment (FDI) is essential for economic growth in developing countries. FDI allows transfer the transfer of technology, uplift in the domestic competition in the domestic input market, contributes to human capital development.

Keywords: Foreign Direct Investment, ARDL Approach to cointegration, Economic growth, Granger causality

ÖZ

Bu çalışma, 1975-2013 yılları arasında Pakistan'daki Yabancı Sermaye Yatırımı ile ekonomi arasındaki ilişkiyi deneysel olarak açıklamaya çalışmıştır. Çalışmada ARDL, ADF ve birim kök için Phillips Perron testi kullanılmıştır. Enflasyon dışında bütün değişkenler 1. Türev sonrasında durağan çıkmıştır. Ayrıca ekonomik büyüme ve diğer değişkenler arasındaki uzun vade ilişkisini ölçmek için bağlı test kullanılmıştır. Çalışmanın esas amacı Yabancı Sermaye Yatırımı ile ekonomik büyüme arasındaki ilişkinin uzun vadede veya kısa vadedeki etkisini ortaya çıkarmaktır. Ayrıca değişkenler arasındaki ilişkiyi ve Yabancı Sermaye Yatırımı ile ekonomik büyüme arasındaki nedensellik ilişkisine vurgulanmıştır. Elde edilen deneysel sonuçlar doğrultusunda Pakistan'a Yabancı Sermaye Yatırımını çekmek için politika tasarısı tavsiye edilmiştir. Gelişmekte olan ülkelerde, ekonomk büyüme için Yabancı Sermaye Yatırımı gerekli bir araçtır. Yabancı Sermaye Yatırımı, teknoloji aktarımına, yerel piyasada yerel rekabeti kalkındırmaya ve insan sermayesinin gelişimine katkıda bulunmaktadır.

Anahtar kelimeler: Yabancı Sermaye Yatırımı, eşbütünleşme için ARDL yaklaşım, ekonomik büyüme, nedensellik

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
PP	Phillips Perron
ARDL	Auto Regressive Disttrubted Lag
CPI	Consumer Price Index
ECM	Error Correction Model
FDI	Foreign Direct Investment
INF	Inflation
EG	Economic Growth
OLS	Ordinary Least square
TD	Total Debt
TO	Trade Openness
DS	Domestic Saving
GCF	Gross Capital Formation
RGDPGR	Real Gross Domestic Product Growth Rate

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Nowadays, Foreign Direct Investment (FDI) has been a important subject in the field world economics. In an era of volatile flows of international capital, the solidity of FDI and its materialization is a significant source of foreign capital for developing countries, has transformed interest in its relationship with sustainable economic growth. Indeed, for developing economies, net inflows of FDI have increased almost five times from an average of 0.44 % of GNP in the period of 1970-74 to 2.18 percent of GNP in the period 1993-97. FDI now forms a major component domestic investment activity in developing economies accounting for more than 8% of Gross Domestic Investment (GDI) in the mid 1990s up from 2% of GDI in the early 1970s. This dramatic development has taken place simultaneously with a substantial growth in international trade. Finally, FDI is now the pre-eminent source of capital flows in the mid- 1990s up from approximately 18% of flows in the 1970-74 period (UNCTAD, 2000, 2004 and 2006). The massive increase in the volume of FDI during the last twenty years provides a strong incentive for study on this phenomenon.

The ongoing processes of integration of the worldwide economy and liberalization of the economies in many developing countries have led to a ferocious competition for inward FDI. The attitude towards inward FDI has changed significantly over the last couple of decades, as majority of the countries have liberalized their policies to magnetize investments from foreign MNCs. Both developed and developing countries have practiced enlarged inflows of FDI, with some fluctuations over year to year. Developed countries have attracted bulk of FDI since mid1970s but on the other hand the developing countries remain unsuccessful to create an enabling atmosphere for foreign investors (UNCTAD, 2004).

According to UNs conference report in (2002), FDI has contributed to economic growth which includes: potential transfer of technology, creating job opportunities, knowledge, enhances competitiveness and private enterprise.

UNCTAD (2006) asserts that FDI have the ability to generate employment opportunities, increased productivity, transfer foreign skills and technology, enhance exports and contribute to the long-term economic growth of the world's developing countries. Moreover, over some 64000 foreign affiliates of Transactional Corporations (TNCs) generate 53 million jobs. FDI is the largest external finance of developing countries, and inward stock of FDI in the year 2000 amounted to around one-third of their GDP, as compared to just 10 percent in 1980.

According to UNCTAD (2000), the average annual inflow of FDI increased from an amount $159 billion over 1986-91 to $865 billion in 1999. FDI inflow as a percentage of domestic capital formation in the world grews from 2.3 percent in 1980 to 11.1 percent in 1998. Therefore, the contribution of multinational companies (MNCs) in the world's GDP was 25 percent in 1997. Approximately 90 percent in trade in technology and technology intensive products and three-quarters in Research & Development are conducted by Multinational Companies.

It has been argued that economic growth depends on technology transfer and FDI can play a key role because it encourages technology diffusion. Zhang (2001) has experienced that FDI is likely to be an engine for the host country's economic growth because (i) it intakes FDI, creates capital formation and jobs opportunities (ii) FDI encourages or boost up to promote manufacturing exports (iii) FDI bring bulk of resources opportunities to the host country like: man power skills, skilled labor from international markets and management skills e.t.c. (iv) FDI may encourage technology transfer and spillover effects.

Historically, FDI inflows in developing countries followed irregular paths at the beginning of 1980s and gradually started increasing in the successive period. This inflow

has jumped from $10100 million in year 1986 to 87124 million in the year. The volume of FDI has been varied significantly across countries. Specifically, China received maximum 31 percent of the entire FDI while Brazil received 13 percent and last India and Venezuela received almost close to three (03) percent. The inflow of FDI in Pakistan was approximately $1101.7 millions in year 1995-96 and was jumped to $1524 at the end of 2004-05. Currently it was round about $ 4020.2 million.

Despite of the growing volume of these inflows to developing countries, this resulted in the gap between FDI flows to develop and developing countries and it has broader in the mid years 1980s. This was largely due to three factors, firstly the continuing economic complexities faced by several developing countries and these difficulties have made them less attractive for trans-national corporations. Secondly the growing importance of technologically intensive instruments favoring locations in other developed countries and thirdly the fear of a rise in protectionist forces in the European Community and in the United States UNCTAD (2006).

Vast body of literature proposes that FDI is related with economic situation of the host country. From the foreign investors' point of view, FDI is justified by essential differences in production costs due to factor productivity and payment differentials across countries Aggarwal (1980). Consolidating the market shares overseas also stimulates FDI. From the recipient economic point of view, FDI is attractive and important for a numeral of reasons, varying from growth enhancement via capital accrual and deepening to technological improvement (Kokko et al, 1996). FDI is also projected to incorporate domestic firms in international production and investment networks, which is likely to increase efficiency and output growth. In addition to this, FDI comprises an excellent source of present account financing and Balance of Payments (BOPs) relief, particularly if it is export-oriented and saving-enhancing. In an international economy, macroeconomic unsteadiness and policy-induced alterations in goods and capital markets tend to minimize the location advantage of a host country in

the competition for inward FDI and capital inflows (Lim, 1983).

In the fast changing global economic landscape, almost every country including developed and developing, large and small alike have required FDI to make their development process easy. FDI is frequently undertaken with the purpose of enjoying control over a venture rather than simply achieving an inert voice in corporate affairs. Thus, the FDI can exercise more deep influence on country's growth; industrial structure; employment and trade patterns than other capital flows (UNCTAD, 2004). Hence, FDI can affect the intensity of output and trade of a country by serving as an engine of growth and development (Meyer, 1988). This unparalleled boost in the size of FDI in developing countries has encouraged research on FDI and economic growth linkages, because it has intensely changed the shape and structure of the modern and current global economy (UNCTAD, 2006).

1.2 Problem statement

In last two (02) decades ago, FDI has been key sources of external financing for developing countries like Pakistan. FDI is considered by different economist and international institutions as key player for enhancing economic growth as well as solve the problem of developing countries. Mostly FDI is defined as an investment involving the transfer human and capital assets, including: financial capital, advanced technology, better managerial practices etc

Empirically enormous of studies have been conducted on FDI through which it concluded that FDI boosted up the economic growth, improve the standard of living, reduced poverty e.t.c. However there is also evidence that FDI have negative effect, while some evidence supported that FDI does not affect the economic growth. Some views are that FDI accelerates economic growth.

It is in line of the above authors'ambiguity in results that this study intends to investigate the empirical effects that FDI may have had on the economic growth of Pakistan.

1.3 Objective of the study

The main objective of the study is to examine the empirical relationship between Foreign Direct Investment (FDI) and Economic Growth (EG) from of 1975-2013 using Bound Test of cointegration approach and causality test by Granger (1969) method. To achieve this broader objective, study is specially defined to:

- Explore the significant relationship between Trade Openness (TO), Total Debt (TD), Inflation (INF), Domestic Saving (DS), Gross Capital Formation (GCF) and Economic Growth (EG) in Pakistan.
- Examine the causal linkage between Foreign Direct Investment (FDI) and Economic Growth (EG) in Pakistan.

1.4 Hypothesis of the study

The hypothesis that this study seek to verify are as stated below:

H0a: There is no significant impact of FDI on EG.

H1a: There is significant impact of FDI on EG.

H0b: There is no significant impact of TO on EG.

H1b: There is significant impact of TO on EG.

H0c: There is no significant impact of TD on EG.

H1c: There is significant impact of TD on EG.

H0d: There is no significant impact of INF on EG.

H1d: There is significant impact of INF on EG.

H0e: There is no significant impact of DS on EG.

H1e: There is significant impact of DS on EG.

H0f: There is no significant impact of GCF on EG.

H1f: There is significant impact of GCF on EG.

H0g: FDI does not granger cause EG.

H1g: FDI granger cause EG.

H0h: EG does not granger cause FDI.

H1h: FDI granger cause EG.

1.5 Justification of the Study

As limited studies have been carried out to investigate the empirical relationship between FDI and EG therefore, this study will prove an effective contribution to the existing literature. Moreover, the study will provide an insight about 'Empirical Relationship' between FDI and economic growth of Pakistan and its macro impact on Pakistan economy. Furthermore, it will help the legal bodies and government authorizes in decision making and promoting the stipulation of FDI for better and prolific consequences.

1.6 Significance of the study

As an attempt to add to the growing body of empirical studies on the relationship between FDI and economic growth and to answer the question of whether or not the selected variables influence the economic growth in the context of Pakistan, this study will use developed econometric techniques to empirically investigate this question.

1.7 Structure of the study

The study is structured into six chapters. The first chapter is already discussed above Chapter two presents the summary of existing theoretical and empirical literature on FDI-growth interaction. Chapter three represents an overview of FDI policy in Pakistan. Chapter four consists of data description and methodology of the study. Chapter five

focuses on the data analysis model estimations. Chapter six comprises the summary, conclusions and policy recommendations.

CHAPTER 2

EMPIRICAL LITERATURE REVIEW

2.1 Introduction

This chapter gives a detailed literature review in the field of FDI and economic growth and other related variables included in the study. The first section covers empirical literature review of interest in topics, and the second sections draw literature comments.

2.2 Empirical Literature Review

The literature on economics pertains that FDI is running the blood for economic growth of a country. The concept of FDI is not very new in the literature. Its different aspects have been explored and evaluated in the past. However, determinants and empirical relationship of FDI has been investigated on theoretical basis without empirical evidence. With the passage of time econometric models, equations, mathematical and statistical techniques were used to find the impact of FDI on empirical basis. These results are different from prior studies. Early studies are totally based on internationally trade, firm and pure economic theory while latest studies, are based on perfect competition, identical production functions and zero production cost (Kindleberger, 1984). Current theories are based on important assumptions of imperfections, oligopolistic interdependence and monopoly advantage. These assumptions will bear the actual impact of FDI on economic growth and determining the FDI inflows.

The literature is mainly dominated by the studies that investigate the statistical relationship between FDI and Economic growth. Most of the studies have been conducted on international level. Well known scholars have concluded that the relationship exist between the two variables whereas; some of them also emphasize on their negative effects. There are some scholars who do not find any relationship between the two variables. In this study the important empirical studies are critically reviewed in

order to develop objectives in framework of Pakistan and further analyze it to illustrate various critical conclusions and policy recommendations.

In this section, a selected number of the empirical studies are reviewed. The empirical studies reviewed are classified in to five groups: (i) Foreign Direct Investment, Trade Openness, Total Debt and Economic Growth (ii) Inflation and Economic Growth (iii) Domestic Saving and Economic Growth (iv) Gross Capital Formation and Economic Growth (v) Literature comments

2.2.1 Foreign Direct Investment, Trade Openness, Total Debt and Economic Growth

On the basis of empirical evidence from LDCs, Chenery and Strout (1996), concluded that FDI has a positive impact on economic growth. Later on, some other reliable studies also argued that FDI stimulate the economic growth. On the other hand some other economist views, Leff (1969) and Griffin (1970), have examined its negative impact on economic growth. They argued that FDI drastically affect the economic growth by substituting the domestic savings. Therefore; the literature on the effectiveness of FDI reflects both its positive and negative impact on economic growth. It is revealed that aid increases the growth rate and this result is not conditional 'good policy'. Although, there are some returns to foreign economic assistance while the projected assistance of FDI is strictly responsive to the estimators' choice and to the controlled variables set. By putting restriction on a human capital and investment activities not a single positive effect was observed in FDI. Moreover, foreign aid stimulates the economic growth through investment.

MacDoughall (1960), studied the cost and benefit of FDI from abroad. In his hypothetical approach the impact of FDI on economic growth is based on simple and easy neoclassical framework. Mah (1965), is of the view that those countries which import capital have brighter future as compared to those which export capital. He place special emphasis on the productivity of FDI. Otherwise, the countries receiving it might

not get actual benefits. Therefore, the analysis of early literature of 1960s demonstrates that the impact of economic growth is favorable in the short run but the benefits of the FDI are not sustainable in long run. Dramatically the world economy has been changed over the last twenty years. In 1960s and 1970s, majority of the countries were not interested in FDI. Now most of the countries observed FDI as an economic indicator in development of a country. In liberalization age, several studies were conducted to investigate the effects of FDI on economic growth globally and internationally.

Bhagwati (1978), analyzed the effect of FDI with special evidence to international trade and economic development. The results concluded that those countries which adopt export led growth strategy could get enormous benefit from FDI. On the other hand, policies of import substitution are applicable when two exchange rates are not identical. Balasubramanyam et.al (1992) analyzed the same hypothesis proposed by Bhagwati. His results are also in support of outward oriented approach because growth rate is higher as compared to import oriented approach.

Stoneman (1975), examined that how FDI influences the economic growth for developing countries. His results concluded that FDI expend the output level for those countries which have higher capital stock as well as increase the Balance of Payment (BOP) status. Furthermore, the countries where capital is less as compared to labor or the labor-capital ratio is small will expect to have additional profits, a larger capital formation and more per capita growth.

Furthermore, Sung-Hoon Lim et.al (1998), explains the benefit of FDI and argued that FDI inflows provides wide range of affirmative externalities e.g. consistent foreign capital inflow, create employment opportunities, increase in Gross National Products (GNP), improvement in balance of payments and transferring technical skills to the host country. These are the key goal of FDI inducing policy.

Soboleva (1999) in her studies constructed a dynamic structural model for the firms to study the impact of trade policy on FDI. She assumed tariff and non-tariff barriers with

export and link between trade policy and investment decisions. The literature is limited to define multiple of factors that explains the attraction of FDI to host country. Briefly these factors are political stability, macro-economic factors and growth strategy factors of the host country.

Santiago (1987), studied the impact of FDI on economic growth along with its determinant for the first time. The study considered a variety of determinants of FDI in the field of exports for Puerto Rice in the year 1979. The study explains that only low cost of labor is not a key determinant of FDI. The study also argued that size of the firm, depends upon the FDI inflows in the industry. In addition to this, performance of macroeconomic factors also affects the FDI of the host country. Furthermore, Balamstram (1986), also suggest that certain threshold of growth is essential for the host country to attain the diffusion of technology through FDI in the case of developing economics. One of the key findings of this study was significant positive impact of FDI on the economic development.

Gonzalez (1988), have done the work on making analysis of benefit of FDI. He says that FDI increase the social strength of the people if there is no twist. The study supports import substitution policies because such policy creates job opportunities and improves the living standard of the people. But this study doesn't reveal the effects of welfare and FDI pattern of trade in the economy. Finally, Srinivasan (1983) ended up by concluding that FDI increases the social strength of the people if there is no disturbance in the labor market. In addition to, Gonzalez (1988) views that FDI effects national income through rural and urban people. FDI increases the national income and enhances the standard of the living of the people in Harris-Tadoro economy without pattern of the international trade. At last, it has been concluded that greater possibility exists; FDI increases the national income if the absolute elasticity value of rural wage is greater and the traffic is stumpy.

Fry (1993), the finding extracted from macroeconomic analysis explains that unlike the cases of Latin American, FDI is the key factor for increasing the productivity stock. Furthermore, change in investment and domestic saving will tend to expend together with FDI inflows.

Malik (1996), examined that, the key reasons behind the debt crises are the capital lack in majority of the developing countries (LDCs). As a result, LDCs are facing dis-equilibrium in growth deficiencies and balance of payments. Moreover, FDI boost the growth of the economy but growth does not attract FDI. This argument experiences that those countries which attract more FDI have brighter growth. Trade policy and political instability are considered to be the key determinant of FDI

Stephen (1997), the findings of the study concluded that Gross GDP, imports, exports, infrastructure and political instability are the key factors in order to invest in multinational companies (MNC's) abroad.

Guisinger (1997), analysis the impact of FDI liberalization on Pakistan economy. He reviewed significant results obtained from World Bank, NBER, OECD and trade liberalization which explains positive impact with economic growth. He concluded in his study that Pakistan economy experiences less costs and the economy significantly benefits from consistently inflow of investment liberalization.

Khan (2007), studies the trend and policies of FDI in the framework of Pakistan. He is interested to find the reasons behind why Pakistan is not successful in attracting more FDI inflows despite in trade openness of its economy. The key reasons behind the low level of FDI inflows are political instability of 1990s, unstable law and order situation of Karachi. Furthermore, unpleasant business climate, lack of infrastructure and conflicting policies between investors and government are responsible to discourage the investors to invest in Pakistan. Illiterate, unskilled labor and other distortions are also the responsible for low economic growth which results in closing the doors for fruitful and productive investment. In addition to that he forced to uplift the investment climate in the country,

which characterized by four "Cs"e.g Cost, Convenience, Capability and Concessions. As mentioned by Khan, Pakistan has focusing so far just on one (01) "C" which is Concession and left the remaining other three(03) "Cs". Pakistan government should specially focus to the Cost, Convenience and Capability features in order to get maximum FDI in the country.

Shabbir H.Kazmi (1988), has study the declining trend of FDI in Pakistan. In this study he found that Pakistan has progressive track record in term of economic growth in early 60's and still it has potential to recover the same economic growth. Pakistan is facing unbalanced economic growth. Government of Pakistan needs to come out with wide-range of pre-investment policies. However, poor democratic structure and pressure groups are exploiting the system. Post economic sanctions reveal that in order to boost the economic growth again the government should rehabilitate the economy by magnetize more FDI.

Aslam (1987), examined that public Foreign Capital Investment has not affected the domestic savings where as private Foreign Capital Investment covered the saving-investment gap. FDI is running the blood for growth of economy and it acts as an engine for economic development. Therefore, Pakistan needs strong conductive environment as compared to other countries in order to attract more inflow of FDI.

Nasir S.M et.al (2005), stated in his book named "Economics of Pakistan" that there is a positive relationship between the population and development of economic activities of Pakistan. He also found that higher growth rate of population is the key indicator for economic development.

Arshad (2012), studied the long-run relationship between FDI, GDP, and Trade Policy for Pakistan. The data span for the study was from 1965-2005. VAR was used for the analysis of the data. The results indicated that both export and import is statistically significant and it affects GDP in short-run while; FDI has no effect on GDP in the long-run.

Falki (2009), studied the impact of FDI on Economic Development of Pakistan. In order to achieve the objective the data has been taken from State Bank of Pakistan. The sample size of the data is from 1980-2006 and variables included in the study are labor force, domestic saving and foreign invested capital. Endogenous Growth Theory has been used for the regression analysis, and concluded that FDI has a negative effect on GDP and FDI in the country.

Shabbir and Mahmood (1992), studied the relationship between FDI and economic growth for Pakistan economy. The data for the study is taken as time series annually data for the period of 1950 -1960 to 1987-1988. The results of the studies concluded that FDI (loans) has significant positive impact on the Real GNP and, FDI is assumed together as a proxy of economic growth.

Ahmed, et.al (2003), was interested to study the relationship between FDI and exports by applying Granger Causality procedure for the period of 1972-2001 for Pakistan economy. The results concluded that effect of FDI with respect to domestic output has a significant impact.

Atique et al. (2004), explained the effect of FDI on GDP for Pakistan from 1970 to 2001. The result concluded that FDI impact is larger under export promotion regime as compared to import substitution regime.

Aurangzeb et.al (2012), analyzed the relationship between Foreign Capital Inflows and economic growth. He considered four variables in his study which are FDI, GDP, External debt and Remittance. Multiple regression analysis technique is used. Time series secondary were taken from 1981-2001. The results revealed that three variables e.g FDI, external debt and remittance have positive relationship with economic growth.

Aitkin and Harrison (1999), studied the effect of FDI on Venezuelan plants by using panel data. The results concluded that Foreign Equity Participation is positively related to plant-productivity. However, foreign investment negatively affects the productivity of

domestic owned plants. Indeed the profits gains from inflow of foreign investment are completely confined by joint ventures.

Nair-Reichert and Weinhold (2001), used Mixed Fixed and Random (MFR) panel data estimation method to check the relationship between FDI and economic growth. He found that relationship between economic growth and investment is highly heterogeneous in developing countries while knowing that heterogeneity may create ambitious results.

Louzi et.al (2001), was interested to study the effect of FDI on Jordanian economy. Sample size for this study is from 1990 to 2009. Co-integration and ECMs were used. The result indicates that FDI has no relationship with Jordan economy but domestic investment and trade liberalization has statistically positive effect on growth rate of GDP.

Zhang (2001), collected data on Latin America and 11 East countries to investigate the relationship between FDI and economic growth. The result of the study concluded that FDI will lead to promote economic growth in those countries that have implemented liberalized policies regarding FDI as well as improved human capital.

Zhang (2004), attempts to find the effects of FDI on China income growth and market oriented transition. The study uses both cross-sectional and panel data for the period 1984-1998 and growth model. The results of the study suggested that FDI facilitate Chinas transition and expends income growth.

Choe (2003), panel data is used from the period 1975-2013 by using VAR model. The results indicated that there strong relationship exist between FDI and economic growth. Furthermore, the study also concluded that there is uni-directionality from economic growth to domestic saving.

Mencinger (2003) used a sample of 08 EU countries in the post-transition period to find the relationship between FDI and growth. The principle contribution of FDI to expend

growth is due to the spill-over effect. The study further explains the negative relationship between FDI and growth.

Omran and Bolbol (2003), performed study on Arab countries and variables incorporated in the study are financial development, FDI and economic growth. The findings reveal that FDI have favorable effect on the economic growth of Arab countries if there is relation with financial variables at a given threshold level of growth. The study also explains that the policies boost FDI will encourage investors to invest in these countries, which finally results in financial development and economic growth. In addition to, this the study also explains, that liberal commercial policies and domestic financial reforms result in encouraging FDI and same investment could cause a better investment opportunities for all the investors.

Hermes et.al (2003), concluded that strong financial sector plays a key role in the economic growth. Both development and financial sector is the pre-condition to boost the economic growth positively. The study was undertaken over 67 countries in which 37 countries have strong financial system.

Li and Xiaming (2005), the main aim of the study is to find the effect on FDI on economic growth. He used panel data from 84 countries from the year 1970-1995. By using simple and simultaneous equation techniques, it is clearly shown that there is significantly endogenous relationship between FDI and economic growth. FDI contributes positive impact on economic growth by: human resource capital and efficiently use of technology.

Chowdhury and Mavrotas (2006), examined three nations' data for the study – Chile, Malaysia and Thailand under the time period of 1969-2000. Innovative methodology is used for testing the causality between FDI and growth. The study concluded that there is uni-directional causality in Chile while, directionality causality between GDP and FDI in case of Malaysia and Thailand.

Pournarakis and Axarloglou (2007) collected the data from 1974-1994 to find the actual impact of FDI on economic growth. The study explains that its impact varies from sector to sector. However, the results indicated the key importance of the specific industries characteristics in evaluating the effects of inflow of FDI on domestic communities.

Yousaf et.al (2008), considered the financial impact of FDI in Pakistan. He examined the impact of FDI on export/import on Pakistan economy. Time span for the data was from 1973 to 2002. Co-integration and error correction technique was used and it concludes that FDI have negative impact with export in short run but has positive impact with export in long-run.

Mum et.al (2008), analyzed the annual data from the period of 1970 to 2005 from the Malaysian economy and employed a simple OLS regression method to check the relationship between the two FDI and economic growth. The result indicates that there is strong positive relationship between the two variables included in the study.

Wang and Wong (2009) collected data from 12 Asian countries from 1987-1997 to examine that whether FDI has an influence on economic growth. Even though endogenous growth theory projects a positive relationship between economic growth and inward FDI, Wang and Wong proposed that by using total FDI might blur its effects which leads to ambiguous results. The study employed FDI in different sectors and concludes that FDI accelerates the economic growth in manufacturing sectors but not in non-manufacturing sectors.

Agarwal (2000), found in his study that, expansion of FDI in South Asian Countries (SAC) was in relationship of the exponential speculation of the domestic speculators, which provides support of relationship between GDP and FDI and hence manipulate that, GDP on FDI was adverse at the end of 1980. In the preceding years, the relationship was slightly positive in the late years of 80s and 90s.

Ang (2008), study the FDI growth nexus in Malaysia for understanding the relationship between FDI, Financial and economic growth. Time series data from 1965-2004 were used and the results show that FDI, financial development are positively correlated with economic growth in the long-run. The study also indicates that uni-directionality exists between growths to FDI in long run.

Ang (2009) studied the role of FDI and financial development in Thailand by applying time series annual data from the period 1970 to 2004. The study suggests that favorable financial systems in an economy results in getting additional benefits of FDI. Result of this study tells that financial development encourages economic growth whereas output growth in the long run impacts negatively through FDI. Data of 126 developing countries from 1985 to 2002 is analyzed in order to check the effect of FDI and portfolio investment on economic growth

Adam and Tweneboah (2009), studied the independent relationship between stock market and FDI for Ghana .Data span for the study is from years 1991 to 1996. VECMs were used in this study and concluded that FDI have positive impact on stock market and relationship between FDI and stock market of Ghana is valuable in long run for the country.

Choong and Lim (2009), scrutinize the endogenous growth model among FDI and financial growth in Malaysia from 1970-2005. The results of the study imply that FDI, investment, labor and government expenditure play a key role in domestic economic prosperity. Furthermore, the study illustrates that FDI and financial growth jointly contribute a significant effect on Malaysia economy.

Wu and Chiang (2008), were interested to find out that, if FDI support economic development process. Threshold regression technique is used for conducting the study. The results, of the study conclude that FDI plays a key and defining role in economic development. These results were obtained from analyzing 62 countries from the year 1975 to 2000. The study provides evidence that FDI depend on GDP and human capital.

Alfaro et.al (2004), similar study has been conducted to explore the link between FDI and GDP. The study also provides information that, strong financial system is more capable for exploiting the FDI. Span of the data is from 1975 to 1995 and therefore, conclude that strong financial system had larger impact of FDI in countries.

Kundan (2010), used yearly time series data from 1980-2006 for Nepal. The data is get from the International Monetary Fund to examine the relationship between FDI and economic growth. Two econometric techniques is used first one, is the Ordinary Least Squares (OLS) method and second one is the granger causality test. The statistical results of the study conclude that there is long-run relationship equilibrium between the variables and uni directionality flow from FDI to economic growth.

Shahbaz and Rahman (2010), examined a study to find the roles of Foreign Capital Inflow (FCI) and domestic financial sector development on economic growth of Pakistan. Time series data is taken from world bank and Economic survey from 1971-2008 Variability of the data is taken from World Bank and the Economic survey of Pakistan from the time period 1971-2008 and, used an ARDL model to check the long-run and short-run relationships. The result reveals that FCI has a positive relationship with economic growth.

2.2.2 Inflation and Economic Growth

Moltey (1994), studied the relationship between inflation and economic growth. He further extends the Solow growth model by allowing the possibility that inflation probably tend to reduce the rate of technological change. The results show negative relationship between inflation and economic growth.

Barro (1995), studied the relationship between, inflation and economic growth and concluded the negative relationship between them. Sample size of the study is large from years 1960 to 1990 to examine the effects of inflation on economic growth. System of

regression equation technique is used in which other variables are assumed constant to find the actual change between inflation and economic growth.

Barro and Martin (1995), the result concludes negative relationship between inflation and economic growth. The study also explains that if inflation raise by 10% per year the projected Real GDP will be decreased by 0.2% to 0.3% per years respectively.

Mubarik (2005), conducted the study to calculate the threshold level of Pakistan economy using time series annual data for the period of 1973 to 2010. From the study he concluded and suggested that above 9% threshold level of inflation is harmful for Pakistan economy. The comparable study performed by Khan and Senhadji (2001) estimated the threshold level of inflation for Pakistan. Panel data of 140 developed and developing economics for the period 1960-1998 is undertaken and recommended that 1-3 % threshold for Pakistan and 7-11% threshold for the developed economics respectively.

Munir et.al (2009), finds the unpredictable relationship between inflation and economic growth for the period of 1970 to 1975 for Malaysian economy and concludes significant relationship between inflation and economic growth.

Abbas et.al (2011), used the panel data to find relationship between FDI, inflation (CPI) and economic growth for SAARC countries. Positive relationship exists between FDI and GDP while negative between FDI and inflation. Multiple Regression models are used for the study. Sample size of the data is from year 2001 to 2010.

There are some empirical evidences that support the findings that positive relationship exists between economic growth and inflation.

Malik and Chowdhury (2001) statistically analysis also supports that positive relationship exist between two variables. To obtain the result they used the co-integration and error correction model to analyze the data for 04 south Asian countries (Pakistan, India, Sri Linka, Bangladesh), and found positive relationship between

inflation and economic growth. They concluded that moderate inflation is helpful to boost up the economic growth. Different empirical literature also exhibits the positive relationship between economic growth and inflation below threshold level of inflation.

Ghosh and Philips (1998), found that if inflation is (less than 2-3 percent) the relationship between inflation and economic growth will be positive. He also investigated the existence of threshold impact in inflation growth on Nigeria using time series annually data for the period of 1970 to 2003. The findings concluded that 06 percent level of inflation as a threshold. Inflation and economic growth has positive relationship below 06 percent threshold level of inflation. Furthermore, Wang Zhiyong (2008), concluded that economic growth is positively related with inflation with 03 quarter lag. Co-integration and ECM are used to get the results.

In the other hand, several empirical studies found that inflation and economic growth have zero relationship.

Sidrauski (1967), found that inflation has insignificant relationship with 13 growths in the long-run. Furthermore, the author testifies the neutrality of money in his model. In the addition to Bruno & Easterly (1995), studies demonstrate that there is no association between inflation and economic growth. For example Christoffersen and Doyel (1998), identified that below 13 percent threshold level of inflation no relationship between inflation and economic growth but above the level there is negative relationship between the two variables.

2.2.3 Domestic Saving and Economic Growth

Economists have known from the long time that growth rate and saving have positive related across the countries

Franco Modigliani (1970), introduced the initial empirical evidence long years ago, and proceeding research papers have proved the correlation. Latest revival in the empirical studies on the determinants of economic growth have stronger the early findings. Vast

empirical studies and literature have been conducted to find the empirical relationship between economic growth and Domestic Saving which gives different based on country, methodology & time span. The positive relationship has been generally interpreted and supported by standard growth models in which high saving leads to temporarily high growth (Solow 1956). Moreover, the evidence implies that this saving-to-growth causation is the only key factor which is responsible for the positive relationship between saving and growth across different countries. Literature reviews also support the positive relationship between saving and economic growth. First growth in saving is the prime factor that can stimulate growth through channel of investment. This argument is supported Solow model of growth.

Empirical studies by Singh (2009), noted that through Solow's growth model, we get more savings which help us in boost up economic growth. Countries need to be increased their saving by increasing income. Yearly data has been taken of Marxian economy from 1997 to 2000. Pair-wise Granger causality method has been carrying out to test the directionality among savings and economic growth. The result of the conducted study support the Solow's growth model that higher saving contributes to economic growth which means there is a causal-relationship among saving and economic growth. Secondly, economic growth encourage saving.

2.2.4 Gross Capital Formation and Economic Growth

To find the relationship between Gross Capital Formation and economic growth, Jhingan (2006) focused in his study that capital formation not only enhances the investment in capital equipment which leads to increase in production but also create job opportunities. He further explains that capital formation give kick to technical growth which leads to economics of large scale of production amplifies specialization and/or thus provides tools, machines and equipment which enhance growth of labor force. Capital formation also facilitate in market growth. He also highlights that capital formation facilitate to remove market imperfections by creating social and economic overheads capital, as a

result breaks the vicious circle of poverty from both demand and supply side. Even in case of increasing population capital formation makes the growth possible. In the least developing countries e.g in sub-Sahara Africa increase in the per capita output is directly related to increase in capital-labor ratio. There are two main problems regarding raising the capital- labor ratio: (i) Capital-labor ratio declines with increase in population due to which large net investment is needed to control the capital- labor ratio. (ii) When population is increasing quickly, it becomes difficult to have sufficient saving for the given quantity of investment, which is the main reason that Marginal Propensity to Save (MPS) is low in developing countries. The only solutions to these problems are to quickly increase the rate of capital formation.

GCF has been ban to the development and economic growth of the peripheral countries. From the previous literature, the macro economic problems are facing the developing countries such as: high foreign debt; BOP etc.

Identifying the ban of capital formation, Beddies (2010), investigated the impact of fiscal policy on economic growth of Nigerian economy by using time series yearly data from 1960-2012. The study tested the stationarity of the data through group unit root test, and found stationarity at first difference at 05% level of significance. VAR and its properties were tested. Two econometric techniques Co-integration Technique and Pairwise-Granger Causality were employed to find the long-run relationship status between the variables.

According to the study of Bakare (2011), established the actual impact of inflation on economic growth in case of Nigeria. Annually data is taken from 1960-2012. The results showed that there is no cointegration relationship between inflation and economic growth in Nigeria. Furthermore, causality relationships were also examined that exists between the two variables by applying the Pairwise-Granger causality at 02 lag periods.

According to Orji and Mba (2011), studied the relationship between Foreign Private Investments, Gross Capital Formation and growth for Pakistan by using two-stage least

square (2SLS) method for estimation of the variables. The result indicates that there is a stronger long run impact of capital formation and foreign private investment as compared to short-run impact. There is long-run equilibrium exists between the variables as well as ECM is statistically significant but the speed of adjustment is small between two models. The results of two-least square (2SLS) estimates are close to OLS estimates, resulting that estimates of OLS are unbiased and consistent. Therefore, endogeneity does not exist in the estimated model. There is no simultaneity existing among GDP growth and capital formation in estimated model. The findings also have some policy implications as discussed in the work.

Adekunle and Aderemi (2012), studied the relationship among GCF, Domestic Investment (DI) and population growth for the Pakistan economy by using secondary data taken from the central bank of Pakistan, for capital expenditure bank credit, capacity utilization and capital formation, while investment and growth rates are downloaded from world economic data base. The empirical findings show that rate of investment does not assist with growth rate of GDP per capita in Pakistan. The paper is estimated on the curve estimation regression model which indicates, that growth exists which is found to be statistically insignificant. The finding indicates the importance of government expenditure, bank credit, and capital utilization in increasing the real income of Pakistan. The results also imply, that there is statistically negative relationship between capital formation and growth rate of population. Based on the estimated curve estimation results, the rate of investment can stimulate growth in the economy slowly but, on a linear path.

2.3 Literature Comments

Finally; to sum up, the existing literature related to the subject of FDI and economic growth the study concludes that, there are various factors affecting the association between FDI and economic-growth, such as political instability, infrastructure and economic conditions which vary from one country to another. Still in the literature,

impact on economic growth is unresolved in empirical studies; some studies scrutinize a positive relationship between FDI and economic growth while some observes a negative relationship. Therefore, to study the relationship of FDI with economic growth, this study examines their empirical relationship in case of Pakistan.

CHAPTER 3

OVERVIEW OF FDI POLICY IN PAKISTAN

3.1 Introduction

This chapter provides review of the FDI policy in Pakistan from the period 1947 to 2013. It discusses the historical trends of FDI with facts, figures and graphs with reliable resources.

3.2 Overview of FDI in Pakistan

Pakistan gained independence in the year 1947. At that time period, average economic growth rate was higher as compared to world economy. In 1960s Pakistan was thought to be a role model in terms of economic development in Asia, and achieved much more success in economic growth.

Concrete, strong and friendly investment policies of countries always give opportunities to the overseas investors to invest in those countries. These policies represent the true pictures of the host countries and also guide the overseas investors in the right areas where they need it the most.

In last twenty years Pakistan received high amount of FDI inflow mainly during the decade of 1990s. Favorable environment for investment, market-oriented policy are the central reasons of receiving bulk quantity of FDI in Pakistan.

The measurement of FDI inflow in Pakistan can be briefly explained in terms of percentage and size of Gross Capital Formation (GCF). The volume of FDI inflow in Pakistan was not progressive until 1991 because of regularity framework policy. It has been observed that FDI inflow is stable in post –liberalization policy. (Table: 01) Actually the inflows of FDI have increased from $41 million in year (1970-74) to $5009 million in (1990-99). However, the speed of FDI inflows in Pakistan has remained slower as compared to developing countries in Asia.

Table 3.1: FDI Net inflow in Pakistan (1970-2000)

Period	1970-74	1975-79	1980-84	1985-89	1990-99	2000
Value ($ millions)	41	138	322	764	5009	308
% GCF	0.53	0.98	1.22	2.31	4.75	3.17

Source: *world development indicator*

In the era of 1970's, the trade policies of Pakistan have been swung between import substitution and export promotion. In early 70's Pakistan went to nationalization policy and become the biggest player in the economy. In 90's Pakistan changed the strategy and opened its economy to allow the foreign investors to invest in.

1n 1960's, the marked role of local and private sector in terms of major services of insurances, banking and commerce slowed down the foreign investment. The foreign investment was restricted in the areas of banking, commerce, and insurance in early 60's. In 70's, the overseas investors were badly effects due to nationalization policy and extreme regulation of commerce and trade from the government side.

The policy of nationalization could not achieve the target results to the government in terms of economic growth. Due to the failure of nationalized organizations the government softened the strategy and allowed the overseas investors to invest in the country. At the Initial stage the investors was only allowed in participating joint equity participation with domestic investors and targeting multiple areas like technical skills, advanced technology and marketing knowledge. In 1980's, government showed additional interest and introduced Export Promotion Zone (EPZ) to facilitate export-oriented industries. However, government encouraged Pakistani overseas to send their investments in Export Promotion Zone (EPZ) on non- repairable speculation basis.

The results of the services provided by the government diminished because of the highly strict policies and laws. The restrictions included: strict licensing, high public ownership, hug taxes imposition and price control from government of Pakistan. In the end 80's and early 90's Pakistan tried to control these barriers and give free hand to investors to invest

in, providing effortless relaxing policies for licensing and registration and for starting new business which is given to the local or domestic investors. Liberalization, of foreign exchange also encourages FDI in Pakistan because overseas investors were given space to invest in, posses and take out the foreign currency and hold certificates of foreign currency.

Special Industrial Zones (SIZs), were also another milestone in history of Pakistan. In SIZs both foreign Pakistani and foreign investors were appreciated to participate. In New investment policy agriculture and services sector was also permitted to participate in it which was not before allowed in foreign investment. This policy has boost inflow of FDI in Pakistan.

As mentioned by the investment board of Pakistan the magnitude of FDI in 2000-2001 was 485$ million and it consistently increased in next six (06) years. In 2007-2008 it reached figure of $5409 million. In 2011-2012 it starts decreasing. There are multiple of reasons behind the declined of FDI inflows. The key important reasons are the global financial crises, political instability and terrorist attacks. The inflow of FDI is shown below in Table-2

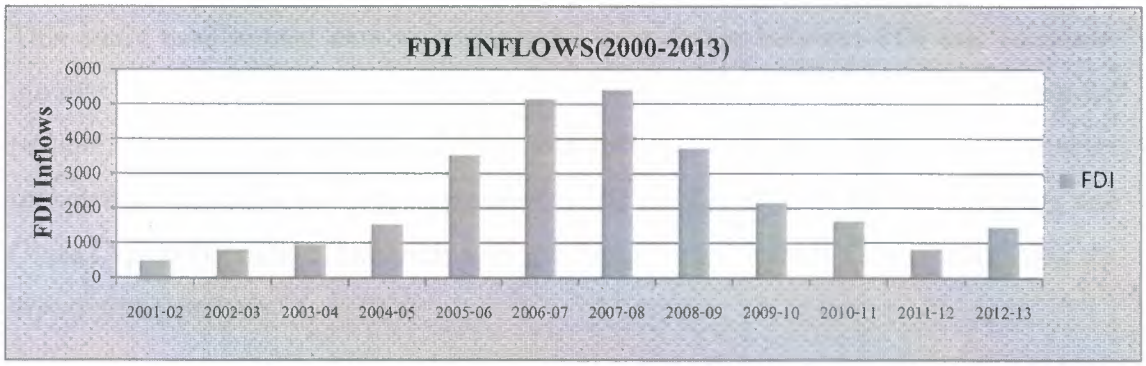
Table 3.2: Foreign Direct Investment ($millions)

Years	Green Field Investment	Privatization proceeds	Total FDI
2001-2002	357.00	128.00	485.00
2002-2003	622.00	176.00	798.00
2003-2004	750.00	199.00	949.00
2004-2005	1116.00	363.00	1524.00
2005-2006	4873.60	1540.00	5139.60
2006-2007	4873.60	133.20	5409.80
2007-2008	3719.20	-	3719.90
2008-2009	2150.80	-	2150.80

2010-2011	1634.80	-	1634.80
2011-2012	812.60	-	812.60
2012-2013	621.90	-	621.90
Total	**23960.80**	**2805.60**	**26766.40**

Source: *Board of investment Pakistan*

Fig 3.1: Graphically inflow of FDI in Pakistan (2000-2013)



In 2004, there is significant increase in the FDI inflows. In 2007-2008 the FDI reached $5.15 billion which is approximately 443% as compared to 2004. Privatization is the vital reasons behind this massive increase of FDI inflows which support the green field investment. Due to the privatization the lack of infrastructure of Pakistan dominated on green field investment which creates job opportunities in banking and telecom sector. Therefore, the capital formation improved.

In comparison to other developing countries, the contribution of FDI in Pakistan is not quite impressive. Capital inflow of FDI in Pakistan was 4% in 2007, as it was 7.5% in other developing countries. The foremost reasons behind this tiny contribution of FDI inflows were political and economic instability, unfriendly business environment, conflict between the government and foreign investors, lack of infrastructures, terrorism e.t.c.

CHAPTER 4

DATA DESCRIPTION AND METHODOLOGY

4.1 Introduction

This chapter explains data description, steps and procedures used in the studies for investigating the long-term relationship and causality between Foreign Direct Investment and Economic Growth and the estimation techniques.

This study used annual data to analyze the relationship between FDI and economic growth for the period 1975 to 2013. Data obtained from two sources, both deemed reliable, World Bank indicators (2016) and Inflation data. Com. The other variables included in the study are Trade openness, Total Debt, Inflation, Domestic Saving and Gross Capital Formation. The study uses the computer software E-views for applying the econometric analysis.

Table 4.1 Variables along with proxy and Expected Sign

Variables	Proxy	Expected Sign	Source
Dependent variable			
Economic Growth	GDP (Constant 2005 US$)		WBI
Independent variables			
Foreign Direct Investment	FDI, net inflows (Bop, current US $)	Positive (+)	WBI
Trade Openness	Trade as percentage of GDP	Positive (+)	WBI
Total Debt	Total Debt Service(% of GDP)	Negative (-)	WBI
Inflation	Consumer Price Index(CPI)	Positive (+)	Inflationdata.com
Domestic Saving	Gross Domestic Saving as percentage of GDP	Positive (+)	WBI

Gross Capital Formation	(Constant 2005 US$)	Positive (+)	WBI
Dum1 (Political Instability)	To investigate the impact of martial law (Political Instability) on economic growth of Pakistan.		
Dum2 (Political Stability)	To investigate the impact of democracy (Political Stability) on economic growth of Pakistan.		

4.3 Definition of the Selected Variables

4.3.1 Economic Growth

The GDP is one of the most important variable for measuring the performance/economic growth/health of the country economy. It is defines, as the total dollar market value of all the final goods and services produced within geographical boundary of a country over a period of one (01) year. GDP represents the volume of the economy.

4.3.2 Foreign Direct Investment

FDI is defined as the sum of the capital equity, re-investment of earning and other short-term and long-term capital as expressed in balance of payment. It provides facilities of technology, employment and innovations which is best forecaster for economic growth of country.

4.3.3 Trade Openness

It is defined as the policy of economics that either limit or magnetize trade between countries. It is one of important variable effecting economic growth. In literature it is mostly used as percentage of GDP. However, in our study we take trade openness as proxy of (Imp+Exp)/GDP. The literature suggests that expected sign is positive between economic growth and trade openness.

4.3.4 Total Debt

The sum of principle amount and interest on short and long-term debt is called total debt. High total debt is problematic for macro economy of country. Total Debt is also

important and key variable for economic growth. The proxy used for measuring total debt is Total debt service (% of GDP).

4.3.5 Inflation

The change in prices of basket of goods and services that are typically purchased by specific groups of households. Inflation is deeming as important indicator for economic growth and relationship exist between GDP & inflation in most of the literature. The proxy for the inflation is Consumer Price Index (CPI).

4.3.6 Domestic Saving

It is defined as the physical contribution of investment while calculating GDP in the measurement of country economic activity. It is the one of important factor of GDP because it measures the future productivity capacity of the Country. The proxy for variable is gross domestic saving (% of GDP).

4.3.7 Gross Capital Formation

The cost which accrued entirely on long-term assets, replacement of long-term asset (land, building, machinery, drains, plant equipment, fences & engineering work). It includes in the expenditure of GDP and thus showing that how much new stock is invested rather than consumed in the economy. The proxy for the GCF is (Constant 2005 US$).

`4.4 Model and Methodology

4.4.1 Model of the study

Broadly, in this study a model of empirical relationship between Foreign Direct Investment (FDI), Trade Openness (TO), Total Debt (TD), Inflation (INF), Domestic Saving (DS) and Gross Capital Formation (GCF) was developed to execute the long-run and short-run analysis for Pakistan's Economic Growth (EG) and to check the granger causality between FDI and Economic Growth (EG). Based on studies of (Saqib et al.,

2013) uses the below model expressing the empirical relationship between FDI and economic growth. The following model will analyze the empirically relationship implicitly stated as follows:

$$EG = f(FDI, TO, TD, INF, DS, GCF, DUM, DUM2) \dots\dots\dots\dots\dots\dots eq(4.1)$$

The equation (4.1) is transformed into linear function consequently:

$$EG_t = \beta_0 + \beta_1 FDI_t + \beta_2 TO_t + \beta_3 TD_t + \beta_4 INF_t + \beta_5 DS_t + \beta_6 GCF_t + DUM_t + DUM_{2t} + \varepsilon_t \dots\dots\dots eq\ (4.2)$$

Where,

EG_t = Economc Growth at time t

FDI_t = Foreign Direct Invetment at time t

TO_t = Trade Openenss at time t

TD_t = Total Debt at time t

INF_t = Inflation at time t

GDI_t = Domestic Investment t

GCF_t = Gross Capital Formation at time t

DUM_t = Political Instability

DUM_{2t} =Political Stability

B_0 = the slope or the constant of the model

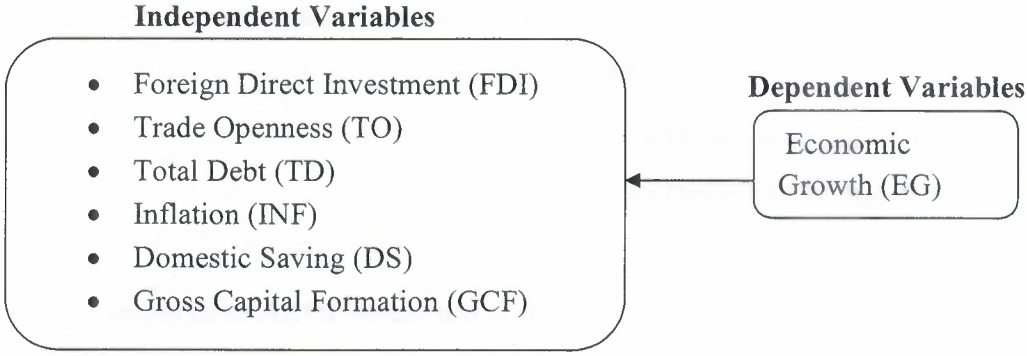
$B_1 - B_6$ = cofficient of the explanantory variables in the model

ε_t = error term

The entire variables are transformed into natural logarithm to lessen the affect of heteroscedasticity in the time series data, if there exists.

$$\ln EG_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln TO_t + \beta_3 \ln TD_t + \beta_4 \ln INF_t + \beta_5 \ln DS_t + \beta_6 \ln GCF_t + DUM_t + DUM_{2t} + \varepsilon_t \dots\dots\dots eq(4.3)$$

4.4.2 Empirical Framework



4.4.3 Unit Root Test for stationarity (ADF and PP)

Most of economic data are having unit root (i.e are not stationary) and this result as the problem of spurious regression. In order to avoid this problem the study performs a test for stationarity for the time series data using the ADF and PP tests. To optimum leg length for ADF test will be determined by Schwarz information criterian (SIC). When there is unit root in the data, the corresponding time series will be considered non-stationary. The formal ADF test procedure can be presented by the following equation.

$$\Delta X_t = \alpha_0 + \alpha_1 t + \beta X_{t-1} + \sum_{j=1}^{\rho} \delta j \Delta X_{t-1} + U_t \dots\dots\dots\dots\dots\dots eq(4.4)$$

Where ΔX_t denotes first difference of the time series data while ρ represent the lag order and t is representing time. In the ADF result, we will reject the null hypothesis that variable (x) is nonstationary ($H_0: \beta = 0$) if β is significantly negative.

The Philips-Perron (PP) test on the other hand will also be employed due to its additional advantage over the ADF test as it was adjusted to do away with the assumption that the error terms are serially independent and include serial correlation through the use of the Newey-West covariance matrix. In the PP test the order of integration in our variables are based on the test which includes both the intercept and time trend. We can therefore present the general form of the test using the following equation:

$$X_t = a_1 + b_2 X_{t-1} + a_3 \left(t + \frac{T}{2}\right) + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots eq(4.5)$$

Where a_1, a_2, a_3 are the coefficients of the regression while T is the number of observations in the model. Here we also test the null hypothesis that the series are having unit root against alternative that assumes the opposite.

If our model is found non stationary at level, they will be converted to first difference in order to achieve their stationarity and the null hypothesis will be tested at conventional 1%, 5% and 10% level of significance.

The assumptions of ARDL bound test is that all variables should be stationary at I(0) and I(1) therefore, before applying the bond test we should check the level of stationarity of the data. The reason behind is to confirm that variables are not I(2) to avoid the spurious results. If the variables are integrated of order I(2) bound test approach will however crash.

4.4.4 ARDL Model Specification

After calculating the level of integration of the variables the next step is to check the long-run and long-run dynamics relationship between the variables of interest. For this purpose we apply the bound test approach within the framework of Autoregressive Distributed lag (ARDL) model purposed by Pesaran et al. (2001) to investigate the presence of cointegration among the variables.

The methodology of bound test is chosen for multiple of reasons.

(i) ARDL avoids the problem of level of integration of same order as connected with Johansen likelihood approach (1990).

(ii) The conventional cointegration approach followed Johansen and Juselius (1990) is best for large small size data while, bound test procedure is best for estimating the small size study.

(iii) At the same time, we run the parameters of short run and long run of the model.

(iv) The variables must be assumed endogenous.

(v) This technique provides Un-biased estimates of the long run and suitable t-statistics.

To apply the bound test procedure the following ARDL will be estimated to find the co-integration relationship between Economic Growth (EG), Foreign Direct Investment (FDI), Total Debt (TD), Inflation (INF), Domestic Saving (DS) and Gross Capital Formation (GCF), we specify the following model:

$$\Delta \ln EG_t = C + a_1 \Delta \ln EG_{t-1} + a_{1\,2} \Delta \ln FDI + \alpha_{1\,3} \Delta \ln TO + \alpha_{1\,4} \Delta \ln TD + \alpha_{1\,5} \Delta \ln INF + \alpha_{1\,6} \Delta \ln DS + \alpha_{1\,7} \Delta \ln GCF + \sum_{i=1}^{P} \alpha_{1i} \Delta \ln EG_{t-1} + \sum_{i=1}^{q} \alpha_{2\,i} \ln FDI_{t-1} + \sum_{i=1}^{r} \alpha_{3\,i} \ln TO_{t-1} + \sum_{i=1}^{s} \alpha_{4i} \ln TD_{t-1} + \sum_{i=1}^{w} \alpha_{5i} \ln INF_{t-1} + \sum_{i=1}^{x} \alpha_{6i} \ln DS_{t-1} + \sum_{i=1}^{z} \alpha_{7i} \ln GCF_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{eq (4.6)}$$

The first step of ARDL approach is estimate the equation (4.6) by OLS. The second step is identifying the presence of cointegration between the variables by restricting all the estimated coefficients of the lagged variable equal to zero. Null hypothesis is that No cointegration exists ($H_0 = \alpha_{1i} = \alpha_{2i} = \alpha_{3i} = \alpha_{4i} = \alpha_{5i} = \alpha_{6i}$) while, alternative hypothesis is cointegration exists ($H_1 = \alpha_{1i} \neq \alpha_{2i} \neq \alpha_{3i} \neq \alpha_{4i} \neq \alpha_{5i} \neq \alpha_{6i}$).

4.4.5 Wald Test Coefficient Restriction

The Wald test coefficient restriction was used to restrict the variables in the model. It comes negative after calculating the equation. By performing Wald test estimation we get the F-statistics which is used the check the long-run relationship among the variables in the model. Computed F-statistics is compared with the critical bound value followed by person el. (2001). If the F-statistics is greater than the upper critical bound value the null hypothesis is rejected and therefore no cointegration exits. But if F-statistics is below the critical lower bound value then we will accept the null-hypothesis of no cointegration. However if the F-statistics lies between the upper and lower bound

values, further knowledge about integration of the variables is required else, the conclusion of the cointegration status is inconclusive.

4.4.6 Error Correction Model (ECM)

The co-integration relationship and ECM was introduced by Engle and Granger (1987). ECM mainly provides causal factors that are may influence the variables. The negative sign of ECM and statistically significant confirmed that long-run relationship can be achieved among the variables included in the model. This method is the easiest to confirm co-integration among the variables. ECM among the co-integrated variables explains change in dependent variables due to independent variable. The divergence in dependent variable shows short period of time to long run equilibrium relationship.

Now co-integration relationship exist between the variables, the next steps is estimate the equation (4.6) via ARDL technique by choosing the order of the model using Akaike Information Criteria (AIC) to achieve the long-run and short-run dynamics parameters and Error Correction from equation (4.7) is given as below:

$$\Delta \ln EG_t = C_o + \sum_{i=1}^{k} \alpha_{1i} \ln \Delta FDI_{t-1} + \sum_{i=1}^{k} \alpha_{2\,i} \ln \Delta TO_{t-1} + \sum_{i=1}^{k} \alpha_{3i} \ln \Delta TD_{t-1} + \sum_{i=1}^{k} \alpha_{4i} \ln \Delta INF_{t-1} + \sum_{i=1}^{k} \alpha_{5i} \ln \Delta DS_{t-1} + \sum_{i=1}^{k} \alpha_{6i} \ln \Delta GCF_{t-1} + \sum_{i=1}^{k} \delta_i \Delta D1_{t-1} + \sum_{i=1}^{k} \gamma_i \Delta D2_{t-1} + ECM_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots \text{eq (4.7)}$$

4.4.7 Sensitivity Analysis

Diagnostic results, Ramsey's RESET, Normality (Jaurque-Bera test), Breusch-Godfrey Serial correlation LM TEST, ARCH TEST, Breusch-Godfrey Heterosedacity TEST are performed under the sensitivity analysis to confirmed the validity of the data used for the variables in the model.

4.4.8 Stability Test

Brown et al. (1975) recommended two tests for the constancy of parameter. These tests are based on recursive residuals, well known as cumulative sum of recursive residuals

(CUSUM) and cumulative sum of square residuals (CUSUMQ) tests. Figure plotted of recursive residuals explains reliable picture of the analysis of parameter deviations as well as in decision making. Both CUSUM and CUSUMQ are also used to check a null-hypothesis of parameter constancy over the sample. CUSUM test depends on CUSUMQ. Figure of the CUSUM test, both 05 percent critical lines and cumulative sum are plotted. If the cumulative sum crosses the 05 % critical lines, the parameter are not to be stable. The second is to check the consistency of parameter CUSUMSQ test, which is based on cumulative sum of squared recursive residuals. Squared residuals are plotted against critical lines and time. Similarly; like CUSUM tests, the statistically significance of the deviation from the mean value is verified by the parallel critical lines about the mean value. If the critical passes/cross the critical bonds, this is indication/conformity of the instability of the regression parameters.

4.4.9 Granger Causality Test

The test for Granger causality as argued by Granger (1969) implied that a time series variables is said to be ''Granger cause'' If and only if X cause Y to historical values of Y. Uni-directionality and bi-directionality can be differentiated by using granger causality. It is said to un-directional X to Y if X granger cause Y but Y does not granger X ($X \rightarrow Y$) while, bi-directionality exits X to Y if X granger cause Y and Y granger cause X($X \leftrightarrow Y$). If both variables do not cause each other then no-directionality exist between them and both are independent from each other.

System of equations is shown below:

$$x_t = \alpha_o + \sum_{i=1}^{n} \alpha_i y_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots \text{eq (4.8)}$$

$$H_0: \alpha_{i=0} \text{ for } i = 1, \ldots\ldots n$$

$$H_1: \alpha_{i\neq 0} \text{ for atleast one } i$$

$$y_t = \alpha_o + \sum_{i=1}^{n} \beta_i x_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots \text{eq (4.9)}$$

$$H_0: \beta_{i=0} \text{ for } i = 1, \ldots\ldots n$$

$H_1: \beta_{i\neq 0}$ for atleast one i

Where α_0 is the intercept, μ_t is the white noise error terms, and n is the maximum lag lenth used in time series. The optimal leg length criteria length to be introduced in the causality test is based on the Akaike Information Criterion (AIC).

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Introduction

In the previous chapter, two econometric models were identified; first of which was ARDL which examines the long-run and short-run dynamics relationship between Foreign Direct Investment and Economic growth and other variables included in the study. This was the latent approach of cointegration proposed by Pesaran et al, (2001) that is not consistent but efficient in the sample case. Secondly the causality testing procedure by Granger (1969) within the Pairwise causality testing procedure was suggested for the estimation process.

This chapter therefore presents the results when the aforementioned econometric techniques were used to examine the long-run and short-run relationship between FDI, TO, TD, INF, DS, GCF and Economic Growth (EG) in Pakistan. The chapter is classified into seven sections. The first two sections provide the descriptive statistics and results of unit roots test respectively. The result of Bound test of cointegration will be presents in third sections. The four sections provide the findings of the pair-wise granger causality test and hypothesis testing. The six sections provide the diagnostic tests for the estimated model and the last sections present the Results discussions.

5.1 Descriptive Statistic

In descriptive statistics, the total number of observations for each variable is thirty nine and the study consists of annual time series data from 1975 to 2013. The variables were expressed in logarithmic to warrant interpretation as elasticities. The descriptive statistics of the variables included in the study are shown in Table 4.1 and affirm that the average lnGDP is 24.89 with standard deviation of 0.54. The average of the lnFDI is 19.55 with standard deviation of 1.62. lnTO has an average of 3.53 on with standard deviation 0.11. The average lnTD is 1.23 with standard deviation of 0.39. lnINF is 4.90

on an average with standard deviation 0.41. The mean of the lnDS is 2.37 with standard deviation of 0.36. lnGCF is 23.35 on an average with standard deviation of 0.39. Skewness measures symmetry or more specifically, the lack of symmetry. Therefore, based on the result obtained below, all the variables are right skewed except lnINF.

Table 5.1: Descriptive Results

	LnEG	lnFDI	lnTO	lnTD	lnINF	lnDS	lnGCF
Mean	24.89	19.55	3.53	1.23	4.90	2.37	23.35
Median	24.96	19.66	3.55	1.31	4.99	2.40	23.51
Maximum	25.69	22.42	3.83	1.89	5.45	2.86	23.92
Minimum	23.87	15.92	3.34	0.27	3.98	1.54	22.45
Std. Dev.	0.54	1.62	0.11	0.39	0.41	0.36	0.39
Skewness	-0.30	-0.22	0.47	-0.57	-0.67	-0.26	-0.63
Kurtosis	1.95	2.43	3.46	2.60	2.50	1.99	2.36
Jaurque-Bera	2.36	0.84	1.81	2.40	3.35	2.09	3.30
Probability	0.30	0.65	0.40	0.29	0.18	0.35	0.19
Observations	39	39	39	39	39	39	39

Source: Author computation

Kurtosis measure whether the data is peaked or flat as compared to a normal distribution. The kurtosis statistics of the variables shows that lnTO, lnTD, lnINF are leptokurtic (higher peak or long-tailed) while remaining variables are platykurtic (short-tailed or fat). These measurements of skewness and kurtosis combined to determine whether the variables follow a normal distribution. We can use Jaurque-Bera (JB) test for normality imply that residuals are normally disturbed. As all the variables Jaurque-Bera (Probability value) is greater than 0.05. Therefore, it is stated that the all the variables included the model are normally distrusted.

5.2 Unit Root Tests

Table 5.2 reported the result of unit root test for the variables under study. Results of Augmented Dickey-Fuller (ADF) unit root test suggest that lnEG, lnFDI, lnTO, lnDS, lnTD, lnGCF are non-stationary at level but become stationary at first difference; while

lnINF is stationary at level. To summarize, all the variables are integrated at order I(1), except lnINF which is stationarity at level I(0).

To confirm test results, Phillips Perron (PP) test for unit root was conducted. The estimated results are in line with those obtained from ADF.

Table 5.2: Results of ADF and PP for Unit root

Variables	Level		First Difference	
	Constant	Constant & Trend	Constant	Constant & Trend
LnEG	-2.5997 (1)	-1.5156 (1)	-3.8867** (0)	-4.7709** (0)
LnFDI	1.389 (0)	-3.354 (1)	-4.2775** (4)	-3.7637** (8)
LnTO	-2.3818 (0)	-3.0968 (0)	-6.2855** (0)	-6.1936** (0)
LnTD	-2.071 (0)	-2.331 (0)	-7.389** (0)	-7.305** (0)
LnINF	**-3.6582*** (2)**	**-4.7190*** (4)**	**-1.799 (0)**	**-2.662 (0)**
LnDS	2.527 (0)	1.918 (0)	-7.201** (0)	-7.228** (0)
LnGCF	-3.1073 (0)	-1.6010 (0)	-4.805** (0)	-5.1877** (0)

Results of PP for unit root

Variables	Level		First Difference	
	Constant	Constant & Trend	Constant	Constant & Trend
LnEG	-3.170 (1)	-1.103 (1)	-3.900** (2)	-4.743** (1)
LnFDI	-1.390 (2)	-2.239 (0)	-5.821** (1)	-6.021** (1)
LnTO	-2.381 (0)	-3.096 (0)	-7.365** (8)	-6.851** (7)
LnTD	-2.010 (3)	-2.180 (2)	-7.421** (1)	-7.305** (0)
LnINF	**-5.4547*** (1)**	**-4.3255*** (9)**	**-1.9644 (1)**	**-1.9131 (4)**
LnDS	-2.547 (1)	-1.936 (2)	-7.543** (3)	-7.648** (7)
LnGCF	-2.9407 (1)	-1.6010 (0)	-4.799** (1)	-5.185** (2)

***Note**: *, ** and *** indicates stationary at 1% and 5% level of significance respectively*

***Source**: Extract from estimation output using E-views 9*

The above table indicates that all the variables are integrated of I(1) except lnINF which is I(0). Having mixture of order of integration lent credence for the usage of ARDL approach for test for cointegration.

5.3 Cointegration Test Results

In the absence of including variable of the higher order I(2) of the variables used in the equation them to examine whether there exists a long run relationship among the variables in the model using OLS technique and then conduct Wald test in Eviews 09. Computed Walt-statistics (F-statistics) = 8.143978 is greater than the critical upper bond value 3.99 at 01 percent level. Therefore, the null hypothesis of no-cointegration is rejected.

Table 5.3: F-statistics for testing the existence of Long-run Cointegration

Country	F-statistics	Lag length	Significance Level	Bound Critical Values	
Pakistan				I(0)	I(1)
	8.143978	2	1%	2.88	3.99
			5%	2.27	3.28
			10%	1.99	2.94

Note: *Critical values are obtained from persaran. (2001)*

Source*: extract from estimation output using Eviews 09*

5.4 Long Run Results

Once we found the long-run cointegration relationship among the variables of our study, equation (4.6) was calculated using the following ARDL (1, 1, 2, 2, 1, 2, 0) specification. The results obtained by normalizing real GDP (lnGDP) in the long run are discuss in Table 5.4

Table 5.4: Long Run Estimation Results

Variables	Coefficient	Standard error	T-ratios	T-probability
C	46.515748	13.346173	3.485325	0.0025
LnFDI	0.181730	0.077942	2.331622**	0.0309
LnTO	0.389332	0.399145	0.975415	0.3416
LnTD	-0.156460	0.059871	-2.613299**	0.0171
LnINF	1.817235	0.463456	3.921054**	0.0009

LnDS	0.113687	0.077279	1.471117	0.1576
LnGCF	1.504438	0.738197	-2.037991**	0.0557
Political Instability (DUM1)	0.345482	0.159359	2.167946**	0.0431
Political Stability (DUM2)	0.239682	0.127844	1.874809	0.0763
R^2=0.999756 Adjusted R^2=0.999538 Schwarz Bayesian Criterion=-5.118792 Akaike Info. Criterion=-5.902481 F-stat=4585.788 Prob. (F-statistics)=0.000 DW-statistic=2.157644 SER=0.010852 RSS=0.002237				

Note: **** (**) indicates 10% (5%) significant level.*

Source*: extract from estimation output using Eviews 09*

The estimated coefficient of the long-run relationship shows that lnFDI has positive long-run impact on economic growth in Pakistan under the study review. This signifies that an increase in lnFDI will lead to increase in economic growth of Pakistan. Increase in 1% lnFDI leads increases 0.181730 % increase in economic growth. Interestingly, t-statistics shows the variable is significant at 5 percent level of significance as the probability value is less than 0.05 (p-value < 0.05). From the statistically results, it is confidently conclude that lnFDI has positive and significant impact on economic growth of Pakistan.. The result corroborated the findings of Chuhday et al (2010).

Considering the impact of Trade Openness (lnTO) as percentage of GDP, it has the positive impact on economic growth as expected. However, its contribution is minimal for the period under study. This implies that as lnTO increases, economic growth follows suit. The decision is based on the probability value of the lnTO which is greater than 0.05 (p-value > 0.05). The estimated coefficient 0.3416 indicates long-run lnTO elasticity for economic growth is inelastic. The result is consistent with Maku (2013) & Nduka (2013).

Similarly, the impact of Total Debt (lnTD) on economic growth is significant at 5% t-probability value and has the expected inverse sign. A 1 % rise in lnTD will cause 0.156460 declines in economic growth. The result is in conformity with the findings of (Amjad & khan, 2004).

However, Inflation (lnINF) seems to negate the apriori expectation. The estimated long-run model shows that inflation has some positive linkage on economic growth. This indicates that increases in inflation will lead to increase in the economic growth in case of Pakistan. More technically, if inflation increases by 1 percent, economic growth will increase by 1.817325%. T-statistics is significant at 01% level of significance as the probability value is less than 0.05 (p-value < 0.05). The result is confirmed by (Malik and Chowdhury, 2001).

Domestic Saving (lnGS) also shows positive impact on economic growth, but statistically insignificant relationship with economic growth in Pakistan under the period reviewed. Furthermore, 1 % increase in lnDS leads to 0.113687% increase in economic growth. Positive linkage between (lnDS) and economic growth is also confirmed by previous study Tang and Lean (2013).

Moreover, Gross Capital Formation (lnGCF) has positive long-run relationship with economic growth at statistically at 5% significant level. Interestingly, this indicates that 1 percent increase in lnGCF leads to 1.504438 increases in economic growth of Pakistan. The study is confirmed with previous literature Chuhday et. al. (2010).

It is common knowledge from the literature that economic growth and political stability are deeply interconnected. On the one hand, uncertainty associated with an unstable political environment may be reduced the investment and the speed of economic growth. On the other hand, poor economic performance may lead to government collapse and political unrest. However, in Pakistan, DUM (Political Instability) is a puzzling relationship with economic growth. The estimate obtained shows that dictatorship have positive impact on economic growth. The dummy variable estimate of 0.342 is perhaps

as a result of commitment to governance. During the regime of Zia-Ul-Haq, the overall macroeconomic performance increased tremendously. This is evidenced by GDP growth to about 154% with average growth rate of 6.5%, electricity production increased up to 200%. Similarly, inflation decreased from 13% to 7% and unemployment decreased by 27% .

In the time period of democracy DUM2 (Political Stability) has also positive but weak impact on economic growth. This insignificant relationship can be attributed to bitter conflict between the political parties, weak democratic institutions and structures. It was observed that GDP declined by 2% and production of electricity marginally by 8% compared to period Zia period. Inflation increased to 15% during the period of democracy, while unemployment decreased by 18%.

5.5 Short Run Results

The statistical results of the Error Correction coefficient (ECM) representation of the chosen ARDL model was obtained from equation (4.6) and accounted in table 5.7. Coefficient with Δ sign explains short-run elasticity. Results indicate that (ΔLFDI) is a key contributor to economic growth in both short and long-run periods in Pakistan. The estimated parameter of ΔLFDI is 0.02689 with P-Value of 0.0022. Therefore, it can be asserted that FDI meaningfully promotes economic growth at the chosen level of significance (0.05).

Interestingly, all our scale variables are largely in agreement with the research expectations. Foreign Direct Investment (FDI), Trade Openness (ΔLTO), Total Debt (ΔLTD), Domestic Saving (ΔLDS) and Gross Capital Formation (ΔLGCF) are positive functions of economic growth. In the same vein, Inflation (ΔLINF) show negative expected sign in short-run. All dummy variables have positive impact on economic growth in short run.

The ECM was obtained as (-0.144661) which is negative and significant at 5% level of significance in tandem with theory. The negative sign of error term means that errors in the short run converge or adjust towards long run equilibrium with the speed of 14 percent. In other words, errors are corrected in the present period and tied to long run equilibrium with 14% magnitude. The statistical value of the Durbin-Watson is 2.3434971 which indicate that no auto correlation exists between the variables. The value of R^2 is 0.764561 which suggests that 76% percent change in variation in dependent variable is due to independent variables. Adjusted R^2 is 0.553905. F-statistics value is 3.629429. Therefore, we conclude that the variables are jointly significant at 5% level and with good fit.

Table 5.5: Short Run Estimated Coefficients using ARDL Model

Variables	Coefficient	Standard error	T-ratio	T-probability
ΔLDS	0.067903	0.015351	4.423441***	0.0003
ΔLGCF	0.048263	0.050174	0.961898	0.3482
ΔLGCF(-1)	-0.105993	0.059583	-1.778903	0.0913
ΔLINF	-0.020504	0.246613	0.083142	0.9346
Δ LINF(-1)	-0.354217	0.217908	-1.625538	0.1205
Δ LTD	0.015572	0.009566	1.627940	0.1200
Δ LTO	0.028133	0.035041	0.802867	0.4320
Δ LTP(-1)	0.042932	0.036397	1.179549	0.2527
Δ LFDI	0.026289	0.007442	3.532345***	0.0022
ΔDUM1(Political Instability)	0.049978	0.012566	3.977374***	0.0008
ΔDUM2 (Political stability)	0.034673	0.014078	2.462946***	0.0235
ECM(-1)	-0.144661	0.056193	-2.574359**	0.0186

R-Squared=0.764561
Adjusted R-square=0.553905
F-stat=3.629429
SER=0.013965
RSS=0.003706
DW-statistic=2.143497
Akaike Info. Criterion=-5.397972
Schwarz Bayesian Criterion=-4.614282

Note: **** (**) indicates at 1% (5%) significance level.*

Source: *extract from estimation output using E-views 09*

5.6 Pair-wise Granger Causality Test

Once the long-run and short-run relationship among LnFDI and LEG, has been established. Now we find the Pairwise Granger-causality between LnFDI and LEG. To check whether LEG cause LFDI or LFDI cause LEG in case of Pakistan we conducted Granger causality test.

Table: 5.6 Causality between LEG and LFDI

Pair wise Granger Causality test
Sample 1975-2013
Lag: 2

Direction of Causality	F-value	P-value	Decision
LEG ⟶ LFDI	5.778	0.0072**	LEG cause LFDI
LFDI ⟶ LEG	1.987	0.1537	LFDI does not cause LEG

Note: *Selection of lag length can be chosen based on minimum AIC.*

*(**) indicates at (5%) significance level*

Source: *extract from estimation output using E-views 09*

The results reveal that there is uni-directionality relationship between LEG and LFDI in Pakistan under the study period. Based on table: 5.8, the F-statistic is 5.778 imply that it is statistically significant at 05% level of significance. As a result, the null hypothesis that LEG does not cause LFDI is rejected. On the other hand, the null hypothesis that LFDI does not "Granger cause" LEG is accepted by the low F-statistics value of 1.987. So, the Granger causality confirms uni-directionality causality running from LEG to LFDI.

The result of the Granger causality confirms that economic growth has key important impact on Foreign Direct Investment. Thus growth exerts positive impact on LFDI, via LEG as a proxy in Pakistan.

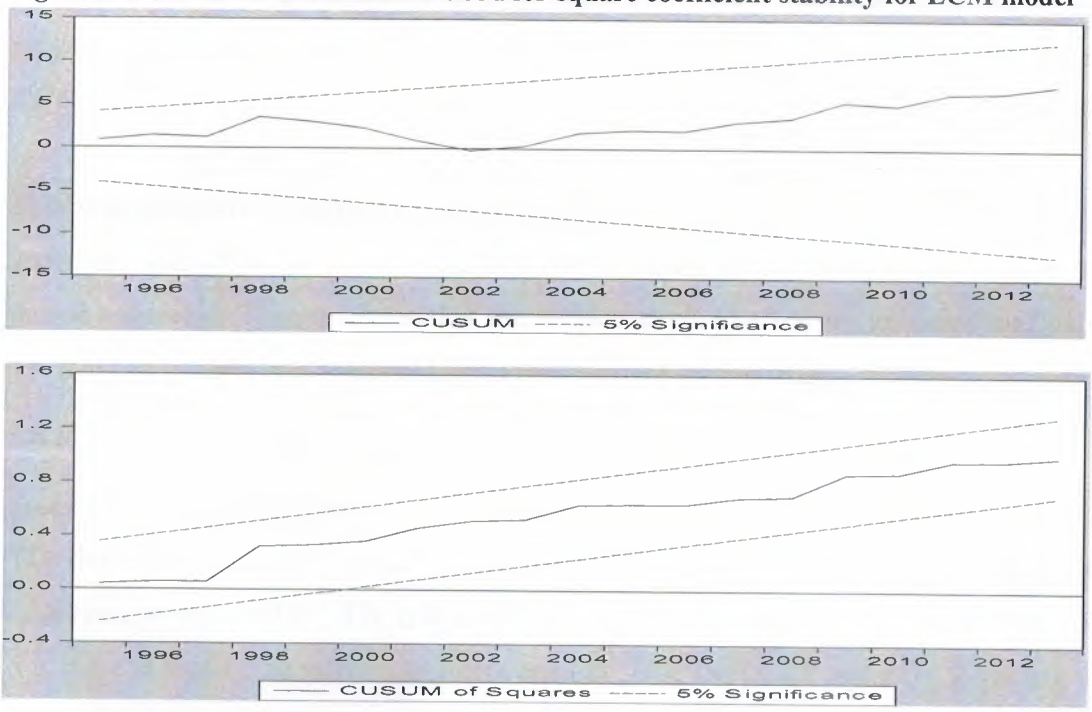
5.7 Diagnostic Tests for ARDL

Table 5.7: Diagnostic/sensitative checking Results

TEST	PROBABILITY
Ramey's RESET	0.6832
Jaurque-Bera TEST	0.6306
Breusch-Godfrey Serial correlation LM TEST	0.2391
ARCH TEST	0.6275
Breusch- Godfrey Heterosedacity TEST	0.3503

Source: *extract from estimation output using E-views 09*

Figure 5.1: Plot of CUSUM and CUSUM for square coefficient stability for ECM model



RESET Test stands for Regression Specification Error Test propounded by Ramsey in 1969. This test is meant to test whether errors in the model follow a multivariate normal distribution. Since the estimated probability (0.6832) is greater than 0.05, we conclude that the model is well specified and without significant omitted variables. Similarly, test of normality: Jaurque-Bera suggests that the model is normally distributed with mean zero given that probability 0.6306 is greater than the 0.05. Serial correlation LM test also confirms that the residuals is white noise i.e serially uncorrelated (0.2391 > 0.05). The diagnostic further reveals the validity of our estimated parameter as our model is homoscedastic (0.3503 > 0.05). As a result, we conclude that the errors converge in the long-run (No heteroscedasticity). Finally, evidences from ARCH shows that the error terms do not follow a specific pattern and size. Therefore, they are white noise given that the P value 0.6275 is greater than 0.05.

The CUSUM and CUSUMSQ tests specify that the model is consistent and constant over time. Since, the plotted recursive residuals at 5% are within the prescribed reliable range or critical lines, we conclude that the parameters are stable. The second test: CUSUMSQ confirms that our coefficients are exhibit consistency/constancy over time

Following the above results, we can confidently conclude that underlying ARDL is well specified, identified, homoscedastic with white noise error terms and stable for the period estimated. This confirms that the estimated parameters are unbiased and valid. Thus, it can be used as a reasonable policy document for Pakistan.

5.8 Hypothesis Testing:

From the entire test carried out with different diagnostic tests, it was revealed that FDI, TD, INF and GCF null hypothesis were rejected (t-value>2) i.e., there is no significant relationship between FDI, TD, INF and GCF and/ or accepted the alternative hypothesis (i.e, there is significant relationship between FDI, TO, INF, GCF and EG). Rejecting the

null hypothesis confidently concludes that FDI and its components have significant relationship with EG in Pakistan.

Also in the Granger Causality test, it is affirmed that null hypothesis (i.e., LEG does not granger cause LFDI) and or accepted the alternative hypothesis (i.e., LEG does granger cause LFDI). Rejecting the null hypothesis concludes that LEG granger cause LFDI in case of Pakistan. In addition to, null hypothesis (i.e., LFDI does not granger cause LEG) and or accepted the alternative hypothesis (i.e., LFDI does granger cause LEG). Accepting the null hypothesis concludes that LFDI does not granger cause LEG.

5.7 Results Discussions:

The result of the study evidently demonstrates that level of FDI in the country largely affect the change in output level. The reason is that the change in FDI with respect to change in economic growth is significant in short-run and long-run. Therefore, it implies that the FDI are essential for economic growth of Pakistan economy both in the long-run and short-run.

Also, Pair-wise granger causality test have been conducted which proposes that change in economic growth may contribute to magnetize more FDI in Pakistan. It means that higher the rate in economic growth, the higher will be the level of FDI in Pakistan. It is well documented in economic literature that foreign investors are devoted to invest in those countries where the growth rate is showing rising trend. A high level of economic growth is strong indication of market opportunities. Economic growth of the host country is considered to be the key factor for expansion in FDI. Thus an important conclusion of our estimation is that inflow of economic growth determines the FDI in the country. The results of our research corroborate with the findings of the Dritsaki, et al. (2004) and give new insights into the factors linked with FDI.

The positive relationships exist between economic growth and lnTO under concerned study. However, the estimate indicates that there is weak evidence for existence of the

long-run relationship between economic growth and TO. As we know that FDI is the key source of new technology liberalization of international trade and investment, therefore it has positive impact on economic growth. FDI result in somehow increase the trade rising the variety and quality of intermediate inputs, increasing the diffusion of knowledge and increasing the market size. Making use of innovative technology by the recipient country is its only benefit. Since the trade openness is low in long-run for Pakistan, policy efforts should be geared towards reducing restriction on trade. This may be in the form of reducing tariffs, tax concession to foreign firms and sound favorable policies that encourage industrial production in the host country.

Total debt (TD) variable and economic growth are inversely related. This negative relationship is driven by burden in servicing the debt collected. As a result public and private investment jointly decline due to high cost of borrowing. Eventually economic growth will decline. Another reason may be the debt which has been paid in foreign currency and worth of Pakistani rupees is weak as compared to foreign creditor's currency. Matching debt with projects, low interest loans with long-term repayment period, debts must be for capital expenditure and ensuring that debts generate the required profits to repay or service the loan collected are critical if the benefits from debts must to be realized.

The positive relationship between Inflation (INF) and economic growth suggests that a minimum threshold of inflation is important to boost up the small economy which is experiencing economic growth. Prices generally signal the investment community that there could be some positive return on investment ceteris paribus. Similarly, our result suggests the existence of "Tobin portfolio-shift effect" in Pakistan. High inflation leads to investor to invest in physical capital and cut their real balance holdings. However, for optimal and overall productivity and welfare, policy efforts are indeed need to decrease the inflation especially in the long-run economic growth.

Domestic Saving (DS) through investment process plays a vital role in economic growth and development of the country. Therefore, the results imply that more capable constructive policy should be put in place to promote domestic saving- investment in Pakistan.

Lastly, in case of Gross Capital Formation the government should ensure there mechanism between the potential investors and/or potential lenders in Pakistan. This will in turn, lead to capital formation and/or hence economic growth. Moreover, government authorities should also need to ensure that both capital and money markets in Pakistan are effectively functioning to boost up the investors' confidence as the source to kick-up capital. Eventually this will lead to capital formation and/or therefore increase economic growth in Pakistan.

CHAPTER 6

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Introduction

This chapter is divided into three main sections. The first section deals with the summary of the major findings and conclusion, while a second section discuss policy recommendations. Third section of this chapter suggests areas for further studies.

6.2 Summary of the major findings & Conclusion

The study was designed seeks to find out the relationship between FDI and economic growth as well as the impact of economic growth and other selected variables of this study are Trade Openness (TO), Total Debt (TD), Inflation (INF), Domestic Saving (DS) and Gross Capital Formation (GCF). The motivation behind this study was to give a bottom line relating to FDI, that either it contributes towards the economic growth or not. Hence the findings show the net Foreign Direct Investment helps to enhance economic growth in the host country. However the contribution of net FDI strongly depends on the prevailing economic environment. There is need to Pakistan to speed up the economic growth.

Moreover, ARDL approach to co-integration is also appropriate where the variables are mixture of I(1) & I(0), hence the model of that study fulfils this criterion also. The findings of this study reveal that there is a long-run relationship between the variables: the value of F-statistics after the Wald coefficient restriction test is higher than the upper bound of the critical values of Pesaran. (2001). The ECM also shows significant results: its value ECM is negative and less than 1. Diagnostic tests revealed an absence of serial correlation, heteroskedasticity and non normality. Stability of the model was also confirmed by CUSUM and CUSUMSQ as there is no movement outside the critical lines which indicates stability of the regression parameters. These results show that there is a long-run relationship between Foreign Direct Investment (FDI), Trade Openness (TO),

Domestic Saving (DS) and Gross Capital Formation (GCF) and that they all contribute significantly to economic growth and Pakistan should keep concentration on the ingredients included in this study for stabilizing or uplifting its economic growth and this study contributes well for policy implications in Pakistan as the CUSUM and CUSUMSQ test reveal models stability.

The main result of our research is that FDI is a major determinant of economic growth in Pakistan. This is evident by its significant positive coefficient on economic growth. Thus, we conclude that FDI has a positive impact on economic growth of Pakistan under period reviewed.

The insight from this research is important for deeper understanding of the role of FDI in economic growth process. In particular, this will serve as a relevant document to policy-makers and add stock researcher materials in this field. An in-depth treatment of the concluded resulted is necessary igniting fresh ideas towards attracting FDI and its effectiveness for the achievement of developmental goals. Though, this research has successfully made these contributions, it however leaves open possibilities to do further analysis on results and observations made as part of this study.

6.3 Policy Recommendations

The outcomes, of the study have significant policy implication to relevant economic agents. Government has a fundamental function to further improve the contribution and importance of FDI to economic growth. Given that the government has the key role of creating employment and overall welfare, promoting free inflow of foreign capital to Pakistan will significantly assist in achieving this objective. This will be more beneficial if FDI is directed towards sectors that improve welfare of the masses such as agriculture, health and education. Moreover, advance technology in production will trained more skilled labor; therefore it will enhance the productivity. Government policy in the scenario should be encouraging joint adventures in order to give opportunities to the domestic producer become one of the parts and enjoy the profit together with foreign

investors. This will benefit to local partner as they are expose to high technology. Besides, ensuring that political stability is maintained and sustained is relevant for attracting foreign capital. Fight against corruption is central in giving good perception to foreign investors. Efficient monetary management is also crucial for maintain economic stability. An optimal inflation threshold consistent with growth needs to be carefully maintained. Given that overvalued exchange rate is at variance with export, determining the best rate that encourages export is required by the monetary authorities.

6.4 Suggestions:

1. The present study can be further extended by analyzing the effect of FDI-led economic growth on income distribution and poverty reduction in Pakistan.
2. Second, future work should be address how the effect of FDI on growth of Pakistan economy varies by industrial structure, the policy regime and the development structure.

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APPENDEXIX

APPENDIX I: ARDL MODEL

Dependent Variable: LGDP
Method: ARDL
Date: 03/27/16 Time: 19:13
Sample (adjusted): 1977 2013
Included observations: 37 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): LGDS LGFCF LINF LTDS LTP LFDI
Fixed regressors: DUM DUM2 C
Number of models evalulated: 1458
Selected Model: ARDL(1, 1, 2, 2, 1, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	0.855339	0.056193	15.22140	0.0000
LGDS	0.067903	0.015351	4.423441	0.0003
LGDS(-1)	-0.051457	0.012897	-3.989717	0.0008
LGFCF	0.048263	0.050174	0.961898	0.3482
LGFCF(-1)	-0.371889	0.080015	-4.647729	0.0002
LGFCF(-2)	0.105993	0.059583	1.778903	0.0913
LINF	-0.020504	0.246613	-0.083142	0.9346
LINF(-1)	-0.070830	0.386482	-0.183267	0.8565
LINF(-2)	0.354217	0.217908	1.625538	0.1205
LTDS	0.015572	0.009566	1.627940	0.1200
LTDS(-1)	-0.038206	0.013397	-2.851797	0.0102
LTP	0.028133	0.035041	0.802867	0.4320
LTP(-1)	0.071120	0.036858	1.929574	0.0687
LTP(-2)	-0.042932	0.036397	-1.179549	0.2527
LFDI	0.026289	0.007442	3.532345	0.0022
DUM	0.049978	0.012566	3.977374	0.0008
DUM2	0.034673	0.014078	2.462946	0.0235
C	6.729032	1.245226	5.403866	0.0000

R-squared	0.999756	Mean dependent var	24.94387
Adjusted R-squared	0.999538	S.D. dependent var	0.505050
S.E. of regression	0.010852	Akaike info criterion	-5.902481
Sum squared resid	0.002237	Schwarz criterion	-5.118792
Log likelihood	127.1959	Hannan-Quinn criter.	-5.626194
F-statistic	4585.788	Durbin-Watson stat	2.457644
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

APPENDIX II: BOUND TEST TO COINTEGRATION

ARDL Bounds Test
Date: 03/27/16 Time: 19:06
Sample: 1975 2013
Included observations: 37
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	8.143978	6

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Test Equation:
Dependent Variable: D(LGDP)
Method: Least Squares
Date: 07/27/15 Time: 19:06
Sample: 1977 2013
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDS)	0.057420	0.019554	2.936503	0.0085
D(LGFCF)	0.105494	0.063552	1.659954	0.1133
D(LGFCF(-1))	-0.006411	0.068838	-0.093132	0.9268
D(LINF)	0.369887	0.285479	1.295675	0.2106
D(LINF(-1))	-0.384119	0.297749	-1.290077	0.2125
D(LTDS)	0.006805	0.012747	0.533885	0.5996
D(LTP)	0.037910	0.046032	0.823551	0.4204
D(LTP(-1))	-0.019780	0.043942	-0.450143	0.6577
DUM	0.049761	0.016175	3.076500	0.0062
DUM2	0.045029	0.017760	2.535443	0.0202
C	4.254625	1.592912	2.670974	0.0151
LGDS(-1)	0.019715	0.014564	1.353710	0.1917
LGFCF(-1)	-0.152971	0.080620	-1.897426	0.0731
LINF(-1)	0.275482	0.086934	3.168870	0.0051
LTDS(-1)	-0.014970	0.017401	-0.860304	0.4003
LTP(-1)	0.136091	0.058178	2.339212	0.0304
LFDI(-1)	0.000761	0.009714	0.078369	0.9384
LGDP(-1)	-0.101045	0.072060	-1.402243	0.1770

R-squared	0.764561	Mean dependent var	0.047630
Adjusted R-squ...	0.553905	S.D. dependent var	0.020909
S.E. of regression	0.013965	Akaike info criterion	-5.397972
Sum squared re...	0.003706	Schwarz criterion	-4.614282
Log likelihood	117.8625	Hannan-Quinn criter.	-5.121684
F-statistic	3.629429	Durbin-Watson stat	2.343497
Prob(F-statistic)	0.004071		

APPENDIX III: ARDL COINTEGRATING & LONG RUN FORM

ARDL Cointegrating And Long Run Form
Dependent Variable: LGDP
Selected Model: ARDL(1, 1, 2, 2, 1, 2, 0)
Date: 03/27/16 Time: 19:06
Sample: 1975 2013
Included observations: 37

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDS)	0.067903	0.015351	4.423441	0.0003
D(LGFCF)	0.048263	0.050174	0.961898	0.3482
D(LGFCF(-1))	-0.105993	0.059583	-1.778903	0.0913
D(LINF)	-0.020504	0.246613	-0.083142	0.9346
D(LINF(-1))	-0.354217	0.217908	-1.625538	0.1205
D(LTDS)	0.015572	0.009566	1.627940	0.1200
D(LTP)	0.028133	0.035041	0.802867	0.4320
D(LTP(-1))	0.042932	0.036397	1.179549	0.2527
D(LFDI)	0.026289	0.007442	3.532345	0.0022
D(DUM)	0.049978	0.012566	3.977374	0.0008
D(DUM2)	0.034673	0.014078	2.462946	0.0235
CointEq(-1)	-0.144661	0.056193	-2.574359	0.0186

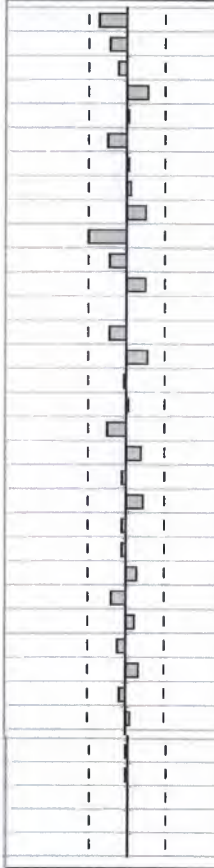
Cointeq = LGDP - (0.1137*LGDS -1.5044*LGFCF + 1.8172*LINF -0.1565 *LTDS + 0.3893*LTP + 0.1817*LFDI + 0.3455*DUM + 0.2397*DUM2 + 46.5157)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDS	0.113687	0.077279	1.471117	0.1576
LGFCF	1.504438	0.738197	-2.037991	0.0557
LINF	1.817235	0.463456	3.921054	0.0009
LTDS	-0.156460	0.059871	-2.613299	0.0171
LTP	0.389332	0.399145	0.975415	0.3416
LFDI	0.181730	0.077942	2.331622	0.0309
DUM	0.345482	0.159359	2.167946	0.0431
DUM2	0.239682	0.127844	1.874809	0.0763
C	46.515748	13.346173	3.485325	0.0025

APPENDIX IV: CORRELOGRAM OF RESIDUALS

Sample: 1975 2013
Included observations: 37
Q-statistic probabilities adjusted for 1 dynamic regressor

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.234	-0.234	2.1939	0.139
		2	-0.151	-0.217	3.1305	0.209
		3	-0.070	-0.182	3.3388	0.342
		4	0.182	0.087	4.7801	0.311
		5	0.014	0.057	4.7885	0.442
		6	-0.170	-0.120	6.1390	0.408
		7	0.017	-0.028	6.1533	0.522
		8	0.033	-0.042	6.2064	0.624
		9	0.168	0.151	7.6632	0.568
		10	-0.324	-0.235	13.276	0.209
		11	-0.154	-0.306	14.596	0.202
		12	0.161	-0.072	16.083	0.187
		13	-0.007	-0.178	16.086	0.245
		14	-0.143	-0.219	17.372	0.237
		15	0.178	0.214	19.444	0.194
		16	-0.013	-0.054	19.456	0.246
		17	0.011	-0.024	19.465	0.302
		18	-0.163	-0.175	21.493	0.255
		19	0.116	0.008	22.568	0.257
		20	-0.028	-0.159	22.636	0.307
		21	0.141	-0.037	24.435	0.272
		22	-0.034	0.001	24.545	0.319
		23	-0.037	-0.035	24.686	0.367
		24	0.088	-0.146	25.549	0.376
		25	-0.119	-0.079	27.241	0.344
		26	0.069	0.080	27.866	0.365
		27	-0.078	-0.114	28.748	0.373
		28	0.106	-0.070	30.540	0.338
		29	-0.065	-0.020	31.296	0.352
		30	0.025	-0.133	31.425	0.395
		31	-0.009	-0.083	31.443	0.444
		32	-0.012	0.032	31.482	0.493
		33	-0.000	0.041	31.482	0.543
		34	0.001	-0.048	31.482	0.592
		35	-0.002	-0.074	31.484	0.639

*Probabilities may not be valid for this equation specification.

APPENDIX V: CORRELOGRAM OF RESIDUALS SQUARED

Date: 03/27/16 Time: 19:07
Sample: 1975 2013
Included observations: 37

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	0.083	0.083	0.2764	0.599
		2	0.142	0.136	1.1126	0.573
		3	-0.088	-0.113	1.4433	0.695
		4	-0.097	-0.105	1.8586	0.762
		5	-0.174	-0.135	3.2203	0.666
		6	-0.152	-0.118	4.2974	0.636
		7	-0.033	0.010	4.3510	0.739
		8	-0.077	-0.080	4.6475	0.795
		9	0.219	0.195	7.1135	0.625
		10	0.353	0.345	13.791	0.183
		11	-0.154	-0.361	15.107	0.178
		12	0.097	0.049	15.652	0.208
		13	-0.107	0.037	16.339	0.231
		14	-0.078	-0.115	16.721	0.271
		15	-0.240	-0.117	20.515	0.153
		16	-0.169	-0.155	22.481	0.128
		17	-0.192	-0.163	25.135	0.092
		18	-0.095	-0.032	25.813	0.104
		19	0.170	-0.054	28.128	0.081
		20	0.030	-0.077	28.202	0.105
		21	-0.007	0.024	28.207	0.134
		22	0.008	-0.232	28.212	0.169
		23	-0.028	-0.023	28.291	0.205
		24	-0.048	0.042	28.543	0.238
		25	-0.050	0.031	28.845	0.270
		26	0.000	0.079	28.845	0.318
		27	0.016	0.114	28.883	0.367
		28	0.070	-0.078	29.658	0.380
		29	0.025	-0.135	29.771	0.426
		30	-0.023	-0.017	29.881	0.472
		31	0.006	-0.033	29.890	0.523
		32	0.027	0.023	30.101	0.563
		33	0.015	-0.111	30.183	0.608
		34	0.016	-0.063	30.303	0.650
		35	0.025	-0.022	30.763	0.673

*Probabilities may not be valid for this equation specification.

APPENDIX VI: BREUSCH-GODFREY SERIAL CORRELATION LM TEST

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.558160	Prob. F(2,17)	0.2391
Obs*R-squared	5.731855	Prob. Chi-Square(2)	0.0569

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 03/27/16 Time: 19:07
Sample: 1977 2013
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP(-1)	0.037115	0.058541	0.634005	0.5345
LGDS	-0.010248	0.016275	-0.629650	0.5373
LGDS(-1)	0.000888	0.013012	0.068231	0.9464
LGFCF	0.026159	0.050999	0.512933	0.6146
LGFCF(-1)	-0.007685	0.078030	-0.098482	0.9227
LGFCF(-2)	-0.001238	0.058246	-0.021249	0.9833
LINF	-0.103882	0.252143	-0.411994	0.6855
LINF(-1)	0.202099	0.400497	0.504619	0.6203
LINF(-2)	-0.150183	0.230534	-0.651457	0.5235
LTDS	0.002221	0.009411	0.235982	0.8163
LTDS(-1)	0.008344	0.013875	0.601380	0.5555
LTP	0.005698	0.034482	0.165259	0.8707
LTP(-1)	0.001495	0.035857	0.041693	0.9672
LTP(-2)	-0.008401	0.036082	-0.232825	0.8187
LFDI	-0.001089	0.007298	-0.149250	0.8831
DUM	-0.004095	0.012438	-0.329233	0.7460
DUM2	0.001910	0.013726	0.139144	0.8910
C	-1.038836	1.345793	-0.771914	0.4508
RESID(-1)	-0.431328	0.272152	-1.584883	0.1314
RESID(-2)	-0.358308	0.275337	-1.301345	0.2105

R-squared	0.154915	Mean dependent var	-1.66E-15
Adjusted R-squared	-0.789592	S.D. dependent var	0.007884
S.E. of regression	0.010546	Akaike info criterion	-5.962691
Sum squared resid	0.001891	Schwarz criterion	-5.091925
Log likelihood	130.3098	Hannan-Quinn criter.	-5.655705
F-statistic	0.164017	Durbin-Watson stat	2.008402
Prob(F-statistic)	0.999853		

APPENDIX VII: HETEROSCEDASTICITY TEST BREUSCH-PAGAN-GODFREY

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.196821	Prob. F(17,19)	0.3503
Obs*R-squared	19.13285	Prob. Chi-Square(17)	0.3210
Scaled explained SS	4.229634	Prob. Chi-Square(17)	0.9992

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/27/16 Time: 19:08
Sample: 1977 2013
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.006609	0.008713	0.758519	0.4574
LGDP(-1)	-0.000407	0.000393	-1.034730	0.3138
LGDS	4.89E-06	0.000107	0.045531	0.9642
LGDS(-1)	0.000124	9.02E-05	1.374226	0.1854
LGFCF	-0.000192	0.000351	-0.546614	0.5910
LGFCF(-1)	-0.000194	0.000560	-0.346130	0.7330
LGFCF(-2)	0.000468	0.000417	1.122730	0.2755
LINF	-0.003135	0.001726	-1.816528	0.0851
LINF(-1)	0.006316	0.002704	2.335355	0.0306
LINF(-2)	-0.002920	0.001525	-1.914829	0.0707
LTDS	5.50E-05	6.69E-05	0.821979	0.4213
LTDS(-1)	-0.000109	9.37E-05	-1.158815	0.2609
LTP	0.000388	0.000245	1.581866	0.1302
LTP(-1)	-0.000217	0.000258	-0.842523	0.4100
LTP(-2)	-0.000252	0.000255	-0.991291	0.3340
LFDI	2.27E-05	5.21E-05	0.436384	0.6675
DUM	-1.61E-05	8.79E-05	-0.183354	0.8565
DUM2	-3.95E-05	9.85E-05	-0.400634	0.6932

R-squared	0.517104	Mean dependent var	6.05E-05
Adjusted R-squared	0.085039	S.D. dependent var	7.94E-05
S.E. of regression	7.59E-05	Akaike info criterion	-15.82695
Sum squared resid	1.10E-07	Schwarz criterion	-15.04326
Log likelihood	310.7986	Hannan-Quinn criter.	-15.55067
F-statistic	1.196821	Durbin-Watson stat	2.691291
Prob(F-statistic)	0.350312		

APPENDIX VIII: HETEROSCEDASTICITY TEST ARCH

Heteroskedasticity Test: ARCH				
F-statistic	0.239809	Prob. F(1,34)		0.6275
Obs*R-squared	0.252137	Prob. Chi-Square(1)		0.6156

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/27/15 Time: 19:08
Sample (adjusted): 1978 2013
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.69E-05	1.71E-05	3.331351	0.0021
RESID^2(-1)	0.083419	0.170346	0.489703	0.6275

R-squared	0.007004	Mean dependent var	6.20E-05
Adjusted R-squared	-0.022202	S.D. dependent var	7.99E-05
S.E. of regression	8.08E-05	Akaike info criterion	-15.95490
Sum squared resid	2.22E-07	Schwarz criterion	-15.86692
Log likelihood	289.1881	Hannan-Quinn criter.	-15.92419
F-statistic	0.239809	Durbin-Watson stat	2.031418
Prob(F-statistic)	0.627489		

APPENDIX IX: RAMSEY RESET TEST

Equation: UNTITLED
Specification: LGDP LGDP(-1) LGDS LGDS(-1) LGFCF LGFCF(-1) LGFCF(-2) LINF LINF(-1) LINF(-2) LTDS LTDS(-1) LTP LTP(-1) LTP(-2) LFDI DUM DUM2 C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.478350	18	0.6382
F-statistic	0.228819	(1, 18)	0.6382

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	2.81E-05	1	2.81E-05
Restricted SSR	0.002237	19	0.000118
Unrestricted SSR	0.002209	18	0.000123

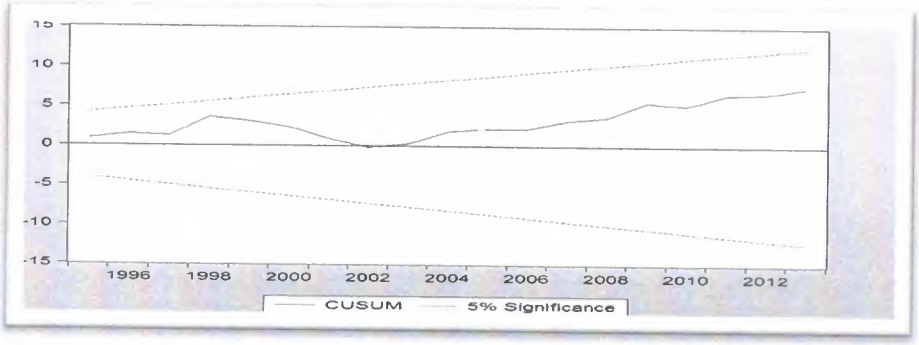
Unrestricted Test Equation:
Dependent Variable: LGDP
Method: ARDL
Date: 03/27/16 Time: 19:09
Sample: 1975 2013
Included observations: 37
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	-0.217545	2.243618	-0.096962	0.9238
LGDS	-0.012253	0.168299	-0.072803	0.9428
LGDS(-1)	0.010930	0.131085	0.083384	0.9345
LGFCF	0.010823	0.093541	0.115702	0.9092
LGFCF(-1)	0.075206	0.938224	0.080158	0.9370
LGFCF(-2)	-0.014017	0.258152	-0.054299	0.9573
LINF	0.057200	0.299631	0.190903	0.8507
LINF(-1)	-0.006719	0.416713	-0.016124	0.9873
LINF(-2)	-0.051466	0.876782	-0.058699	0.9538
LTDS	-0.001499	0.036999	-0.040502	0.9681
LTDS(-1)	0.010232	0.102181	0.100137	0.9213
LTP	-0.014782	0.096585	-0.153048	0.8801
LTP(-1)	-0.015943	0.185856	-0.085782	0.9326
LTP(-2)	0.001375	0.099801	0.013782	0.9892
LFDI	-0.004589	0.064998	-0.070608	0.9445
DUM	-0.008130	0.122152	-0.066559	0.9477
DUM2	-0.007429	0.089181	-0.083307	0.9345
C	14.02190	15.29880	0.916536	0.3715
FITTED^2	0.023844	0.049846	0.478350	0.6382

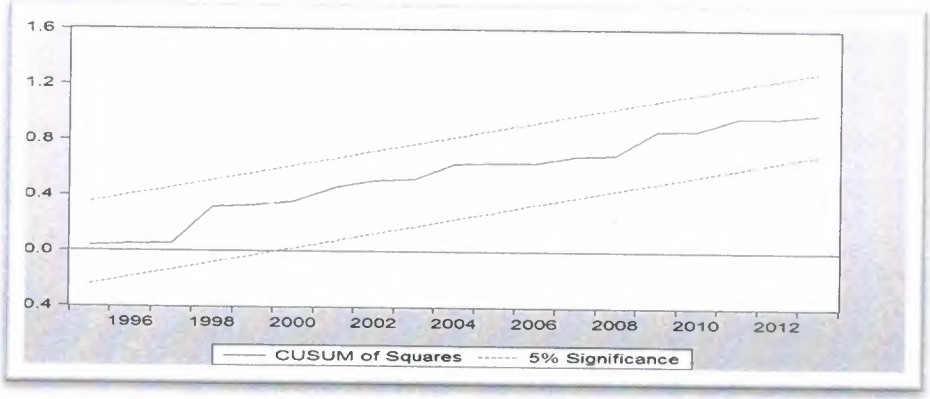
R-squared	0.999759	Mean dependent var	24.94387
Adjusted R-squared	0.999519	S.D. dependent var	0.505050
S.E. of regression	0.011079	Akaike info criterion	-5.861059
Sum squared resid	0.002209	Schwarz criterion	-5.033831
Log likelihood	127.4296	Hannan-Quinn criter.	-5.569423
F-statistic	4155.245	Durbin-Watson stat	2.414707
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

APPENDIX X: CUSUM



APPENDIX XI: CUSUM OF SQUARES



APPENDIX XI: PAIRWISE GRANGER CAUSALITY TESTS

Pairwise Granger Causality Tests
Date: 05/14/16 Time: 17:41
Sample: 1975 2013
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LGDP does not Granger Cause LFDI	37	5.77883	0.0072
LFDI does not Granger Cause LGDP		1.98705	0.1537